Disaster Risk Reduction Financing in Asia and the Pacific

Scoping Study for the Midterm Review of the Sendai Framework for Disaster Risk Reduction 2015-2030

Midterm Review

SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

UNDRR
UN Office for Disaster Risk Reduction

Acknowledgement

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For additional information, please contact: United Nations Office for Disaster Risk Reduction (UNDRR)

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Executive Summary

This scoping study reviews high-level trends in financing for disaster risk reduction (DRR) in Asia and the Pacific since the adoption of the Sendai Framework for Disaster Risk Reduction in 2015. It was prepared by the United Nations Office for Disaster Risk Reduction (UNDRR) to inform the Midterm Review of the Sendai Framework and pays specific attention to financing for pre-disaster investments that help prevent and prepare for disasters, as well as post-disaster projects that build resilience. The report maintains a multi-hazard focus, including climate change adaptation (but excluding mitigation) and outlines key progress and challenges in financing, as well as opportunities for accelerating investment in DRR through 2030.

Countries in Asia and the Pacific are particularly prone to disasters, experiencing a disproportionate level of impact relative to other regions of the world, owing to climate change, the region's prevalent seismic hazards, coastal exposure, substantial population base, and other socio-economic factors.

Levels and sources of financing

Data on DRR-related expenditures are limited due to the lack of development of approaches such as DRR budget tagging and tracking for collecting and monitoring DRR-related data in the region. In this context, estimates of the level of financing still needed for climate change adaptation alone are as high as $177 billion and $208 billion per year for South Asia and East Asia and the Pacific, respectively (UNEP, 2022). Further, the projected cost of adaptation to climate-related and biological hazards in Asia and the Pacific is $270 billion annually (UNESCAP, 2021a).

The official development assistance (ODA) in Asia and the Pacific allocated to DRR, prevention, and preparedness between 2012 and 2020 is averaging approximately $1.4 billion per year[1]. However, there is no specific data on how much of this is allocated to DRR investments. Data on government spending for multi-hazard disaster risk reduction is also limited across the region, but in the context of climate change adaptation specifically, governments spend approximately $3 billion annually (Climate Policy Initiative, 2021).[2] Financing of DRR from the private sector is growing but still only a fraction of its total potential. Globally, private sector financing directed at climate change adaptation totalled $1 billion in 2019-20, or about 2% of adaptation financing from all sources (Climate Policy Initiative, 2021).

Governance approaches to DRR financing

Governance approaches for financing DRR span three broad categories: (1) Strategy; (2) Assessment and Analysis; and (3) Review and Tracking.

[1] Average from 2012-20, based on data from the Creditor Reporting System of the Organization for Economic Cooperation and Development (OECD).

[2] For 2020-21, based on $6.5 billion in government spending globally, and 45% of global adaptation finance allocated in East Asia and the Pacific.

Disaster Risk Reduction Financing Strategies (DRRFS) is an analytical approach that improves governance by increasing the transparency and accountability of the budget. The region has a trend toward creating Disaster Risk Financing Strategies (DRFS).

DRFS focus on financial strategies for estimating loss and urgent liquidity needs under various disaster scenarios and how to finance them with the least cost. In addition, the DRFS also recommend investing in DRR priorities to mitigate and minimize the impact of future disaster shocks. However, the DRFS does not address how to analytically determine DRR investment priorities and how to finance these investments. Accordingly, these issues, which are not included in DRFS, will be analyzed in detail in DRRFS. In this regard, DRRFS complements DRFS.

DRRFS focuses on financing strategies for estimating the costs of DRR investments under various disaster scenarios and with which financial instruments these costs will be financed with the least cost. DRRFS also determines which DRR investments are financially feasible under various financial strategies. Further, DRFS is more concerned with the creation of post-disaster financial strategies, while DRRFS is concerned with the design of financing strategies that will reduce the risk of disasters.

Another point that DRRFS completes DRFS is that it considers the indirect costs (the impacts of disasters on the economy) in the DRRFS analysis. The risk layering approach currently used in DRFS implementation considers only direct costs rather than the costs to be paid by society in selecting appropriate financial instruments. In particular, considering indirect costs in the risk layering approach[3] to identify suitable financial instruments for financial gaps will yield more accurate results.

On the other hand, analytical approaches such as budget stress testing that predict the effects of possible disasters on public revenues and expenditures will inform countries in advance how spending and tax policies can be implemented during disasters. In this way, countries become financially and economically prepared for disasters. Further, in the budget stress test, tax revenues, fiscal buffers, indirect contingent liabilities and public expenditures affected by disaster scenarios can be analyzed and how these will affect DRR investments can be shown in DRRFS.

DRR-focused public spending reviews or budget tagging and tracking for DRR show how much is spent on DRR. In contrast, DRRFS shows how much financial resources should be allocate to DRR investments under various disaster scenarios. Therefore, DRRFS can be critical in building political leadership on DRR financing.

Although there is no DRR-focused public spending reviews or budget tagging and tracking for DRR investments in Asia and the Pacific, climate budget tagging and tracking is implemented by some countries. Nine countries in the region are now implementing climate budget tagging systems, including Bangladesh, Cambodia, India, Indonesia, Nepal, Pakistan, Philippines, Thailand, and Viet Nam (UNDP, 2022).

With climate change, disaster risks have increased for countries. Regulatory authorities have been working on integrating climate change risk into financial regulations. In this context, one of

[3] Risk layering refers to combining different financial instruments to protect against disasters of different frequencies and severity.

the main policy options to reduce the impact of disasters on economic and financial stability is to provide institutional investors with some financial regulatory incentives that will accelerate the mobilization of their resources for long-term DRR investments.

The global economy has been significantly affected by the COVID-19 pandemic. COVID-19 has shown us that disasters affect not only economic stability but also financial stability. The increase in disasters caused by climate change emphasizes the importance of designing policies that can reduce the effects of such disasters on the economy and financial sector. However, to design such policies, it is important first to estimate the effects of disaster scenarios on macroeconomic and financial stability and to prepare economic and financial policies within the framework of these estimations. In this context, to determine the effects of possible disasters on economic and financial stability, it would be useful to support developing countries in collecting disaster data, conducting comprehensive disaster risk assessment, and developing disaster models.

Disclosure requirements can be important in collecting disaster-related data and reducing disaster risks. Unfortunately, disclosure rules regarding disaster-related risks have not yet been developed. However, since investors want to see information about companies' activities that protect the environment and society, most large companies disclose information about it. An example is the disclosure of Environmental, Social, and Governance (ESG) criteria in the private sector. This is an increasing trend in the Asia-Pacific region from 2010 to 2020. Some companies have started to add resilient criteria to their ESG criteria. However, there is no unity of practice in this field, as there is no global application guide for ESG criteria (Bloomberg, 2021). Firms in the region are also supporting recommendations of the global *Task Force on Climate-related Risk Disclosures* (TCFD): 47% of all firms supporting the TCFD are situated in the Asia and Pacific region, primarily in Japan (TCFD, 2022).

International financial institutions and multilateral development banks are starting to review their DRR-related spending and creating strategies to guide future financing. Strategic partnerships are also emerging for DRR financing and through various formal agreements between multilateral development banks (MDBs) and national governments for delivering development results at the country level.

Instruments for DR and DRR Financing

Governments across Asia and the Pacific use various instruments to finance infrastructure, climate mitigation and adaptation, risk transfer, disaster risk reduction, and social assistance.

Domestic resource mobilization has included the use of public taxes, tariffs, land-value capture and crowdfunding. Grants and transfers represent another class of instruments, including for example, minimum conditions and performance grants and payment for ecosystem services. Debt financing by governments has included sovereign bonds and sovereign green bonds, although application to DRR or climate change adaptation has been limited to date. Equity financing is another type of instrument used by governments, including blended financing and securitization. DR financial instruments in the region include risk pools, catastrophic insurance for disasters and shock- social protection measures.

A limited number of private financial instruments are active in the region, supporting disaster risk reduction and climate adaptation, including debt and equity financing. Therefore, the overall potential remains largely untapped, including DRR incentives and charitable donations through foreign direct investment, equity financing, debt financing (i.e., private bonds, sustainable funds, exchange-traded funds), insurance protection, and insurance products and services.

A mix of financing instruments are also being deployed by international development organizations. For instance, debt financing instruments include the Asian Development Bank's (ADB) Contingent Disaster Financing (CDF), under policy-based lending, to provide 'quick and flexible' support to member countries and the World Bank's Deferred Drawdown Option for Catastrophic Risk (Cat DDO) and Development Policy Financing (DPF). Thematic bonds have also been used, such as the International Finance Corporation's support to the Philippine Green Bond delivering investment to resilience-related measures of the Philippines Energy Development Corporation. Grant funding is also being used, such as the ADB's Integrated Disaster Risk Management Fund (2013-2020) and Urban Climate Change Resilience Trust Fund (2013–2021). Insurance and re-insurance instruments are also used in the region for DRR, such as the Pacific Disaster Risk Financing and Insurance Program created through a joint initiative among international development organizations. And novel approaches are being piloted by international organizations, including forecast-based financing in countries like Bangladesh and Mongolia.

Furthermore, Islamic finance, one of the fastest growing elements of global finance with total assets now worth USD 3.06 trillion (IFSI, 2022), offers a range of potential instruments for supporting DRR, including via Islamic Banking assets, Sukuk issuances (i.e., similar to a bond), Islamic funds assets, Takafuk (insurance), as well as giving instruments such as zakat and waqf.

Recommendations to Accelerate DRR Financing in Asia and Pacific

Based on the experience gained since the Sendai Framework came into force in 2015, more than 90 recommendations proposed by relevant international organizations to accelerate DRR financing have been identified (see Chapter 7, Table 11). Based on a review of these recommendations and other high-level financing trends observed across the region, 11 key recommendations are identified to help accelerate investment in DRR across Asia and the Pacific during the second half of the Sendai Framework implementation:

Recommendations for Accelerating DRR Financing in Asia and the Pacific

For governments:

1. Develop analytical methodologies such as DRR financing strategies and budget stress testing to assess potential fiscal losses due to disasters and identify and select efficient and effective DRR investments and compare the financing cost of these investments with the cost of disaster risk financing instruments, and select the most appropriate and least costly financial instruments and mechanisms within the scope of comprehensive disaster risk assessment.
2. Undertake annual **budget expenditure reviews** for disaster risk reduction, including climate adaptation. Such reviews can be greatly facilitated by implementing an expenditure/budget tagging system using **a clear taxonomy** that organizes DRR expenditures into groups based on a hierarchy by classifying, marking, and reporting budget items.

3. **Integrate the DRR Financing Strategy and budget stress testing** into the Integrated National Financing Framework.
4. **Provide financial regulation incentives** that will reduce the rising regulatory capital cost of institutional investors due to DRR investments in order to mobilize the resources of institutional investors into long- term DRR investments.
5. Use **a mix of financing instruments within a risk-layering and ex ante approach to finance for response, damage, and build back better and risk reduction investments by considering both direct and indirect cost of disaster scenarios.**

For the private sector:

6. With the private sector bond market for risk reduction expanding, along with the sustainable funds market to a lesser extent, **institutional investors, should continue to fuel growth in the bond market**. Elaborating further on the principles already created for thematic bonds to include reference to the Sendai Framework and concept of resilience, or creation of distinct principles for DRR bonds, would help mobilize the bond market in support of risk reduction.
7. With **Asia's equity market and sovereign pension funds** comprising over $6 trillion in total assets, engagement with these sectors represents a **leverage point for financing disaster risk reduction**, including hazards exacerbated by climate change.
8. Private and cooperative & mutual insurance sectors are encouraged to continue their efforts to **close protection gaps** and importantly, to **use their insurance and investment products and services to incentivise disaster risk reduction** by clients and community stakeholders.

For international development organizations:

9. International financial institutions are encouraged to undertake **finance reviews** and **increase official development assistance** in Asia and Pacific targeting ex-ante disaster risk reduction and climate adaptation and ex-post recovery and reconstruction that build resilience.
10. International development organizations are encouraged to **continue exploring the potential of Islamic Finance instruments** to support disaster risk reduction, including climate change adaptation.
11. International development organizations are encouraged to develop and use taxonomies that distinguish between pre-disaster and post-disaster expenditure and define resilience-related expenditure between post-disaster recovery and reconstruction efforts to urgently address the limited information currently available on the cost and level of financing for disaster risk reduction in Asia and the Pacific.

Section One: Introduction to the Midterm Review

Context

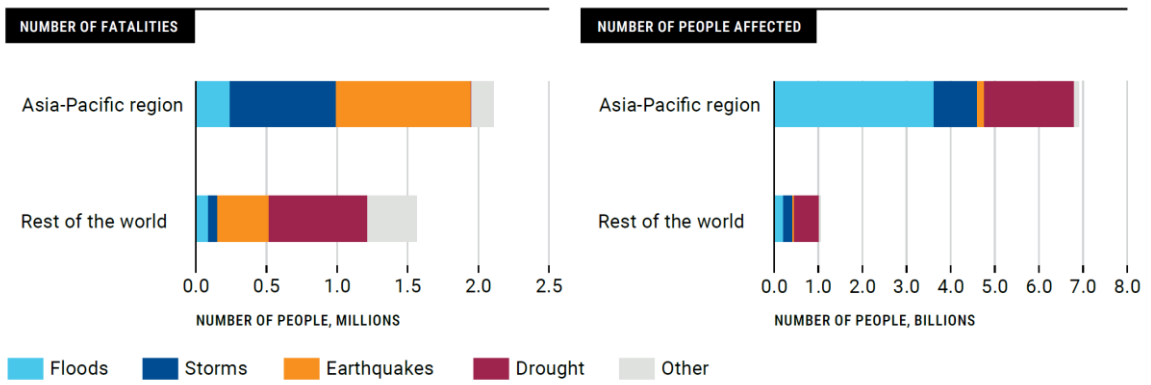
The Asia and Pacific region endures a disproportionate impact from disasters relative to the rest of the world. For example, in Asia, upwards of 1 billion people are estimated to be living in areas experiencing lethal heat waves, compared to 1.2 billion people globally, with expected damage to capital stocks from riverine flooding to be $1.2 trillion by 2050, compared to $1.6 trillion globally (McKinsey Global Institute, 2020; in ADB, 2022a). While substantial progress has been made over the past 50 years in reducing fatalities and the number of people affected by disasters, the region is still exposed and vulnerable, owing to the region's geography, its substantial population base, and various socio-economic factors (Figure 1).

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by the Member States of the United Nations in 2015. It advocates for 'the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries' by 2030. It recognizes that the State has the primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. It further recognizes that developing countries face specific disaster risk challenges that need adequate, sustainable, and timely provision of finance.

The Sendai Framework calls for countries to allocate and leverage existing resources as well as facilitate new modes of financing disaster risk reduction. Since the adoption of the Sendai Framework, several countries have developed national disaster risk reduction strategies; however, financing the implementation of these strategies remains a challenge, particularly for many developing countries and small island developing states (SIDS). **Despite these efforts, the rising economic cost of disasters** (e.g., UNDRR-GAR, 2022) **indicates that insufficient action is still being taken to reduce risk and that part of the issue is insufficient financing and disproportionate allocation for post-disaster emergency response and recover versus prevention and risk mitigation.**

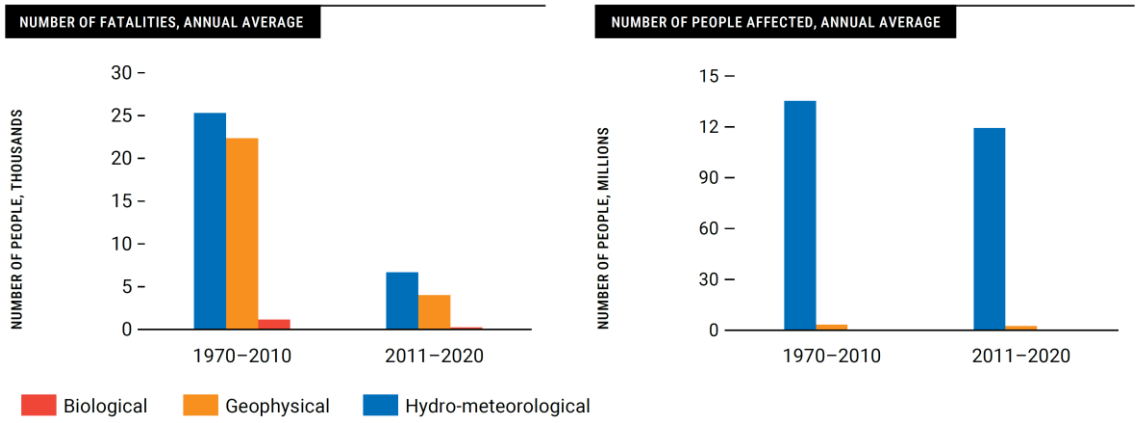
Target (f) of the Sendai Framework seeks to substantially enhance international cooperation to developing countries, with the other targets all require financial inputs to drive progress. **The mid-term review of the Sendai Framework provides an opportune time to examine how countries at national and sub-national level, communities, and the private sector in Asia and the Pacific are financing disaster risk reduction.** Given the challenges faced in financing disaster risk reduction, identifying good practice, enablers and success factors offers an opportunity for actors to replicate and draw on success.

This scoping study was prepared by the United Nations Office for Disaster Risk Reduction to inform the Mid-term Review of the Sendai Framework and takes stock of trends and innovations in how disaster risk reduction, including climate change adaptation, has been financed in Asia and the Pacific since 2015, outlining progress, challenges and opportunities for accelerating progress.



Source: Data from EM-DAT – The International Disaster Database. Available at https://www.emdat.be/ (accessed on 4 May 2021).

1a. *Number of fatalities and people affected over time by disasters from 1970- to 2020 in Asia and Pacific*



Source: Data from EM-DAT – The International Disaster Database. Available at https://www.emdat.be/ (accessed on 4 May 2021).

1b. *Number of fatalities and people affected over time by disaster in Asia and Pacific*

Figure 1. *The disproportion impact of disasters in Asia and the Pacific (source: UNESCAP, 2021a)*

A Multi-hazard View of Disaster Risk Reduction

There exist three main levers for reducing the risk from disasters, including the severity of the hazard, the degree of exposure, and the level of vulnerability (UNDRR-GAR, 2022):

- **Hazard**: a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.
- **Exposure**: the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.

- **Vulnerability**: the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

Regarding hazard types, the UNDRR and the International Science Council define eight clusters and over 300 types of hazards including meteorological & hydrological, extraterrestrial, geohazards, environmental degradation, chemical, biological, technological, and societal (see Figure 2; UNDRR and ISC, 2020). Furthermore, the origin of hazards can be natural or human-made and can be driven by human actions such as the influence of climate change on meteorological & hydrologic hazards.

For hazards that are influenced by climate change, the levers for reducing disaster risk include: (1) climate mitigation efforts which reduce carbon emissions and hence, the extent of climate change and related hazards; (2) reducing exposure to hazards exacerbated by climate change, such as by not building in flood-prone areas; and (3) reducing vulnerability to hazards exacerbated by climate change, such as by providing access to a back-up power supply in the event of damage to a central electrical grid.

In the case of a biological hazard such as a pandemic, the levers for reducing disaster risk include for example: (1) conserving forest edge zones in regions with biodiverse zoonotic animals to reduce animal-human interaction; (2) reducing exposure to a pandemic through such measures as social distancing and wearing masks; and (3) reducing vulnerability to a pandemic through production and distribution of vaccines.

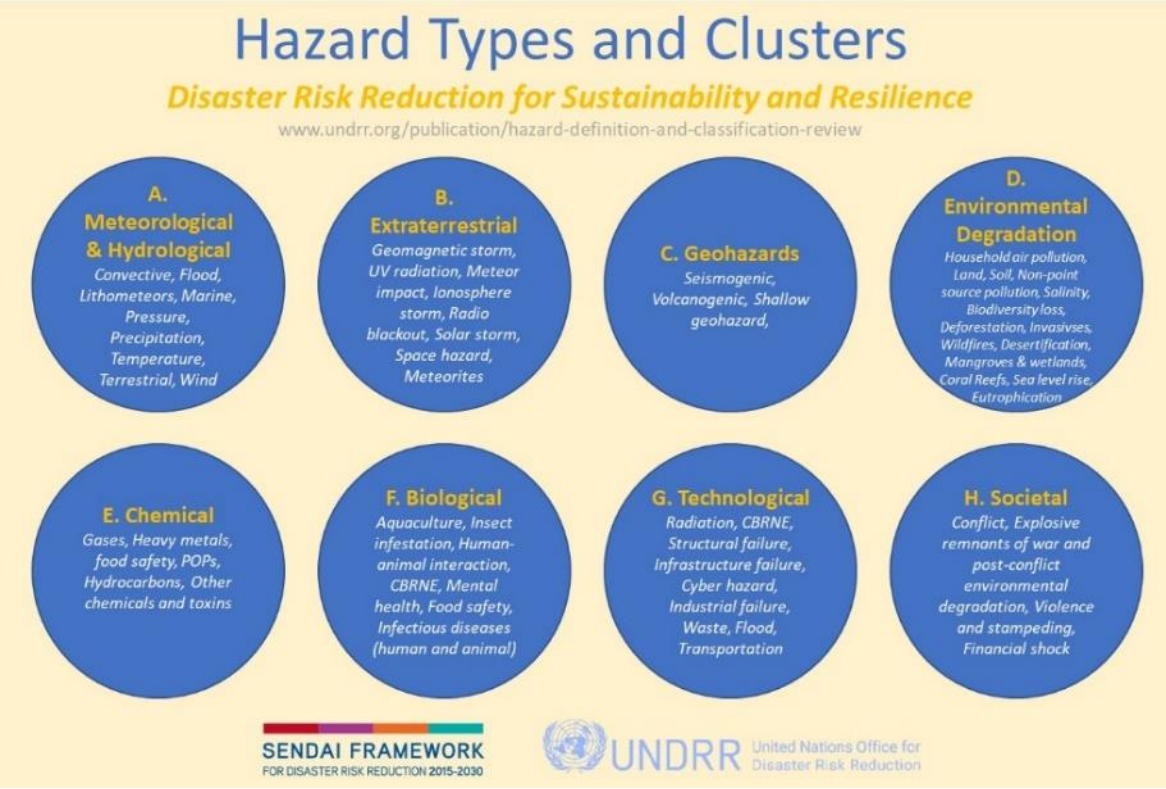


Figure 2. *Hazard types and clusters (based on UNDRR and ISC, 2020)*

Purpose and Scope

The purpose of this scoping study is to provide an analysis of efforts in Asia and Pacific region to scale-up disaster risk reduction financing since the adoption of the Sendai Framework, outlining progress, challenges, and gaps. It provides a qualitative and semi-quantitative analysis of where efforts to create financing and financing strategies for disaster risk reduction in the region stand and how efforts can be further accelerated during the second half of Sendai Framework implementation. The study further outlines opportunities to enhance financing to accelerate disaster risk reduction through to 2030, including recommendations for policy makers, donors, private sector investors and development partners to promote, support and enable integrated mechanisms for effective and inclusive disaster risk reduction financing.

The thematic scope of this study is multi-dimensional. First, the sources of financing consider **public, private, and international development** sources (i.e., the columns of Figure 3). Second, the study includes not only the array of **approaches for financing** DRR such as governance, assessment, and review, but also the full range of **conventional and Islamic financing instruments** applicable to public, private and international development sources (i.e., the rows of Figure 3). Third, the study covers financing that is targeted as "**disaster risk reduction (DRR)**" specifically, as well as financing that supports DRR-related targets within the **Sustainable Development Goals,** including "**climate change adaptation (CCA)"** (i.e., represented as the depth in Figure 3). Fourth, the study reveals why it is important to prepare DRRFS to mobilize financial resources for DRR investments. As such, this scoping study includes the substantive body of data that has emerged related to spending and financing instruments for CCA, but excludes data on climate change mitigation.

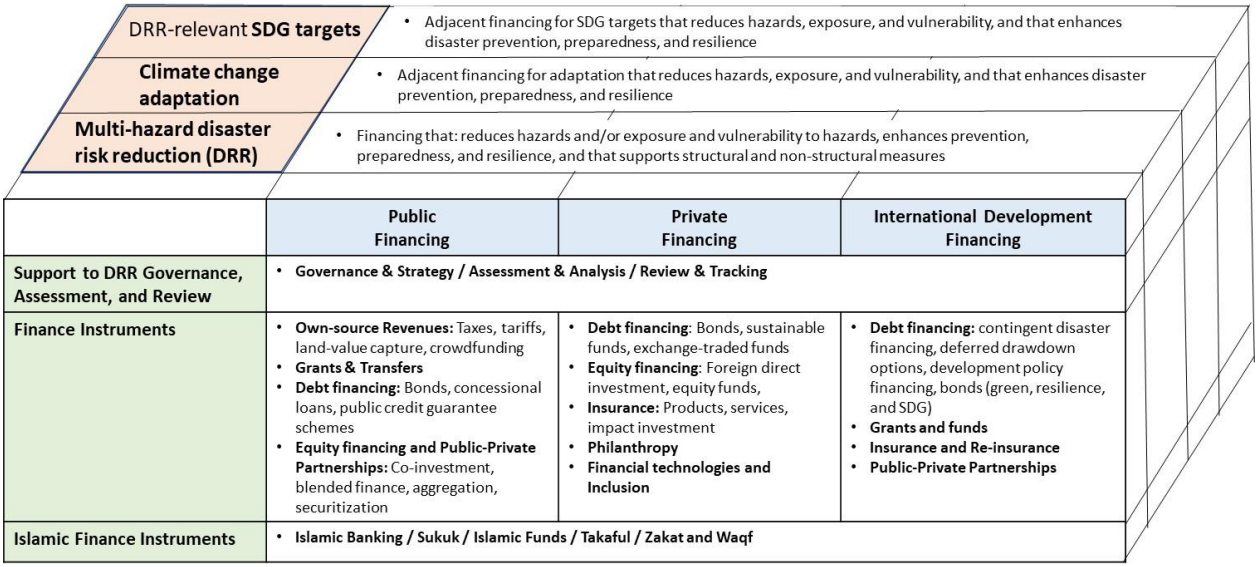


Figure 3. *Thematic scope of the UNDRR Asia and Pacific review on financing for disaster risk reduction (sources: (UNDRR (2022),see paras 3.29 – 3.31, and ADB (2020), see figs 1.1 and 4.1 and pp 26-30).*

Methods and Sources

The methods for undertaking this review included a **desk review** of peer-reviewed and grey literature[4], including Sendai Framework national status reports and submissions to the Medium-term Review, and k**ey informant interviews** with experts and officials from international financial institutions, UN agencies, think tanks, and the private sector. Key informants were identified based on results of the desk review and advice from UNDRR experts, as well as using a snowball approach during interviews to identify new informants. A **survey** was also developed and administered to engage economists in the United Nations Resident Coordinator Offices across Asia and the Pacific.

[4] Grey literature is materials and research produced by organizations outside of the traditional commercial or academic publishing and distribution channels. Common grey literature publication types include reports, working papers, government documents, white papers and evaluations.

Section Two: High-level Trends in DRR Spending Across Asia and the Pacific

This section begins with a consideration of high-level trends in financing and spending across the Asia and Pacific region for reducing disaster risks and finishes with a review of estimates for what will be needed to build resilience to disasters over the coming years and decades, including a view to the scale of the current spending gap. The scope of this section covers spending and financing needs described explicitly as DRR, as well as spending and financing needs relating to climate change adaptation and for achieving SDGs in areas that help build resilience to any of the eight DRR hazard clusters (see Figure 2).

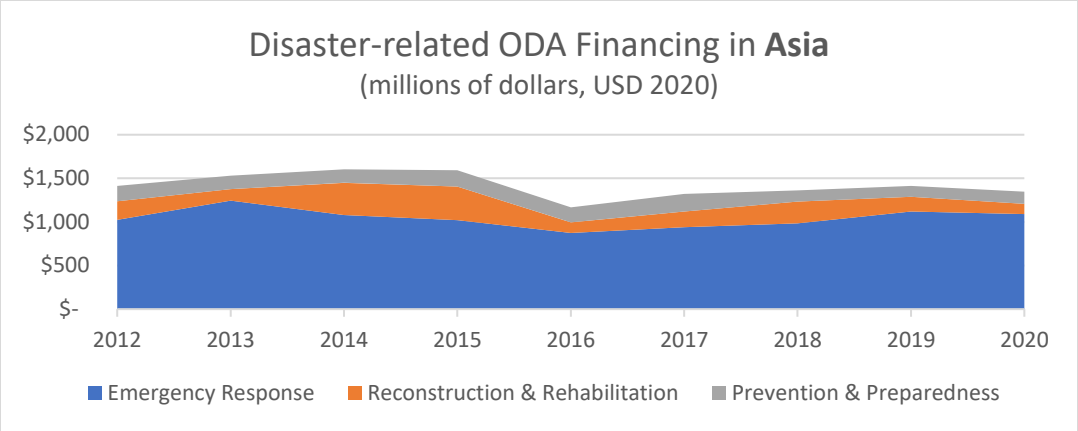
Estimates of Current DRR Financing and Spending

Governments have access to an array of sources to finance their spending to reduce risks from multiple disaster hazards, including for climate change adaptation. These sources emanate from international development organizations, private sector companies and capital markets, not-for-profit and mutual/cooperative companies and organizations, domestic resource mobilization (i.e., taxes, subsidy reform, etc.), and also from Islamic financing sources which differ from traditional sources of financing (see Section 6).

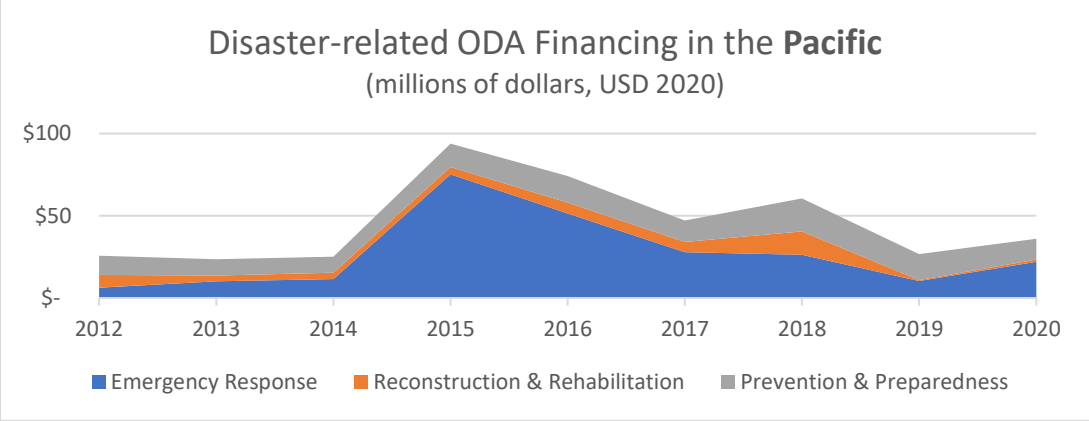
Starting with **international sources of financing**, Figure 4a and 4b shows disaster-related official development assistance (ODA) for Asia and the Pacific from 2012 through 2020 based on data from the Organization for Economic Development's Creditor Report System. The financing trend for Asian countries indicates that disaster-related ODA has remained relatively steady over the past decade at around $1.4 billion dollars per year. Available data for Pacific countries shows greater fluctuation and averaging at around $46 million per year.

These data reveal two key points. First, despite the increasing trend in disaster impacts, disaster-related ODA financing has not increased in the region. Second, the relative allocation of ODA financing to the prevention and preparedness of disasters is small, representing on average only 16% of financing allocated to emergency response.

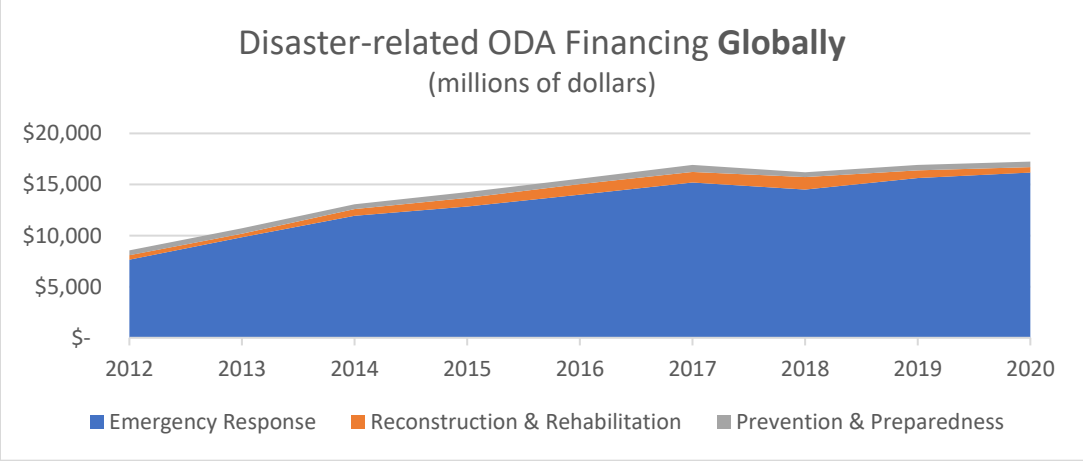
For comparison, global disaster-related financing for all developing counties is shown on Figure 4c, revealing additional insights. First, at a global level, overall disaster-related financing has increased over the past decade while financing for the Asia and Pacific region has remained relatively steady. This amplifies the point raised in the previous paragraph. Second, financing toward prevention and preparedness globally is on average only 4% of financing for emergency response, indicating higher relative level of financing for prevention and preparedness in the Asia and Pacific region. Lastly, disaster-related ODA financing for Asia and the Pacific is on average only around one-tenth of disaster-related ODA financing for all developing countries. **This seems at odds with data showing that the Asia and Pacific region experiences a disproportionate level of impact from disasters, including those exacerbated by climate change.**



4a. *Disaster-related ODA financing in Asia*



4b. *Disaster-related ODA financing in the Pacific*



4c. *Disaster-related ODA financing globally – all developing countries*

Figure 4. *Disaster-related ODA financing from 2012 to 2020 (source: based on OECD Creditor Reporting System, n.d.)*

The OECD (2020) provides a more detailed view of financing from multilateral development banks focusing on **disaster risk reduction**, disaster management (**reconstruction relief and rehabilitation** but excluding emergency response), and climate change adaptation (for **flood prevention and control**). Figure 5 shows this financing trend globally for 2013 through 2017, based on loan data from World Bank, Asian Development Bank, Asian Infrastructure and Investment Bank (2017 data only), Inter-American Development Bank, and the Islamic Development Bank (2013 data only). On average, 47.6% of loans in these loans targeted disaster risk reduction efforts, with 45.4% focused on flood prevention and control and 7.6% on reconstruction relief and rehabilitation (OECD, 2020).

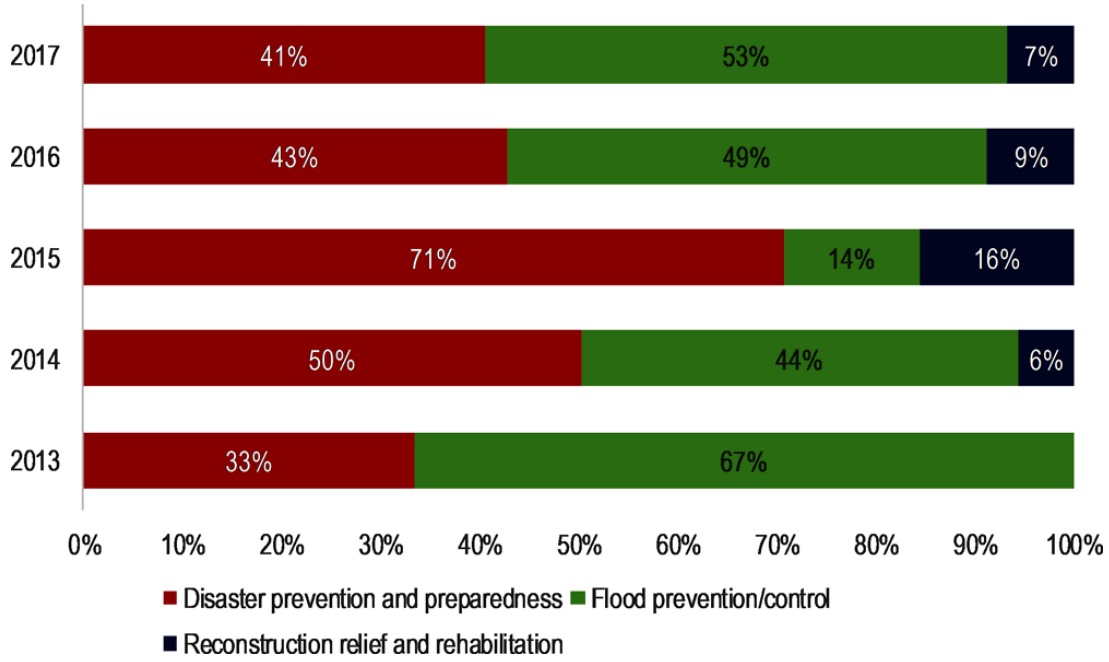


Figure 5. *Trends in multilateral development bank commitments at the intersection of disaster risk reduction, disaster management, and climate change adaptation (source: OECD, 2020; 99% of commitments are in the form of loans).*

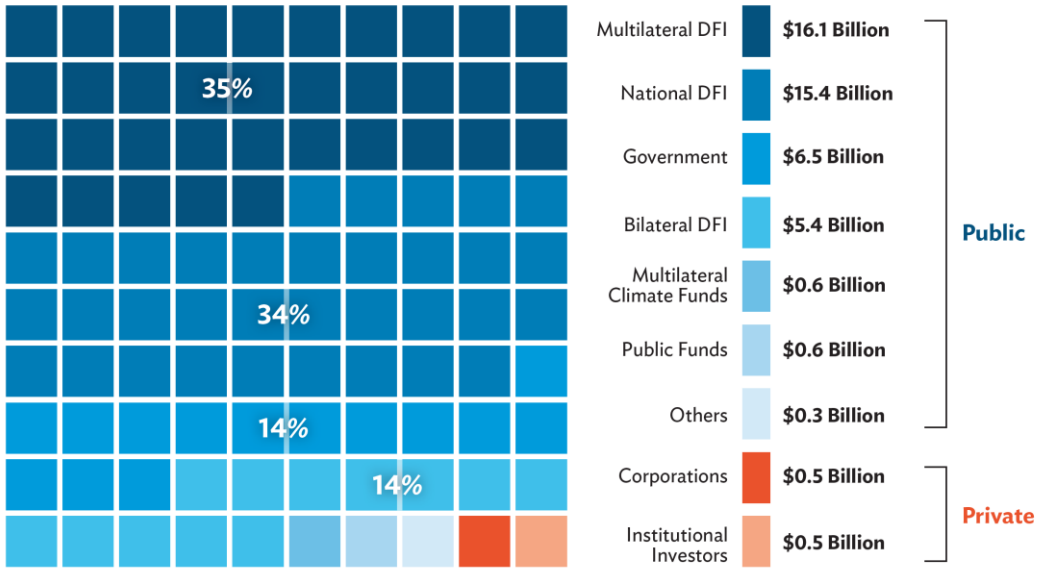
Shifting to a view of **financing from the private sector** specifically, the Climate Policy Initiative reports that of the approximately $46 billion in average annual global climate change adaptation finance in 2019-20, approximately 2% ($1 billion annually) comes from the private sector (Climate Policy Initiative, 2021; see Figure 6)[5]. However, this does not include foreign direct investment and capital markets where debt and equity financing in sustainability, climate change and environmental and social governance (ESG) is a growing source. Considering these, financing for DRR and climate change adaptation from the private sector could encompass the following sources:

- Foreign Direct Investment (FDI): FDI flows to developing countries in Asia increased by 19% from 2020 to 2021 to a record high of USD $619 billion (UNCTAD 2022a). For SDG sectors relating to water and sanitation, food and agriculture, health and education,

[5] It should be noted that data on adaptation finance from the private sector is largely missing (Climate Policy Initiative 2021; in ADB, 2022)."

investment project announcements in 2021 totalled **$17.8 billion** (11% of total investment announcements; UNCTAD, 2022b)

- Bonds: The global private sustainable bond market totaled $540 billion in 2021, with Asia and Oceania representing 16.8% of the market or $91 billion (UNCTAD, 2022c). If China's green bond market is any indication of potential, estimated to comprise of 3% climate adaptation related projects (Climate Bonds Initiative, 2018a), then annual risk reduction related financing could have an upper-end potential of **$2.7 billion annually** in the region.
- Equity: Asia's equity market of $2.3 trillion (2021; Bain & Company, 2022) is mostly untapped for risk reduction. If just 1-10% of the equity market could be directed at DRR and CCA, that could represent **$23 billion to $230 billion** in financing.
- Funds: The sustainable funds market in Asia and Pacific totaled $128.8 billion in 2021 (UNCTAD, 2022c). Globally, SDG-related equity funds represented 27% of total assets under management in 2021 (UNCTAD, 2021), suggesting a potential **$35 billion** market for risk reduction-related financing. As well, seven of the top 30 pension funds globally are in Asian countries, representing almost $4 trillion in total assets (6 of 7 being sovereign funds, with Japan comprising half of total value; Thinking Ahead Institute, 2022).
- Insurance: Of $50 billion natural catastrophe loss in 2021 in Asia and the Pacific region, only $9 billion was insured (an 83% protection gap; Gallin 2022; in ADB, 2022a).
- Philanthropic financing: For one of Asia's largest grant advisors (Give2Asia, 2020), 17% of $55 million worth of philanthropic giving over 15 years in Asia and Pacific was tagged as "resiliency" and multi-phase (WASH, DRR and preparedness, and sustainable infrastructure). This amounts to, on average, **$623,333 per year** in giving.



DFI = development finance institution.
Source: Climate Policy Initiative (2021).

Figure 6. *Average annual global climate change adaptation finance, 2019-20 (from: ADB, 2022a,* based on Climate Policy Initiative, 2021; see also GFDRR, 2021)*).*

Regarding **domestic government spending**, the following information provides insight toward financing that is allocated to disaster risk reduction, including climate change adaptation:

- Overall: In East Asia and the Pacific during 2019 and 2020, $14.7 billion in climate adaptation finance annually was attributable to public domestic actors, including from government, DFIs, and multilateral/public funds and primarily in China (Climate Policy Initiative, 2021).
- Viet Nam: The percentage of the domestic climate budgets (of six ministries) allocated to adaptation in Viet Nam was 75% in 2019 and 2020, totalling approximately 10,000 billion VND in each year (~USD $420 million). (*Viet Nam Ministry of Planning and Investment and UNDP, 2022*).
- Indonesia: Between US$90 million and US$500 million of government spending annually on disaster response and recover, representing between 1.4% and 1.9% of total spending by Indonesia's central government (source: World Bank (2020) as cited in OCHA (2021))
- Philippines: The annual allocations from the National and Local Disaster Risk Reduction and Management Funds averaged Php 16.5 billion and Php 58.8 billion from 2017 through 2021, respectively (~USD $300 million and USD $1 billion, respectively; Gov. of the Philippines, 2022). And results from a 2021 public expenditure review reported that "fiscal augmentation from ODA sources was channeled mostly for climate change adaptation

programs" and that grants and loans primarily targeted climate change adaptation and disaster risk reduction (Domingo and Manejar, 2021).

- Australia: In 2018, federal and state government spending on direct recovery from disasters was around $2.75 billion per year (~USD $1.9 billion; Gov. of Australia, 2022)
- Republic of Korea: The disaster and safety budget of 2022 was 21.9 trillion won (~USD $16.9 billion), an increase of 6.3% from the previous year and representing 3.6% of the ROK government's total budget (Gov. of the Republic of Korea, 2022).

Islamic finance has been described as one of the fastest growing elements of global finance with total assets growing at a rate of 11.3% year-on-year as of 2021 and worth USD 3.06 trillion (IFSI, 2022). Operating under Islamic law and principles, such as the prohibition of interest, its main sectors comprise **Islamic Banking, Sukuk, Islamic funds assets, and Takafuk** (insurance) (IFSI, 2022). Notably, the Saudi Arabia-based Islamic Development Bank was able to track its cumulative financing related to climate change, estimated at $644 million with 47% attributable to adaptation-related efforts (African Development Bank et al., 2018; in ODI, 2019). For an elaboration of the principles of Islamic finance, see Section 6.

Estimates of DRR Financing Needs

The 2021 Asia-Pacific Disaster Report published by the United Nations Economic and Social Commission for Asia and the Pacific projects that the **cost for adapting to climate change and other biological hazards will be approximately $270 billion per year this century** under a high climate change scenario. (UNESCAP, 2021a). Of these adaptation costs, $68 billion were for biological hazards and the rest were for climate-related hazards. But altogether, the total projected cost of adaptation is only one-fifth of the projected average annual losses due to climate-related natural hazards and biological hazards ($1.2 trillion per year; UNESCAP, 2021a).

Box 1. Projected adaptation costs in select subregions

South-east Asia

The total annual adaptation cost of $24.9 billion for South-East Asia under the worst-case climate change scenario, from which $22.9 billion is the adaptation cost for climate-related hazards, and $1.9 billion is the adaptation cost for biological hazards.

From: UNESCAP (2022a)

South and South-west Asia

The total annual adaptation cost of $61.5 billion for South and South-West Asia under the worst-case climate change scenario, from which $57.1 billion is the adaptation cost for climate-related hazards and $4.4 billion is the adaptation cost for biological hazards.

From UNESCAP (2022b)

Small Island Developing States

The total annual adaptation cost is estimated at $487 million with $480 million as the adaptation cost for climate-related hazards, and $7 million as the adaptation cost for biological hazards.

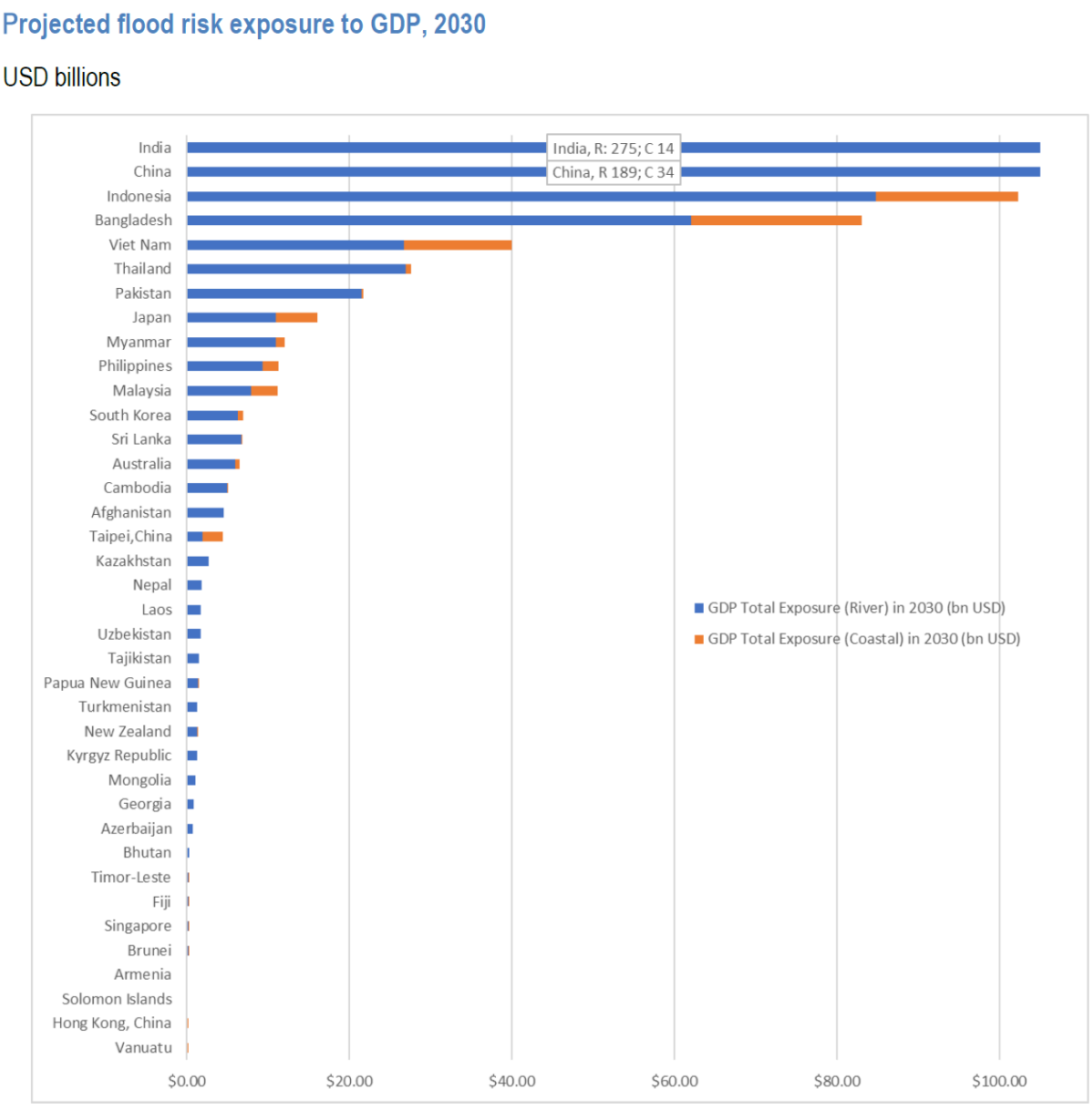
From: UNESCAP (2022c)

East and North-East Asia

For East and North-East Asia, the total annual adaptation cost is estimated at $203.9 billion, with $143.4 billion as the adaptation cost for climate-related hazards and $60.5 billion as the adaptation cost for biological hazards.

From: UNESCAP (2022d)

With a specific view of **flood damage costs** across Asia and the Pacific, the OECD reported on analysis using the World Resources Institute's Flood Analyser, including for riverine and coastal areas (OECD, 2021). As illustrated in Figure 7, riverine flood risk exposure through 2030 is the greatest cost for all countries analyzed. The combined risk exposure in coast and riverine areas ranges from $280 billion and $220 billion in India and China, respectively, to significantly lower cost yet greater affect on GDP in the Solomon Islands, Bangladesh, Vanuatu, and Viet Nam (OECD, 2021).



Source: WRI (2020).

Figure 7. *Projected flood risk exposure in Asia and the pacific (from: OECD, 2021).*

Furthermore, the OECD summarized the annual investment requirements for **infrastructure needed to manage water-related risks** across Asia and the Pacific, including for water supply and sanitation and flood protection for riverine and coastal areas (OECD, 2021). The top ten countries for each investment category are listed in Table 1. For water supply and sanitation, annual investment requirement was greatest in **China** at $60.79 billion per year while as a percentage of GDP, the impact was greatest in **Timor-Leste** at 5.5%. For riverine flooding, **India** had the greatest annual investment requirement at $275.24 billion per year while the impact as a percentage of GDP was the highest in **Bangladesh** at 8.2%. Finally, for coastal flood protection, China's

investment requirement was the most at $34.10 billion per year while Bangladesh again was most impacted as a percentage of GDP at 2.8%. Notably, the OECD emphasized that "much of the burden in terms of cost to GDP falls upon those countries that can least afford it" (OECD, 2021).

Table 1. *Annual investment costs for managing water-related risks in Asia and the Pacific (from: OECD, 2021)*

Top ten countries for annual investments costs in water infrastructure in the Asia-Pacific region

Water supply and sanitation		Riverine flood protection		Coastal flood protection	
% GDP	USD billions	% GDP	USD billions	% GDP	USD billions
Timor-Leste (5.5)	China (60.79)	Bangladesh (8.2)	India (275.24)	Bangladesh (2.8)	China (34.10)
Afghanistan (2.9)	India (23.02)	Myanmar (5.8)	China (188.75)	Solomon Islands (2.1)	Bangladesh (20.93)
Nepal (2.7)	Indonesia (6.76)	Cambodia (5.3)	Indonesia (84.76)	Viet Nam (1.7)	Indonesia (17.53)
Pakistan (2.3)	Thailand (5.74)	Afghanistan (4.4)	Bangladesh (62.06)	Vanuatu (1.5)	India (13.73)
Papua New Guinea (1.8)	Malaysia (3.85)	Kyrgyz Republic (4.1)	Thailand (26.94)	Myanmar (0.6)	Viet Nam (13.31)
Azerbaijan (1.7)	Pakistan (3.59)	Tajikistan (3.7)	Viet Nam (26.70)	Indonesia (0.6)	Japan (5.18)
Fiji (1.6)	Viet Nam (2.90)	Viet Nam (3.4)	Pakistan (21.52)	Fiji (0.5)	Malaysia (3.29)
Kiribati (1.6)	Philippines (2.69)	Laos (3.1)	Myanmar (10.98)	Malaysia (0.4)	Philippines (1.96)
Marshall Islands (1.6)	Japan (2.47)*	Indonesia (2.8)	Japan (10.89)	Philippines (0.2)	Myanmar (1.09)
Micronesia (1.5)	Bangladesh (1.64)	Timor-Leste (2.7)	Philippines (9.33)	Papua New Guinea (0.2)	South Korea (0.67)

Low-Income Economies
Lower-Middle Income Economies Upper-Middle Income Economies High-Income Economies

Source: OECD using data from Rozenberg and Fay (2019) and WRI (2020). *Japan water supply and sanitation estimate from UNESCAP Bank Income Groups.

The DRR Financing Gap in the Asia and Pacific Region

Using domestic climate change adaptation ambitions as submitted by member states to the UNFCCC, UNEP's 2022 Adaptation Gap Report estimated regional aggregate adaptation finance needs (Table 2). Globally, the total median adaptation financing need was estimated at $202 billion annually (UNEP, 2022). For East Asia & Pacific and South Asia, the total median adaptation financing need was estimated at $69 billion and $59 billion, respectively, with significant variation noted (UNEP, 2022).

As well, in 2021 the Climate Policy Initiative estimated the global annual financing gap for adapting to climate change, concluding it was approximately $134 billion, based on a need of $180 billion per year through 2030 and a current level of financing at $46 billion per year from all available sources (Climate Policy Initiative, 2021). Regarding what portion of this could be attributable to the Asia and Pacific region, currently 45% of global adaptation finance is allocated in East Asia and the Pacific (Climate Policy Initiative, 2021). Therefore, a very **rough estimate of the climate change adaptation financing gap for Asia and the Pacific could be somewhere on the order of $60 billion per year**. This is consistent with the median estimates reported in UNEP's 2022 Adaptation Gap Report.

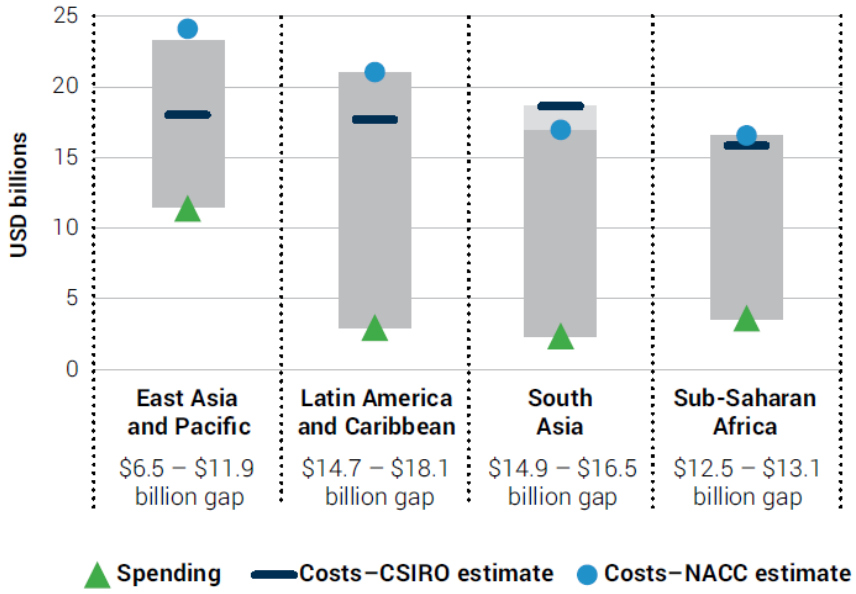
Table 2. *Estimated adaptation financing needs for 2021-2030 (from: UNEP, 2022)*

Region	Annual adaptation finance needs in US$ billion (2020 value)		Annual adaptation finance needs as a percentage of GDP	
	Median	Min–Max	Median	Min–Max
East Asia & Pacific	69	27-208	0.35	0.14–1.05
South Asia	59	23–177	1.69	0.66–5.10
Sub-Saharan Africa	36	14–109	2.10	0.82–6.34
Latin America & Caribbean	21	8–62	0.41	0.16–1.25
Middle East & North Africa	15	6–44	0.47	0.19–1.43
Europe & Central Asia	4	1–11	0.69	0.27–2.08
Global	**202**	**79–612**	**0.60**	**0.24–1.80**

Source: UNFCCC (2022c)

As an additional cross-reference, the World Bank GFRDD (2021) estimated the climate change adaptation finance gap for the Asia and Pacific region based on data from 2014-16. As illustrated in Figure 8, the total gap for East Asia and the Pacific and South Asia was estimated to be approximately **$28 billion per year**. This is reasonably consistent with the other estimates reported above given the earlier timeframe of the estimates.

Latin America, the Caribbean and South Asia Face the Biggest Absolute Shortfall in Adaptation Finance (USD)



Notes: Spending means the amount of international public adaptation finance in 2014 directed to both public and private sectors, as described in Buchner et al (2015). Costs estimates refer to the average annual cost of adaptation for each year from 2010-2050 for seven sectors and 144 low income and middle income countries described in World Bank (2010). Estimates cover varying climate scenarios: dry global climate projections (costs estimate – CSIRO) and wet global climate projections (costs estimate – NACC).
Source: Vivid Economics

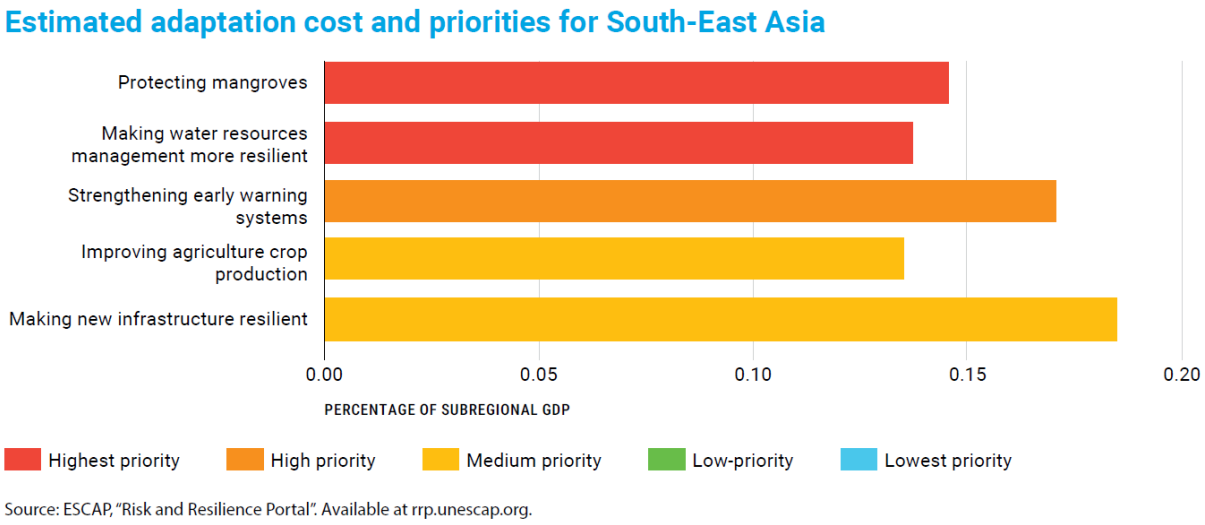
Source: Reproduced with permission from CIF (2016)

Figure 8. *Estimated shortfall in adaptation finance (source: World Bank GFDRR, 2021)*

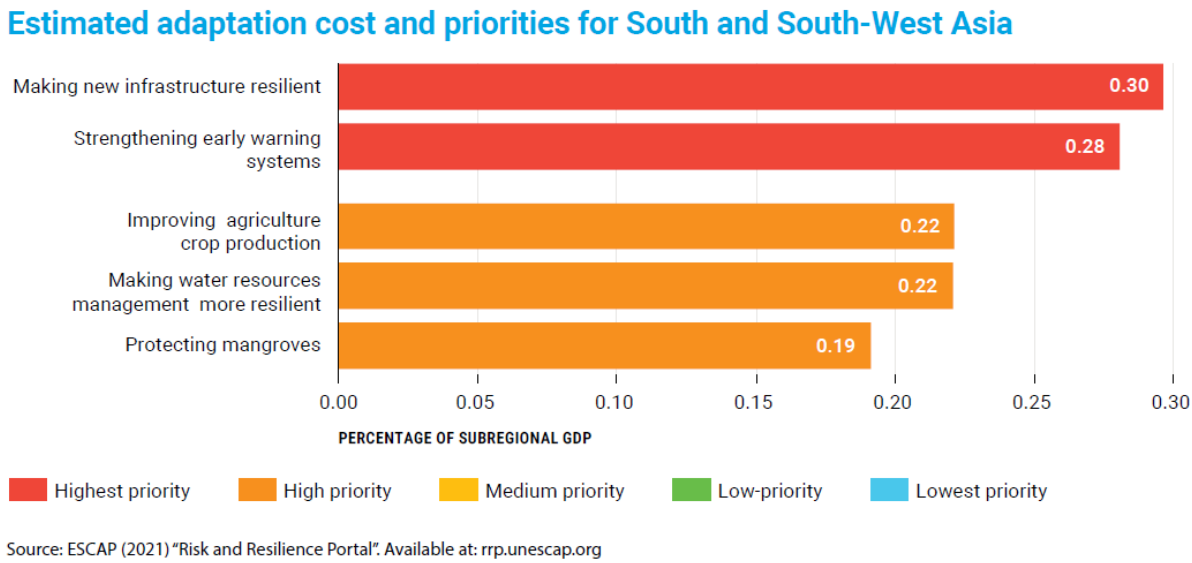
With a detailed and nuanced view, UNESCAP's Asia-Pacific Disaster Report featured regional costs and priorities for adaptation to support achieving the SDGs as a percentage of GDP. Figure 9 summarizes these costs and priorities each for South-east Asia, South and South-west Asia, East and North-east Asia, and regional SIDS. Using five priority areas outlined by the Global Commission on Adaptation that yield a high cost-benefit ratio for building resilience, UNESCAP concluded the following:

- **South-east Asia:** Protecting mangroves is identified as the top priority for adaptation. One of the essential nature-based climate adaptation measures is the conservation and restoration of mangroves which face the threat of being converted for aquaculture and coastal development. Mangroves reduce the impact of typhoons, storm surges, coastal flooding and erosion. (from: UNESCAP, 2022a)
- **South and South-west Asia:** The top adaptation priorities are strengthening early warning systems, and making new infrastructure resilient followed by making water resources management more resilient, improving dryland agriculture crop production, and protecting mangroves. (from: UNESCAP, 2022b)

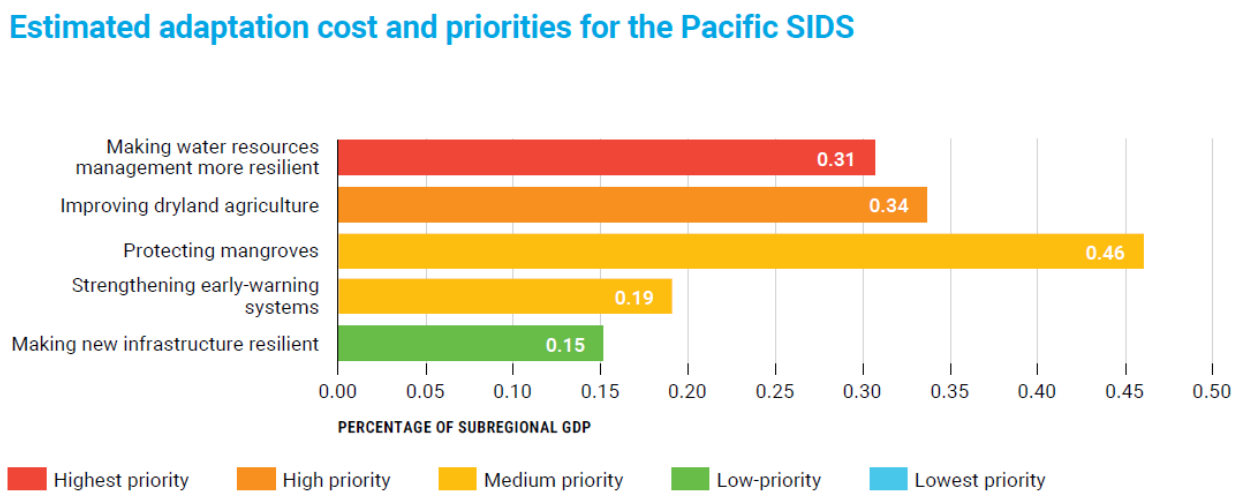
- **Pacific SIDS:** The top adaptation priority is making water management systems more resilient, protecting mangroves and improving dryland agriculture crop production followed by strengthening early warning systems and making new infrastructure more resilient. It is estimated at 0.31 per cent of subregional GDP for making water resources resilient and 0.34 per cent of subregional GDP for improving dryland agriculture crop production. (from: UNESCAP, 2022c)
- **East and North-east Asia:** The top adaptation priority is making new infrastructure resilient. The associated estimated adaption cost is marginal at 0.18 per cent of subregional GDP. The second priority is strengthening early warning systems with an estimated adaptation cost of 0.16 per cent of subregional GDP. (from: UNESCAP, 2022d)



9a. *South-east Asia (from: UNESCAP, 2022a)*



9b. *South and south-west Asia (from: UNESCAP, 2022b)*

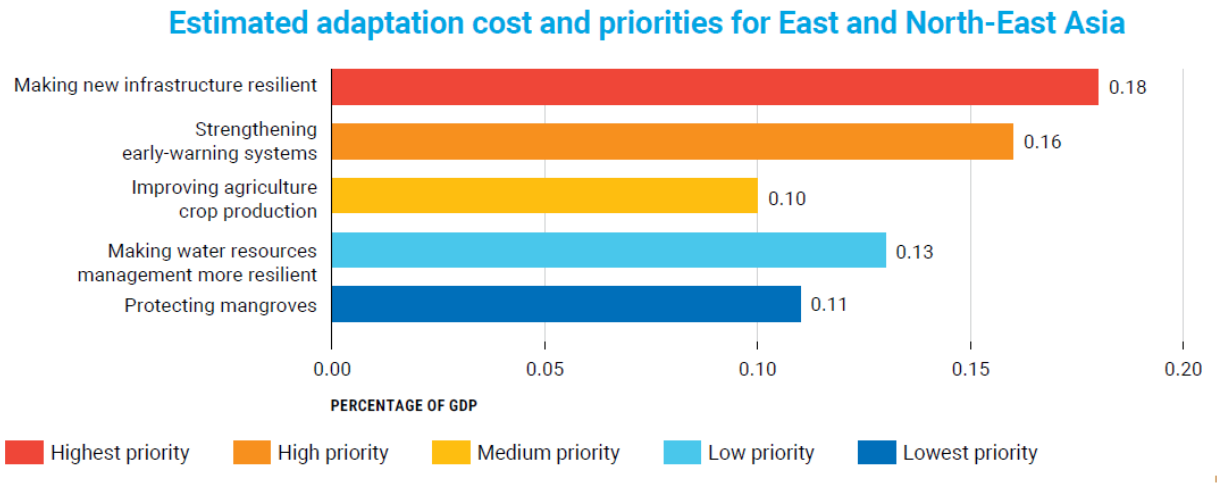


Source: ESCAP, "Risk and Resilience Portal". Available at: rrp.unescap.org.

51 Global Center on Adaptation, "Adapt now: A global call for leadership on climate resilience", 13 September 2019. Available at https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/ (accessed 26 March 2021).

52 ESCAP, "Risk and Resilience Portal". Available at: rrp.unescap.org.

9c. *Pacific SIDS (from: UNESCAP, 2022c)*



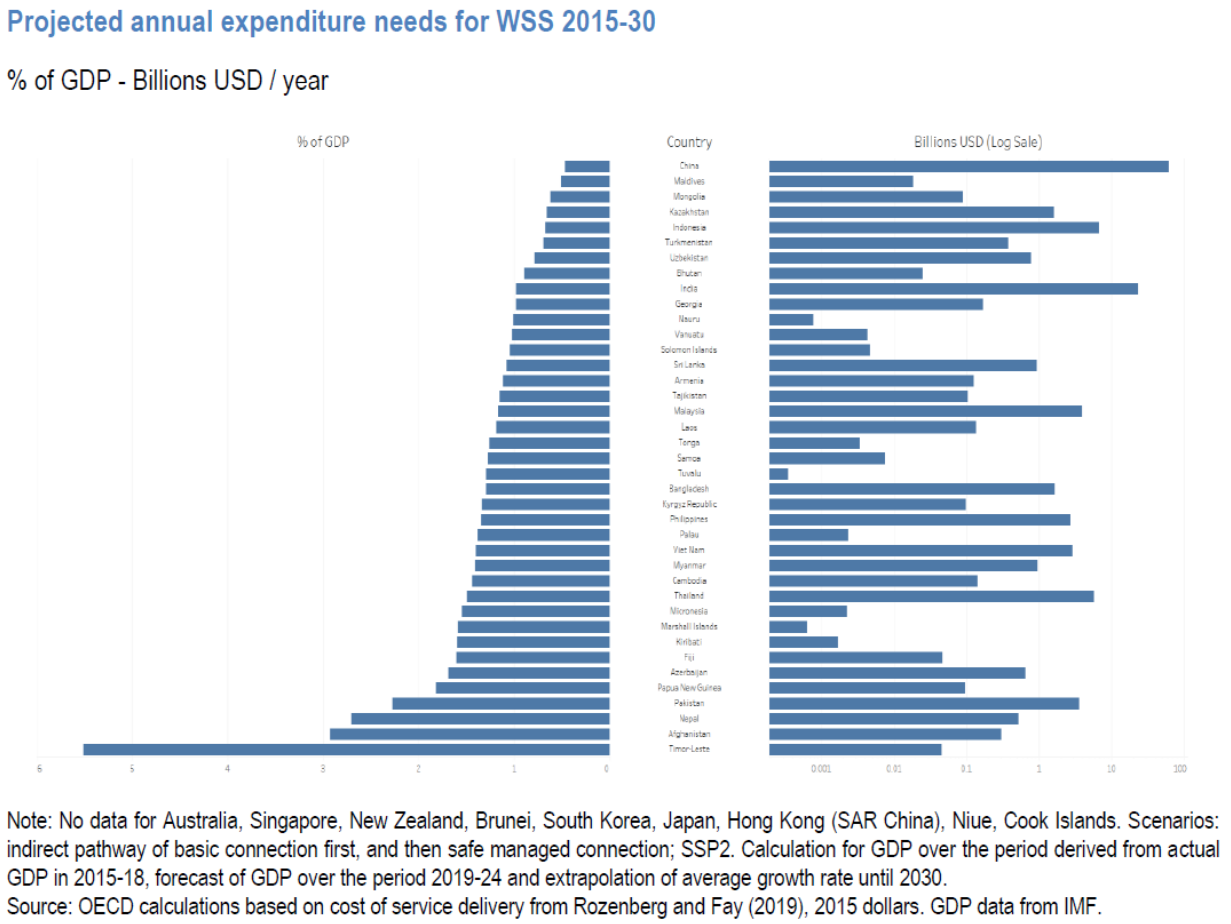
Source: ESCAP, "Risk and Resilience Portal". Available at: rrp.unescap.org

9d. *East and North-east Asia (from: UNESCAP, 2022d)*

Figure 9. *Adaptation costs and priorities for achieving the SDGs in Asia and the Pacific.*

In the context of the estimated investment gap to achieve universal access to safely managed water supply and sanitation services, the OECD reported on the expenditure needs for countries in the Asia and Pacific region over the period 2015-2030. It was concluded that China (at $60 billion per year) and India (at $22 billion per year) have the highest annual investment needs "due to the sheer size of their populations"; however, in terms of percentage of GDP, Timor-Leste, Afghanistan, Nepal and Pakistan had the largest relative need (Figure 10, OECD, 2021).

Furthermore, three countries in particular reported on their funding gap to reach national WASH targets, including Afghanistan, Viet Nam, and Bangladesh with funding gaps of 83%, 67%, and 39%, respectively (OECD, 2021).



Note: No data for Australia, Singapore, New Zealand, Brunei, South Korea, Japan, Hong Kong (SAR China), Niue, Cook Islands. Scenarios: indirect pathway of basic connection first, and then safe managed connection; SSP2. Calculation for GDP over the period derived from actual GDP in 2015-18, forecast of GDP over the period 2019-24 and extrapolation of average growth rate until 2030.
Source: OECD calculations based on cost of service delivery from Rozenberg and Fay (2019), 2015 dollars. GDP data from IMF.

Figure 10. *Adaptation costs and priorities for achieving the SDGs in Asia and the Pacific (from OECD, 2021).*

The Impacts of Disasters on Macro-Economic and Financial Stability

Annual economic losses caused by disasters are increasing due to climate change and are expected to increase in the coming years. As stated in UNESCAP's 2019 The Asia-Pacific Disaster Report, **recent disasters triggered by climate change and environmental degradation have deviated from their usual tracks and are growing in intensity, frequency and complexity compared to previous years.** For example, almost half of the 281 natural disasters that occurred around the world in 2018, occurred in the Asia and Pacific region. An average of 142 million people has been affected annually in the region since 1970, while the global average is 38 million (UNFPA, n.d.). Further, annual economic loss for Asia and the Pacific due to disasters is 675 billion dollars as of 2018, which is equal to about 2.4% of the region's GDP (UNESCAP, 2019).

The world economy has been significantly affected by the COVID-19 epidemic**. COVID-19 has shown us that disasters have the potential to affect not only economic stability but also financial stability.** For example, the decrease in GDP due to COVID-19 and the resulting increase in bankruptcies had a negative impact on banks` profits through the increase in non-performing loans. However, to reduce the impact of this effect on the cost of bank capital, bank provisioning regulations in many countries in Asia and the Pacific were temporarily relaxed, allowing banks to hold fewer reserves than they needed to set aside. These temporary regulations have masked the impact of COVID-19 on non-performing loans in real terms.

In this context, although population and economic growth continue to be the main drivers of rising losses from disasters, the increase in disasters caused by climate change emphasizes the importance of designing policies that can reduce the effects of such disasters on the economy and financial sector. However, to design such policies, it is important first to estimate the direct and indirect costs of disaster scenarios. Next, the impact of these estimated costs on macroeconomic and financial stability needs to be evaluated. Finally, economic and financial policies can be prepared within the framework of these estimations before any disaster occurs. In this way, the country's economies will be more prepared for the effects of disasters. An elaboration of the impacts of disaster on stability is provided below, first from a macro-economic stability point of view and then from a financial stability point of view.

The Impacts of Disasters on Macro-Economic Stability

Macroeconomic stability can be defined as the economic equilibrium state of sustainable growth that minimizes vulnerability of a national economy to external shocks. Macroeconomic stability can be measured through various macroeconomic indicators. Below is information about the five variables that the European Union's Maastricht Criteria[6] uses to measure the macro-economic stability.

[6] The Treaty on European Union is a comprehensive document addressing all aspects of the political and economic union of the European Economic Community. The macroeconomic criteria required of all member nations have come to be known as the Maastricht Criteria, after the Dutch city that hosted the convention.

Box 2. Indicators Affecting Macroeconomic Stability

Low and stable inflation indicates healthy demand in the marketplace; however, high or unstable inflation threatens growth. High inflation alters the value of long-term contracts. Volatile inflation creates uncertainty in the marketplace, increasing risk premiums. Since many tax rates are adjusted by average inflation, volatile inflation can severely alter government revenues and individual liabilities. The Maastricht criteria capped inflation at 3%.

Low long-term interest rates reflect stable future inflation expectations. While current inflation rates may be acceptably low, high long-term rates imply higher inflation to come. Keeping these rates low implies that the economy is stable and is likely to remain so. The Maastricht criteria restricted long-term rates to the range of 9%.

Low national debt relative to GDP indicates that the government will have the flexibility to use its tax revenue to address domestic needs instead of paying foreign creditors. Additionally, a low national debt permits lenient fiscal policy in times of crisis. The Maastricht criteria capped debt at 60% of GDP.

Low deficits prevent growth in the national debt. The Maastricht criteria capped the deficit at 3% of GDP.

Currency stability allows importers and exporters to develop long-term growth strategies and reduces investors' needs to manage exchange-rate risk. For national accounting, currency stability reduces the threat posed by debt issued in foreign coin. The Maastricht criteria permitted fluctuation of at most, 2.5%.

(Panos C. Afxentiou, 2000)

The ratios determined for macroeconomic indicators in the above box serve as reference of economic stability and thus the impact of disaster scenarios on these indicators can be used to indicate the impact of disasters on economic stability.

The first effect of disasters on all the indicators in the above box is negative by reducing total factor productivity[7] due to the damage they cause to the production capacity of the country. However, within the framework of the policies to be implemented after the disaster, productivity may increase more than before the disaster. There are opinions suggesting that rapid depreciation of capital due to a catastrophic shock will result in higher productivity growth as technology will be updated. This is called the “build-back-better” hypothesis in the literature (Hsiang and Jina, 2014).

[7] Total factor productivity is a measure of productive efficiency in that it measures how much output can be produced from a certain amount of inputs.

There is not a very large literature on how disasters affect the macro economic indicators. Studies on this subject are mostly aimed at measuring economic loss. However, estimating the effects of economic losses on macroeconomic indicators shows us the impact of disasters on economic stability. When measuring economic loss, direct and indirect effects of disasters should be considered. The definition of these two effects is important in terms of the methodology used to measure economic loss.

In this respect, direct effects refer to the damage caused to assets by disasters, together with the losses occurring during or immediately after the disaster. Examples of direct economic losses include the destruction of residences, businesses, productive capital, infrastructure, crops, livestock, and (monetized) physical and mental health impacts. Direct effects lead to indirect effects that express changes in economic activities following the disaster. Indirect economic losses are transmitted through the interconnection of economic systems and occur through disruption of economic flows as a result of disaster. The disruption of economic flows is caused by the physical capital stock damaged by the disaster. For example, disasters engender exogenous, internal, or external 'shocks' to economies, with far-reaching ripple effects. Beyond the direct losses caused by disasters, affected sectors are likely to cut their activities and output, generate less income, lay off staff, and delay investments. Thus, direct losses initiate a series of 'upstream' and 'downstream' reactions that affect suppliers and customers. These ripple effects are the indirect effects of a disaster (Lorenzo Carrera et al., 2014).

While there is little need to theorize about the direct effects of disasters, theoretical models are often used to estimate the indirect economic effects of disasters. All these models aim to transform a complex economic reality into a mathematical representation. Disaster is conceptualized as the sudden loss of factors such as labor and capital, to which the economic system adapts by returning to the pre-disaster equilibrium or shifting to a new equilibrium (Muhammad Tariq Iqbal Khan et al., 2023).

Most of the studies on the estimation of the indirect economic effects of natural disaster risks use Dynamic Stochastic General Equilibrium (DSGE) model[8]. To calculate the indirect losses, the outputs of the direct losses obtained under various disaster scenarios can be used as shocks in the DSGE model. Shocks to the economic system resulting from disasters to the productivity of primary factors of firm`s production such as capital, land, and labor transform into an effect on economic flows, i.e., the annual deterioration of regional/sectoral output and GDP. For example, the percentage of flooded area per land use class in the country is resulted in a reduction of firms' capital and land productivity with disaster risk reduction and without disaster risk reduction investments. In the same way, the percentage of workers affected by disasters is translated into a reduction in the labor productivity of firms. In this way, we can estimate the impact of disasters on GDP (output) from capital and labor through the firm`s Cobb-Douglas production function. In this situation, the production functions of firms that produce a final good (Y_t) using capital (K_t) and labor (L_t) in a small economy with only one sector are as follows (Cobb-Douglas production function):

[8] Dynamic stochastic general equilibrium modeling is a macroeconomic method which is often employed by monetary and fiscal authorities for policy analysis, explaining historical time-series data, as well as future forecasting purposes.

$$Y_t = e^{z_t} K_t^{\alpha} (A_t L_t)^{1-\alpha}, \quad \text{with } 0 < \alpha < 1$$

in which t stands for time index, $\mathbf{z_t}$ and $\mathbf{A_t}$ are respectively the transitory and trend productivity shocks[9]. While transitory shock is specific to capital, the trend shock belongs to labor. In this way, we can associate the capital and labor losses, which we calculated as direct losses, with the economic indicators with the help of the above production function, under the assumption that DRR investments are made or not. On the other hand, assuming that recovery investments started in the disaster year, the money spent on these investments compensates for some or all of the capital and labor losses in the production function mentioned above. In this case, the impact of disasters on the economy will depend on the amount and speed of recovery investments.

Unfortunately, we cannot explain the effects of disasters on the economy with the single formula above. The above formula is one of the entry points. The crash of the economy due to disasters can cause different effects on the output (GDP) by changing more than one economic variable at the same time. For example, if some people die due to disasters, this causes a decrease in the consumption of households that both consume and provide labor to companies. In addition, the decrease in the labor supply decreases the production of the companies, and the decrease in the production decreases the tax revenues of the state. These effects then impact the output of the economy (GDP) by influencing each other and other economic indicators. Each of these variables can have different effects on the output and each other. For this reason, we will use the DSGE model to observe how much the output is affected by considering all these effects.

One of the other important problems encountered when measuring the direct and indirect effects of disaster is that there are probably several historical observations to estimate the losses, especially for a disaster with a low probability of occurrence but a high severity. In addition, when disasters occur, their effects are not always recorded in detail. To solve this problem, computational models are used to simulate potential effects from hypothetical (but realistic) or historical disasters (Botzen et al., 2019).

In this context, considering the increase in the number of disasters due to climate change, it is necessary to develop models that will predict the impact of these disasters on the economic stability of countries and integrate these disaster risks into economic policies of countries.

The Impacts of Disaster on Financial Stability

Financial Stability reflects the situation in which the three components of the financial system, including financial institutions, financial markets and the financial structure, are stable at the same time. For example, a country's payment systems may be damaged by a major earthquake, and this may result in the inability to make electronic payments in the country, causing the economic system to collapse.

[9] While transitory shock refers to a shock whose effects gradually die out, trend productivity shock refers to a shock that is temporary.

Box 3. Financial Stability Definition

Stability of financial institutions refers to a condition in which individual financial institutions are sound enough to carry out their financial intermediation function adequately, without assistance from external institutions, including the government.

Stability of financial markets means a condition in which there is no major disruption of market transactions, with no significant deviation of financial asset prices from economic fundamentals, thereby enabling economic agents to raise and operate funds with confidence.

Stability of financial infrastructure refers to a condition in which the financial system is well structured to ensure smooth operation of market discipline, and both the financial safety net and the payment and settlement system are running effectively.

After a major disaster, the most important problem for financial institutions is to reach liquidity. For this, it is important both for the functioning of the financial infrastructure and for the functioning of the market to know in advance how much liquidity the Central Banks need to give to the market. The best way to find out is for Central Banks to estimate how much liquidity the market needs under various disaster scenarios. In addition, after disasters, temporary softening can be made in Basel III liquidity ratios for banks[10]. In order to do this, disaster risks need to be integrated into liquidity risk guidelines and stress tests.

Besides liquidity risk, there are other channels in which disasters affect the banking sector or financial institutions. The other important channel is the capital adequacy ratio, which can finally determine the resilience of financial institutions against shocks in their balance sheets. Basel regulations require this ratio to be at least 8% for banks. When a major disaster strikes, this ratio can drop below 8% due to bank reserves, write-off of credit losses, as well as subsequent bank runs. Below are examples of how the capital adequacy ratio (CAR) is affected by disasters.

The asset quality of the bank is one of the most important channels affecting the CAR. Many lives may be lost, including bank loan borrowers, after a major disaster. Significant physical damage can also destroy bank loan collateral. This situation may negatively affect the profitability and CAR of the bank and increase the vulnerability of the bank.

Operational losses also affect the CAR. After disaster, disruption to the offices or systems of financial institutions reduces their income and increases their expenses. Therefore, disasters increase the operational losses of financial institutions and negatively affect their profits and capital adequacy ratios.

Further, cybersecurity risks in operations constitute one of the most important risks for financial institutions. Such risks include financial institutions being unable to perform their transactions for two or three-days or losses such as stealing customer account information or withdrawing

[10] See Section Four for more information on the Basel regulations.

money from the customer's account without approval. In this context, the most important risk for financial institutions is the inaccessibility of the electronic infrastructure. In such cases, both their customers and financial institutions may face great losses, as banks need a certain amount of time to re-run their systems. Further, if any of the digital or electronic systems of a *systemically important financial institution*[11] becomes inoperable due to cyber attack, this can lead to a financial crisis in a country.

Market risk is another risk affecting CAR. Just like the liquidity risk, this risk can turn into a crisis and reduce the price of the securities held in the financial institution's balance sheet below the required amount of the CAR. Especially in the past, panic in the financial markets can cause a fire sale[12] and leave many financial institutions in a difficult situation. For this reason, it is very important to add disaster risks to the Macro stress tests of Central Banks.

As stated above, some financial regulations are softened to prevent the negative effects on financial institutions after disasters. As a result, the balance sheets of financial institutions may look better than they actually are. The best example of this is the easing of the implementation of banks' provision regulation after COVID-19. In this way, the banks made a provision less than the required provision. Thus, capital adequacy ratios or profits seem higher than they are. This situation may adversely affect financial stability by making it difficult for financial institutions to be supervised. Therefore, in such cases, it is important for supervisory authorities to request reports from financial institutions that are created within the scope of both the old regulations and the new provisional regulations.

The Difference Between Disasters and Climate Change Risks in Terms of Financial Stability

It is clear that there is an increase in the occurrence of disasters due to climate change. But we will begin to see the much more devastating effects of climate change after 30 or 40 years[13], under the assumption that business as usual. Therefore, if the number of disasters as a result of climate change is not desired to increase further, measures should be taken now.

However, the problem encountered in preventing climate change is to impose more costs on future generations, as future generations cannot give an incentive to current generations to solve this problem. In other words, the climate change problem is beyond the horizon of the business cycle, the political cycle, and the technocratic authorities connected with their mandates such as central banks (Carney, 2015).

In this framework, the horizon of climate change is 30 or 50 years, while the horizon of monetary policy extends to 2-3 years. The horizon is slightly longer for financial stability, but typically only up to the outer limits of the credit cycle - about a decade. In other words, when climate change

[11] A systemically important financial institution (SIFI) is a bank, insurance company, or other financial institution whose failure might trigger a financial crisis. They are colloquially referred to as "too big to fail".

[12] Fire Sale: A fire sale is the sale of securities at extremely discounted prices. Especially in the 2008 crisis, the phenomenon of fire sale was encountered in the financial markets and this situation left many financial institutions in a difficult situation.

[13] Considering that the time horizons of the climate change stress tests carried out by the Bank of England and Bank of France in 2022 are 30 years, it is thought that the Bank's supervisors expect to see the effects of climate change exactly after 30 or 40 years.

becomes a decisive issue for financial stability, it may be too late. This is called the **tragedy of the horizon.**

The only way to deal with this tragedy is to make changes in financial regulations to enable financial actors to make decisions considering climate events beyond their horizons.

This tragedy also shows itself in forward looking risk instruments. For example, macro stress tests are designed to cover a maximum of 5 years. For this reason, the desired results could not be obtained from the climate change stress tests applied so far. For example, according to the macro stress test covering 30 years conducted by the Bank of England, climate change does not significantly impact on the financial stability of the UK. The most important reason for reaching this result is that the models used in stress testing are not dynamic[14].

However, we do not see the tragedy of horizon in the impact of disasters caused by climate change or other than climate change on financial stability. Therefore, disaster risks can be relatively more easily integrated into financial risk regulations compared to climate change risk. In this context, integrating disaster risks by regulatory authorities or central banks into financial risk regulations have great potential to reduce the negative impact of disasters on financial stability.

[14] The dynamic model represents the time–dependent aspects of a system.

Section Three: Public Financing Review

A range of governance approaches and instruments have been deployed by national governments across Asia and Pacific to finance disaster risk reduction since 2015. Examples are highlighted in the sections that follow.

Governance Approaches

Governance approaches for financing disaster risk reduction span three broad categories: (1) **Strategy**; (2) **Assessment and Analysis**; and (3) **Review and Tracking**. Notable governance approaches in these three areas across Asia and Pacific are illustrated in the sections that follow.

Disaster Risk Reduction Financing Strategies and Disaster Risk Financing Strategies

Financing strategies, policies, and frameworks for disaster risk reduction provide specific, high-level strategic direction for national spending. Unfortunately, no country in the Asia and Pacific region has Disaster Risk Reduction Financing Strategies (DRRFS). Instead, some countries have Disaster Risk Financing Strategies (DRFS). However, although there are differences between DRFS and DRRFS, it can be said that both strategies complement each other in general.

Governments bear a significant portion of the costs of disasters. The financial impact of disasters on a government's budget can be quite significant. Major disasters or a series of minor events in a short period can result in substantial government spending, potentially negatively impacting revenues. This may lead to deviations from previously predicted fiscal results, leading to increased public debt. Depending on the level of these effects, this may pose a fiscal risk to public finances.

For example, economic activities may shrink in the short term as a result of disasters. The contracting economy may reduce the government's revenue collection in the short run. This situation may crowd out other priority expenditures. In order not to exclude priority expenditures, governments need to have strategies to finance the DRR investments before the disaster occurs.

The Sendai Framework for Disaster Risk Reduction was adopted in 2015 by the Third World Conference on Disaster Risk Reduction held in Japan and subsequently by the United Nations General Assembly. It is the global blueprint to reduce disaster risk. Its target E stipulated the objective of "Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020". Moreover, Para 27(b) indicated "To adopt and implement national and local disaster risk reduction strategies and plans, across different timescales, with targets, indicators and time frames, aimed at preventing the creation of risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience", and Priority of Action 3 is entirely devoted to "Investing in disaster risk reduction for resilience".

Against this backdrop, in 2020 the United Nations Financing for Development Forum[15] encouraged "the development of DRRFS and financial instruments", and the United Nations

[15] E/FFDF/2020/L.1Rev.1

General Assembly[16], recommended countries to develop “comprehensive disaster risk reduction financing strategies to support their national and local disaster risk reduction strategies”.

Before determining which financial instrument and mechanism the DRR investments will be financed by, the required DRR investments and costs stemming from disasters to be financed should be determined. The required DRR investments and direct costs of disasters are found with comprehensive risk assessment under various disaster scenarios. Then, it is selected with which financial instruments these costs will be financed most cheaply. However, at this stage, it is unclear whether the DRR investments financed this way are economically and financially viable. For this reason, a probabilistic benefit and cost analysis of these investments is made. To make this analysis, it is necessary to know the direct and indirect benefits of DRR investments. In this context, disaster scenarios' direct and indirect costs are estimated, and how much DRR investments reduce these costs is determined. Thus, various financial strategies are created for DRR investments that are economically and financially viable.

In addition, with the budget stress test, the effects of various disaster scenarios on the fiscal buffers, implicit contingent liabilities, tax revenues, and public expenditures in the state budget will be determined. Later, their impact on DRR financing will be analyzed by using these results in DRRFS.

In this context, the general objective of DRRFS is to provide the government and its institutions with strategic guidance and direction on the following issues under various disaster scenarios:

- Identify and select efficient and effective DRR investments within the scope of comprehensive disaster risk assessment under various disaster scenarios, and compare the financing cost of these investments with the cost of disaster risk and other financing instruments and mechanisms, and select the most appropriate and least costly financial instruments and mechanisms.
- Choose the most appropriate financial strategies by comparing the financing costs and benefits of DRR investments with the cost of retention and risk transfer financial instruments to manage the economic and fiscal risk.
- Determine the impact of the government's explicit and implicit contingent liabilities impact of this situation on fiscal risk by considering scenarios where appropriate DRR investments are not made, and risk transfer and contingent financial instruments are used.
- Support governments to build fiscal resilience and strengthen fiscal management against disaster risks by considering DRR investment financial instruments and risk financial instruments and mechanisms, including through budgeting frameworks and other fiscal policies.
- Present strategic options to governments on how large fiscal buffers should be and how they should be created, considering DRR investments` financial instruments and mechanisms, disaster risk financing instruments, social assistance gaps, and private sector sources.

[16] United Nations General Assembly Resolution (A/RES/75/216) of 21 December 2020

On the other hand, DRFS generally focuses on creating financial strategies within the framework of the risk layering approach on how to finance the financial gap resulting from disaster scenarios. However, the risk layering approach is used in selecting financial instruments. Only the direct costs of disaster scenarios are considered, while indirect costs are not in this approach used in DRFS. This situation may lead to mistakes in the selection of appropriate financial instruments. According to the risk layering approach, it is recommended to use financial instruments that transfer risk against low-frequency but high-severity hazards. Because the costs /benefits of risk reduction investments related to low-frequency but high-severity hazards are higher/lower than the costs/benefits of risk transfer financial instruments, however, this only applies to cases where direct costs are considered, and indirect costs are not. For example, the costs of retrofitting investments, which must be made to reduce the effects of a high-severity earthquake expected to occur once in a century, may outweigh its benefits. However, considering the indirect cost that retrofitting investment reduces, the DRR investment cost may be less than the cost of risk transfer financial instruments because risk transfer financial instruments do not take into account the economic losses caused by the loss of people (This causes a negative effect on total factor productivity[17] from an economic point of view).

Assuming that all houses and people are insured due to the earthquake, and many doctors and engineers died after the earthquake, despite a large amount of money flowing through the market due to insurance, it will take time for the production of the country to return to its previous level. Besides, this huge inflow may lead to an increase in inflation in the country. Therefore, risk transfer financial instruments cannot transfer the costs to be paid by the whole society after the disaster. However, this is not the case for DRR investments.

In this regard, the risk layering approach only considers individual costs (direct costs) in DRFS rather than the costs to be paid by the whole society (indirect cost). For this reason, it is thought that it would be more accurate to consider the costs to be paid by society in selecting financial instruments in the DRFS.

Finally, while DRFS prepares countries how to finance post-disaster costs, DRRFS prepares countries to finance DRR investments before disasters. In this respect, it can be said that both strategies complement each other.

Since DRRFS has not been implemented in any country until now, there is no country implementation example for it, but examples of DRFS implementations are given below.

Tonga's Disaster Risk Financing Strategy (DRFS) 2021-25 is one such example (Tonga Ministry of Finance, 2021). Motivated by dual shocks in the form of COVID-19 and a tropical cyclone, and coming on the heels of Tonga's worst disaster from Tropical Cyclone Gita in 2018, the Government of Tonga issued its first DRFS building on existing legal and policy frameworks (Tonga Ministry of Finance, 2021). Specifically, the purpose of DRFS is to predict the financial gap that the country will face after the disaster, identify a cost-effective combination of financial instruments to close this gap, and increase its capacity to respond quickly and effectively. It is an integral part of a comprehensive, proactive approach to proactive disaster resilience. It also

[17] Total factor productivity is a measure of productive efficiency in that it measures how much output can be produced from a certain amount of inputs.

includes some strategic policy recommendations on DRR and preparedness investments to reduce this financial gap in the future. (Tonga Ministry of Finance, 2021).

Tonga's DRFS uses a risk-layering approach (Figure 11) to achieve its goal recognizing that "different instruments are not equally cost-effective in covering events of different magnitudes" and that "the timing of needs is important when prearranging disaster response financing" (Tonga Ministry of Finance, 2021). The approach is designed to help the DRFS achieve six strategic priorities, including:

1. Identify and quantify disaster-related economic and financial risks, including those exacerbated by climate changes;
2. Review the portfolio of risk financing instruments annually to ensure they meet government objectives cost-effectively;
3. Assess options to transfer risk to the private sector and strengthen domestic insurance markets
4. Strengthen disaster-related public financial management;
5. Develop ASP (Adaptive Social Protection); and
6. Develop national DRM policy frameworks and plans and invest in national DRR priorities to mitigate and minimize the effect of future disaster shocks, including those exacerbated by climate change.

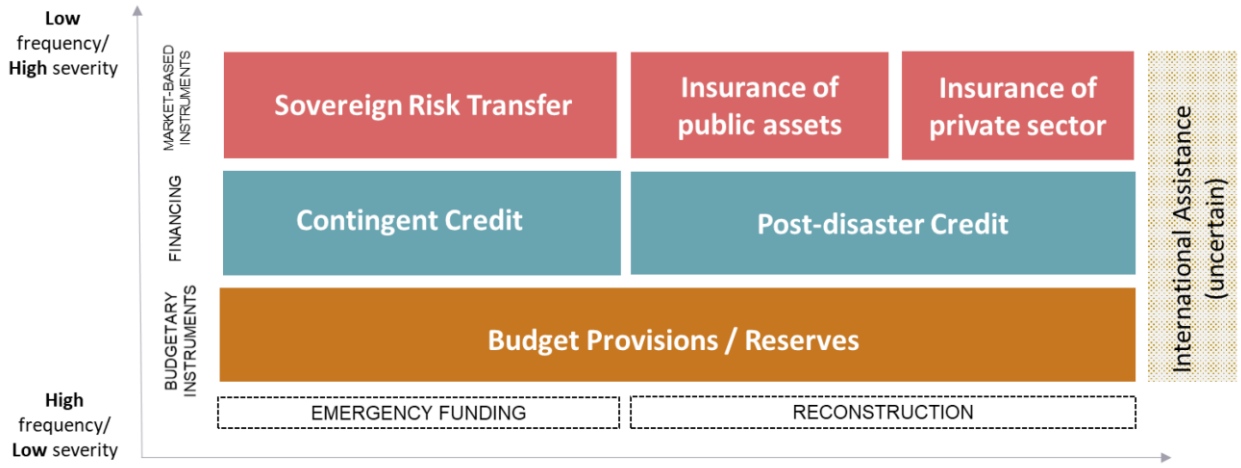


Figure 11. *Risk-layering for Samoa's Disaster Risk Financing Policy 2022-25 (source: Tonga Ministry of Finance, 2021).*

The **Samoa Disaster Risk Financing Policy for 2022-2025** is another example (Samoa Ministry of Finance, 2022). The policy is described as "a framework to protect the economy and people from adverse impacts of disasters through a set of disaster risk financing instruments." It was created as part of the World Bank Budget Support and Joint Policy Action Matrix. Motivating creation of the policy were the average annual losses from disasters including cyclones, earthquakes and tsunamis totalling USD $10 million with future losses for 1-in-100 year event cyclones and earthquakes projected to be on the order of $35 million. Among the policy's strategic priorities are the following:

1. Identify and quantify disaster-related economic and fiscal risks:
    a. Enhance the Public Asset database to improve information on the exposure of public assets to disasters, including infrastructure, public buildings
    b. Build capacity to understand fiscal and economic risk to inform policy decisions on retention and risk transfer to the market
    c. Improve understanding of the country's disaster related contingent liability, including of outputs of available probabilistic catastrophe risk models
    d. Incorporate updated disaster risk information into economic, fiscal, and investment planning
2. National Budget and Planning to be informed by Climate and Disaster Risk analysis: Strengthen reporting of all sources of disaster financing and their use, to strengthen planning and oversight
3. Explore options to transfer disaster risks to the private sector: Conduct an analysis of the current constraints, including legal, regulatory and capacity gaps, in the insurance sector in collaboration with insurance regulator and key private sector
4. Identify a cost-efficient combination of disaster risk financing instruments each year: Set risk financing objectives, including the determination for what type of event and to cover what type of cost (emergency/recovery) contingent financing will be put in place
5. Build institutional capacity on disaster risk financing: Strengthen capacity for assessing the relative cost efficiency of different instruments; and Develop capacity for fiscal and actuarial modeling.

The Samoa Disaster Risk Financing Policy framework is guided by four core policies. First is timeliness of funding, recognizing that "speed matters but not all resources are needed at once." The second principle relates to the disbursement of funds, recognizing that "how money reaches beneficiaries is as important as where it comes from." Regarding data and analytics, the policy framework recognizes that "sound financial decisions require the right financial information and data."

And lastly, the policy framework recognizes that risk layering is crucial for success, based on the understanding that "no single financial instrument can address all risks." The strategy uses the same risk-layering approach articulated by Tonga (Figure 11) and describes the implementation of budgetary instruments (i.e., budget provisions and reserves), financing (i.e., contingent credit and post-disaster credit), and market-based instruments (i.e., sovereign risk-transfer, insurance of public assets, insurance of private sector). Among the financing instruments currently available to the Government of Samoa are: (a) PCRAFI Insurance ($10.5 million per year) for addressing high risk disasters; (b) contingent credit/grant from the Asia Development Bank and the World Bank's CAT-DDO, each at the level of USD $10 million per year for addressing medium-risk disasters; and (c) CERC contingent emergency response components of IDA funded projects at USD $0.5 million per year and an unforeseen payment line of USD $8.4 million.

The disaster risk financing policy was the first of its kind for Samoa. Among the challenges cited by the Samoa Ministry of Finance in the development of the policy were its broad scope, capacity constraints, and the prioritization of activities in line with the policy timeframe.

Overall, considering the DRFS of Tonga and Samoa, some aspects of DRRFS complement DRFS. Examples are selecting the most effective DRR investments and how they will be financed, considering indirect costs, and DRRFS preparing countries to finance DRR investments before disasters. (See pages between 33 and 35).

As another case example, **Nepal's National Disaster Risk Financing Strategy** was created in 2020 (World Bank, 2020b). The vision of the strategy is "to build a Disaster Resilient Nepal, while safeguarding the achievements made in development by adopting the measures to minimization of loss or damage from disaster every year and risk transfer instruments through effective financing in disaster risk reduction and management".

The goal of the strategy suggests a focus on emergency response: "to ensure Pre-arranged Financial Mechanisms for providing adequate financial resources immediately at the onset of a disaster by maintaining financial risk sharing of stakeholders, while reducing financial, physical, social and human losses from disasters". However, the objective of the strategy describes a more loss reduction approach: "to develop appropriate instruments and technologies to forecast the nature and magnitude of hazards and disaster impacts, and estimate the damages to be caused by them, to minimize the damage of individual, private and public assets from disaster, and identify and implement appropriate mechanisms and instruments for risk transfer."

The scope of Nepal's Disaster Risk Financing Strategy includes disaster risk management and transfer instruments at public, private and individual levels and is meant to provide guidance at the provincial and local levels. This scope is designed to deliver the following outcomes (World Bank, 2020b):

- Disaster resilience will be enhanced from the increase in risk information based private and public financing and risk sharing, and through insurance and other instruments.
- Information along with necessary instruments and technologies will be received to forecast disaster risk. There will be immediate financial arrangements in place for disaster risk reduction and post-disaster recovery through various financing mechanisms.
- Financial risk investment will be ensured in construction of critical infrastructures according to the concept of disaster risk sensitive development.
- There will be adequate development of infrastructure insurance, social security allowance, property insurance and life insurance programs, considering the disaster risk.

Importantly, a mix of strategic activities are also identified to support Nepal's strategy such as leveraging both public and private financing, adopting pre-arranged and well-planned protection measures like insurance and reinsurance, encouraging business continuity planning, and legally requiring the adoption of risk reduction and safety measures by public service providers (World Bank, 2020b).

In **Indonesia**, the national government partnered with the World Bank and the Swiss State Secretariat for Economic Affairs and in 2018 announced its **National Disaster Risk Finance and Insurance Strategy** (OCHA, 2021). Motivated by past experience when the government relied primarily on the state budget to respond to disasters, the key goals of the new strategy are to:

- Protect the state budget through a dedicated mechanism to efficiently manage central government disaster expenditures;
- Strengthen central-regional fiscal coordination through clear roles and responsibilities for financing disaster response;
- Protect state assets through an indemnity insurance program to cover all agencies and ministries;
- Protect households and the poor, for example, through adaptive social safety net programs; and
- Strengthen DRFI coordination through training and dissemination of the strategy among related institutions.

The strategy puts forth a mix of financing instruments, including a USD $500 million **Disaster Pooling Fund** created in 2021 and managed by the country's Environmental Fund and Management Agency. The fund's intent is to "strengthen the synergy between climate change action and risk reduction" given that over 90% of Indonesia's natural disasters are meteorological and hydrological such as floods, landslides, strong winds, extreme weather, and hurricanes (Gov. of Indonesia, 2022). The Disaster Pooling Fund is also intended to invest in "activities to improve planning, such as introducing budget tracking for disaster-related expenditures" (World Bank, 2021a). More specifically, the fund supports disaster-related activities "at the pre-disaster, emergency, and post-disaster stages including risk transfer by obtaining insurance products to protect public assets and our vulnerable communities such as farmers and fishermen" (World Bank, 2021a). Another key component of the strategy is the government's **State Asset Insurance Program** which as of 2021 covers 4,300 buildings (World Bank, 2021a), up from 2,112 buildings and USD $1.03 billion in assets in 2019 (Gov. of Indonesia, 2022). The intention is to integrate this program with the government's membership in the Southeast Asia Disaster Risk Insurance Facility, together with other country members including the Philippines and Viet Nam ((World Bank, 2021a).

Prior to 2015 and the Sendai Framework, the **Philippines** introduced its **National Disaster Risk Reduction and Management Framework** (ADB, 2021). Established in 2011 and administered by the National Economic and Development Authority, the framework consists of stand-alone funding supplemented by Local Disaster Risk Reduction and Management Funds from provincial, city and municipal levels of government. Overall, 5% of local government income is earmarked for the framework, with 70% reserved specifically for use against disaster prevention, mitigation, preparedness, response, rehabilitation, and recovery projects as identified in a city's local disaster risk reduction and management plan. It is noted however, that "**the mechanism for disbursement for pre-disaster funding is less clear than for recovery funding and the annual allocation reverts back to the General Fund if it is not used within 2 years.**" The level of uncertainty about the level of funding for the framework was highlighted as an additional challenge, with possible solutions including "legal provisions to enforce a predetermined amount of budget allocated to the fund".

Other Examples of Governance Financing Approaches for Disaster Risk Reduction, Prevention, and Preparedness

In the context of SMEs specifically, UNDRR (2020a) reported that in 2019 the **Japan** Ministry of Economy, Trade and Industry issued its '**White Paper on Small and Medium Enterprises**' (Japan Ministry of Economy, Trade and Industry, 2019). The paper identified disaster risk reduction and prevention measures as priority actions for SMEs aligned with legislation such as the Small and Medium-sized Enterprises Business Enhancement Act. The Act was "enhanced to further encourage SMEs to reduce impacts of disasters and implementing disaster preparedness and recovery measures (i.e. formulation and implementation of a plan to strengthen business continuity, insurance purchase, etc.) in cooperation with relevant parties such as large enterprises, local governments, and other stakeholders" (UNDRR 2020). Other mechanisms were outlined including tax benefits, financial support and subsidies, for example, investment in disaster risk reduction and prevention measures in SMEs is incentivized by a special depreciation of 20% for capital investments. For prevention specifically, it includes more than JP¥600,000 for building accessories such as water-stop boards, fire prevention shutters, etc. In addition, two financial support interventions were established: a credit guarantee which adds a separate quota in the fidelity insurance of SMEs; and the expansion of loans for Business Continuity Plans by the Japan Finance Corporation. Other specific measures include reduced interest rates for loans to businesses located in areas prone to tsunami, floods and landslide damages. Reduced interest rates are also available for purchasing equipment related to disaster risk reduction.

In 2021, **India's 15th Finance Commission** issued its Recommendations for Disaster Risk Management (Government of India, 2021) which have been referred to by some experts as a "game changer" in disaster finance for the country (Sinha et al., 2021). The recommendations represent a shift from the expenditure-based approach to a "new methodology for allocation" whereby state-level disaster management financing is assessed using a combination of capacity, risk exposure, and hazard & vulnerability (Government of India, 2021). The new methodology for allocation includes continuation of the country's **National Disaster Risk Management Fund** (NDRMF) and State Disaster Risk Management Funds (SDRMF) with 20% earmarked for the National Disaster Mitigation Fund and the remaining 80% for the National disaster Response Fund (Government of India, 2021). Furthermore, the National Disaster Response Fund is sub-divided into three financing windows including Response & Relief (40%), Recovery and Reconstruction (30%), and Preparedness & Capacity Building (10%) (Government of India, 2021).

In **Australia**, the federal government's **Disaster Risk Reduction Package** and **National Partnership Agreement** supports the implementation of its National DRR Framework, and at the state level, the **Queensland Disaster Resilience and Mitigation Investment Framework** "provides guidance on effective investment decision-making and prioritisation to support disaster resilience and mitigation across Queensland, looking at both infrastructure and community resilience measures" (Gov. of Australia, 2022).

In the wake of the COVID-19 pandemic, **National Financial Inclusion Strategies** emerged as another approach to help "build back better" following a disaster and reduce the vulnerability of MSMs (Table 3). In studying finance for micro and small and medium-sized enterprises (MSMEs), UNESCAP (2021) reported that "in many Asia-Pacific developing countries, central banks and

financial authorities have promoted financial inclusion as part of their wider national inclusive growth strategies". Among some of the policy areas identified as important based on lessons learned during the pandemic include: increased digitalization by MSMEs; increased use of "regulatory sandboxes" to trial new financial products; expand supply chain and trade finance; raising awareness of the value of integrating ESG approaches into the operation of MSMEs; financing women-led MSMEs, among others (UNSESCAP, 2021).

Table 3. *Examples of national financial inclusion strategies in South-East Asia (from: UNSESCAP, 2021)*

Country	Strategy	Launch year	Responsible entity	Outline
Cambodia	National Financial Inclusion Strategy 2019–2025	2019	National Bank of Cambodia	1) Encourage savings in formal financial institutions. 2) Promote innovative credit products for MSMEs. 3) Enable the expansion of payment system capabilities. 4) Improve broader access to insurance. 5) Strengthen the capacity of the financial sector regulators. 6) Increase consumer empowerment and protection, and financial sector transparency.
Indonesia	National Strategy for Financial Inclusion	2016	Coordinating Ministry of Economic Affairs	1) Financial education. 2) Public property rights (improvement of collateral for loans, e.g. land titling and copyright/patent certificate). 3) Financial distribution channels and intermediary facilities (e.g. digital financial services and value chain financing). 4) Government financial services (including a guaranteed micro-finance programme and non-cash subsidy and payment). 5) Customer protection.
Lao PDR	Financial Inclusion Roadmap 2018–2025	2019	Bank of the Lao PDR	1) Improving the availability and sustainability of credit. 2) Consumer protection and empowerment. 3) Strengthening village funds. 4) Payment ecosystem development. 5) Extending the outreach of banks and other financial service providers (financial outreach).
Malaysia	Financial Inclusion Framework (through 2020)	2011	Bank Negara Malaysia	1) Innovative channels. 2) Innovative products and services. 3) Effective financial institutions and infrastructure. 4) Well informed and responsible underserved.
Myanmar	Myanmar Financial Inclusion Roadmap 2014-2020	2014	Central Bank of Myanmar	1) Strengthened financial sector to better support financial inclusion. i) Institutions critical to financial inclusion are created/strengthened. ii) Market barriers across product categories are addressed. 2) Financial inclusion for three priority segments. i) Improved financial access in agriculture. ii) Increased financial access for MSMEs. iii) Financial inclusion and resilience for low income households.
Philippines	The National Strategy for Financial Inclusion	2015	Financial Inclusion Steering Committee	1) Policy and regulation that facilitate access to a wide range of financial products and services for all. 2) Financial education and consumer protection. 3) Advocacy programmes. 4) Data and measurement for proper monitoring.
Viet Nam	National Financial Inclusion Strategy	2020	State Bank of Vietnam	1) Situation assessment. 2) Directions and solutions. 3) Roadmap.

Expenditure Reviews and Budget Tagging and Tracking

The practice of undertaking *Risk-sensitive Budget Reviews*, *Public Expenditure and Institutional Reviews (PIERS)* and *Budget Tagging and Tracking* for climate change as well as disaster risk management is evolving in the Asia and Pacific region. **Together with a DRR Financing Strategy, Budget Tagging and Tracking play a major role in making the case for DRR investments**. DRRFS shows how future DRR investments should be financed, while Budget Tagging and Tracking show current DRR investment expenditures. **Therefore, the difference between current and future DRR expenditure helps to clarify financing gaps and focus areas.**

Budget tagging is a critical mechanism to inform disaster risk reduction at the country level, including climate change adaptation. As of 2022, nine countries in Asia and Pacific are implementing climate budget tagging systems, including Bangladesh, Cambodia, India, Indonesia, Nepal, Pakistan, Philippines, Thailand, and Viet Nam (UNDP, 2022). UNDRR and IIED (2023) report that while some countries in the region are embarking on more multi-hazard DRR budget tagging approaches, such as in the Pacific Island countries of Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Solomon Islands, Tonga and Vanuatu, there currently is "no commonly accepted global framework or methodology for comprehensive disaster and climate budget tagging and tracking". In response to this, UNDRR and IIED are

developing a methodology for disaster and climate budget tagging and tracking expected to be finalized in the second half of 2023.

In 2021, the Philippines Institute for Development Studies undertook a **PIER focused on the Philippines Disaster Risk Reduction Management Act of 2010** (Domingo and Manejar, 2021). The review analysed "the status and trends of public investment and policy initiatives, and bottom-up and participatory mechanisms" and used qualitative inputs from key informant interviews and focus group discussions together with quantitative data encoded from the DILG-Full Disclosure Policy Portal (FDPP) 2015-2019.

The review found that the Disaster Risk Reduction Management Act "facilitated opportunities and invitations for participatory bottom-up approaches, but gaps existed on structured reporting and appraisal of DRRM budget and spending, and bottom-up participation". Furthermore, the review noted that there were "sub-optimal allocations despite the abundance of fiscal resource in both national and subnational governments regardless of location and income levels largely attributed to unclear issuances from oversight agencies or spending preferences of local administrations". It was concluded that while community resilience was stated to be the core of the Act: (i) institutional structures still needed to strengthen their enabling mechanisms for representation and stakeholder participation; (ii) expenditures should explicitly support more community-led initiatives as well as proposals from sectoral committees, and barangay councils; and (iii) monitoring and evaluation strategies should be able to capture and track accurately DRRM funds, goods and services, across agencies, fund sources, and varying enabling conditions.

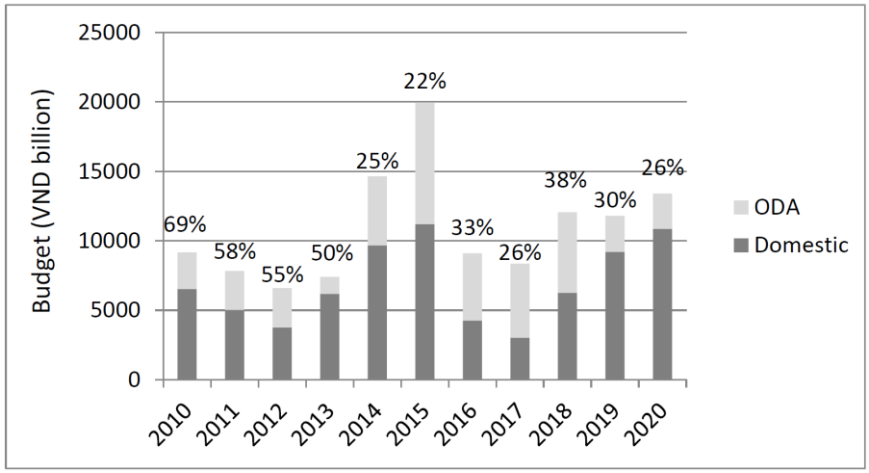
In 2021, the World Bank analyzed the **Vanuatu's economic and public finances through the lens of disaster resilience** drawing on two of the Bank's diagnostic tools: the **Country Economic Memorandum and Public Expenditure Review** (World Bank, 2021b). However, since the country's Public Financial Management system does not currently tag expenditure according to disaster risk reduction, no quantitative expenditure analysis was completed on this topic.

The **Republic of Korea's Prior Consultation System for Disaster and Safety Budgets** (PCSDSB) provides a mechanism for the Ministry of the Interior and Safety to request and review budgets from each central ministry and set yearly investment directions based on the information (Gov. of The Republic of Korea, 2022). The PCSDSB enables the government to manage DRR-related expenditures in an "integrated and efficient manner". The budget tracking data showed that the disaster and safety budget of 2022 was 21.9 trillion won, up by 6.3% from 2021 and representing 3.6% of the government's total budget. The Provisional Plan for the PCSDSB in 2023 is set to increase by 13.5% and consist of 377 programs totalling 24.3 trillion won (Gov. of The Republic of Korea, 2022).

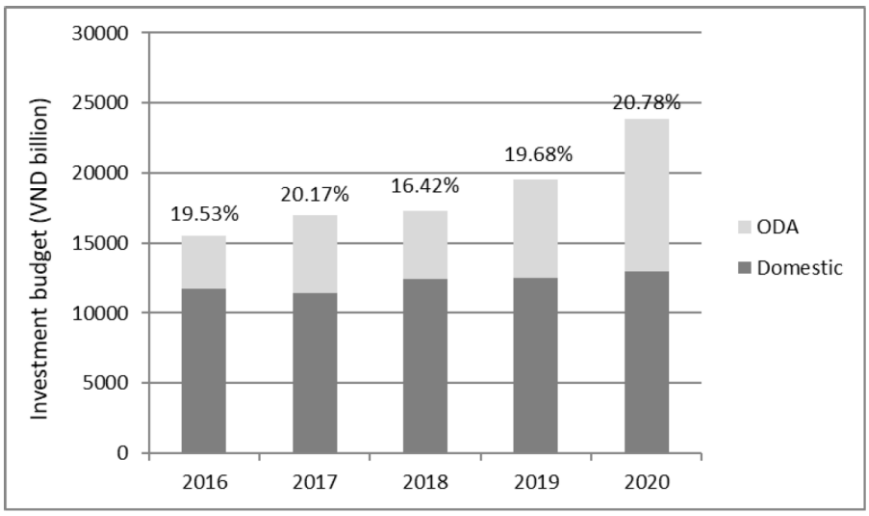
While examples of DRR-specific public expenditure reviews and budget tagging and tracking are few in the Asia-Pacific region, there are several examples of public expenditure reviews being undertaken specifically for climate change, including adaptation; however, most of these reviews occurred prior to 2015.

UNDRR and IIED (2023) report that nine Pacific Island countries have implemented the **Pacific Climate Change Finance Assessment Framework** (PCCFAF), including Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Solomon Islands, Tonga and Vanuatu. Originally launched in 2013, the PCCFAF builds on the climate public expenditure and institutional review methods and includes gender and social inclusion (UNDRR and IIED, 2023).

In 2022, **Viet Nam** issued its '**Climate Public Expenditure and Investment Review**' (Viet Nam Ministry of Planning and Investment and UNDP, 2022). The results of the review are shown in Figure 12 providing a climate change budget view at both the national (Figure 12a, for six ministries) and provincial levels (Figure 12b) and including ODA and domestic sources. At the national level, a slight increase in overall budgets for 2015-2020 relative to 2010-2014 is observed, despite the average percentage of total budget allocation decreasing from 51% to 29%, in the pre and post 2015 period, respectively. Importantly, the percentage of the climate budgets allocated to adaptation (i.e., disaster risk reduction) was 75% in 2019 and 2020. At the provincial level, adaptation was cited as the dominant expenditure, "representing over 90% of the climate budget" in all years from 2016 through 2020. The overall investment budget increased steadily from 2016-2020, with the percentage of allocation to climate change (mitigation and adaptation) relative to the overall budget remaining relatively stable over the period at an average of 19%.



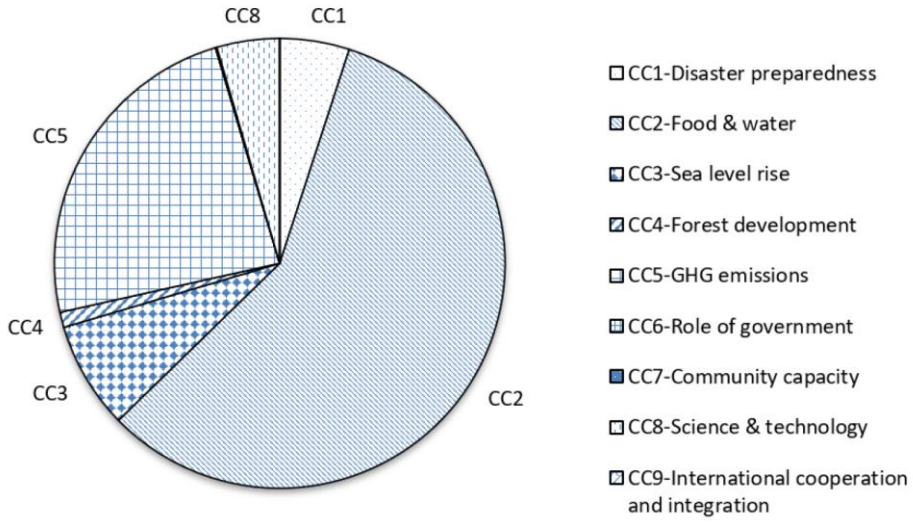
12a. *Climate change budget of 6 ministries, including ODA and domestic sources. The values above the bars represent the percentage of the overall budget that is allocated to climate change.*



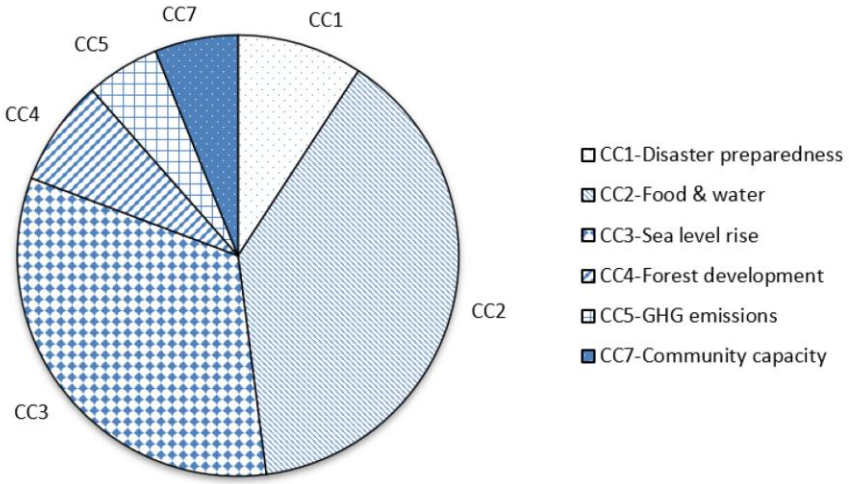
12b. *Climate change budget for 29 provinces, including ODA and domestic sources. The values above the bars represent the percentage of the overall budget that is allocated to climate change mitigation and adaptation.*

Figure 12*. Results of climate expenditure and investment review in Viet Nam (source: Viet Nam Ministry of Planning and Investment and UNDP, 2022).*

From a policy perspective, the allocation of climate change budgets at the national and provincial levels to different policy areas is shown in Figure 13. At the national level, over half of the expenditures were allocated to food and water objectives while at the provincial level, dominant expenditures included food and water, sea level rise, forest development, and GHG emissions.



13a*. Allocation of the climate change budget of 6 ministries to various policy areas.*



***13b**. Allocation of climate change budget for 29 provinces.*

***Figure 13**. Results of climate expenditure and investment review in Viet Nam (source: Viet Nam Ministry of Planning and Investment and UNDP, 2022).*

Prior to 2015 several climate change-related expenditure reviews were undertaken in Asia and Pacific, including for Nepal in 2011 followed by Bangladesh, Thailand, Samoa and Cambodia thereafter (UNDP, 2015), as well as other nations including Vanuatu in 2014 (Vanuatu Ministry of Climate Change Adaptation, Geohazards, Meteorology and Energy, 2014) and Pakistan in 2015 (Pakistan Ministry of Climate Change and UNDP, 2015). Among the notable trends prior to 2015, the proportion of total budget expenditure that was assessed as being climate related for Nepal, Bangladesh, Thailand, Samoa and Cambodia ranged from 2.7% to 16.9% (UNDP, 2015)[18]. Regarding the allocation to adaptation efforts, and by extension, risk reduction, the breakdown based on three countries where data was available suggests that adaptation expenditure was between 70-80% of total climate expenditure (UNDP, 2015).

There exist a range of governance approaches for integrating climate change mitigation and adaptation into the budgeting process of national governments, including: budget circulars issued to ministries, expenditure tracking, transparency and disclosures, performance orientation, legislative scrutiny, benefit analysis, risk screening, and risk-informed monitoring and evaluation. A summary of such approaches is provided by UNDP (2021), including several examples from the Asia and Pacific region (see Table 4).

[18] The authors provide a cautionary note regarding the findings, describing that the results are affected by judgement on relative relevance of expenditure categories and that in some countries there is no explicit evidence on how much climate-proofing is undertaken for infrastructure projects described as having taken climate proofing into account.

***Table 4**. Approaches for integrating climate change into budgeting (source: UNDP, 2021, based on OECD, UNDP, and World Bank data).*

Country	Approach	Description
Philippines	Budget Circular	In the Philippines, a Joint Memorandum Circular issued by the Department of Budget and Management and the Climate Change Commission guides spending ministries on identifying projects/activities/programmes (P/A/Ps) and classifying climate-related adaptation and mitigation expenditures. The guidance also includes disaggregation of expenditure items by codes adopted for object-wise recurrent and capital outlays.
	Expenditure Tracking	Objective-based definition adopted, and 247 activities aligned with strategic priorities identified in the National Climate Change Action Plan (NCCAP) that are used to list positive climate-relevant items for expenditure classification. Ex-ante and Ex-post. 6-digit code introduced to tag line items for climate relevance. National and subnational levels.
Bangladesh	Budget Circular	Bangladesh has integrated climate change into the Budget Circular issued by the MoF. This was complemented by the Planning Manual Guidelines of the Planning Commissions. Further efforts are directed to amend the project proposal template for the ex-ante extraction of climate finance data.
	Expenditure Tracking	Climate Public Finance Tracking Methodology (CPFTM) adopted by MoF. Ex-ante and Ex-post. A 4-digit segment in the CoA tracks the climate-relevant cost centres. National Government (30 of 45 ministries covered).
	Transparency and disclosures	The Climate Budget Report is prepared based on climate data and information in the budgets of relevant Ministries/Divisions to inform Parliamentarians and other stakeholders of the pattern of resource allocation to address the adverse fallouts of climate change. The Citizens Climate Budget Report is an annual publication presented in simple language and published for a wider audience using infographics. The Government invites CSOs to participate in pre-budget consultations.
Pakistan	Budget Circular	In Pakistan, the MoF has amended the Budget Call Circular (BCC), requiring the spending ministries to prepare budget estimates with a climate perspective. The Ministry of Planning has revised the project manual (2019) that includes guidelines for identifying and screening projects with weightage for climate-relevant expenditure.
	Expenditure tracking	Climate change typology was developed by the Ministry of Climate Change grounded in the National CC Policy. Ex-post. Cost centres approved for budget execution are tagged for climate relevance. National and subnational levels, in the pilot stage.
	Performance orientation	Pakistan has adopted performance-based budgeting and submits it as part of the Executive Budget Proposal to Parliament. For climate change, on a pilot basis, the relevant information on the outcomes and outputs is provided in the medium-term budgets of the pilot ministries (Water and Food Security) and in comparable sectors at the subnational level (Agriculture and Irrigation). The recent enactment of a PFM Law (2019) has made performance evaluation mandatory, stipulating the submission of a mid-year budget performance review to Parliament.

	Legislative scrutiny	Legislative scrutiny of the Public Investment Programme is conducted with a climate change perspective by the Parliamentary Standing Committee on Climate Change. The current focus of the review is major public investments. The records of Parliamentary debates are not made public; however, documents are available with the Secretariat with regard to questions tabled by the Parliamentarians and the response by the Executive.
Cambodia	Climate Change Benefit Analysis	In Cambodia, CCBA has been done for projects for the Ministry of Public Works and Transport and the Ministry of Rural Development.
Fiji	Risk-informed monitoring and evaluation	In Fiji, the government has started risk informing all development projects implemented by the Ministry of Rural and Maritime Development and Disaster Management. Risk screening toolkits and risk-informed monitoring and evaluation checklists have been prepared by the Government of Fiji with support from UNDP.
Thailand	Climate Change Benefit Analysis	In Thailand, Climate Change Benefit Guidelines were developed in 2015 as a new feature in the existing process for justifying budget requests, which is to be used alongside the other techniques required for impact assessment, such as Environmental Impact Analysis (EIA) and Cost-Benefit Analysis (CBA).43
Tonga	Risk Screening Toolkit	The Government of Tonga adopted the risk screening toolkit in 2020, making it an integral part of the selection and preparation process of major infrastructure projects. The project proposal application is a mandatory submission for the project proposal. It consists of the risk screening toolkit that, alongside assessing the key risks to and from the projects, also takes climate change-related risks into account. The application of the risk assessment tool integrates climate change in the budget formulation stage. For the 2021 budget, the National Planning Division (Office of the Prime Minister) used the risk assessment toolkit in the project selection process. A sustained application would facilitate the government in climate-proofing infrastructure development.
Indonesia	Expenditure tracking	Focuses on mitigation and adaptation. MoF provides guidelines/manual books on climate budget tagging. The guidelines are being updated in 2021. Ex-ante and Ex-post. At the output level in programme-based budgeting, tagging takes place, which is reconciled in the budget negotiation process. National Government – only to six ministries that are relevant to the National Action Plan for Greenhouse Gas Emissions Reduction. Since 2018, CC adaptation tagging has also been implemented by eight ministries. Climate budget tagging expanded to the sub-national level. The piloting process was conducted at 11 provinces (in 2020) and followed by six provinces, city & districts in 2021.
Nepal	Expenditure tracking Performance orientation Legislative scrutiny	Climate change calculation methodology adopted at the national level. Ex-Ante (Budget templates include CC-relevant columns for identification and for CC-relevant budget allocations. Nepal has started linking climate-related performance information to budget activities. The Government has begun to specify performance indicators for climate projects, starting with the Ministry of Agriculture and Livestock Development (MoALD). The MoF plans to extend the method developed by the Ministry of Agriculture to other ministries. The Parliamentary Committee for Environmental Protection has legislative and oversight functions, including work on climate change. Other key committees are the Finance Committee and the Public Accounts

	Transparency and disclosures	Committee, which have budget approval and public accounts oversight mandate. Parliament, with the technical support of UNDP, has developed a practical guide for members of Parliament and the staff for scrutinizing funds identified in the annual government budget and during the various stages of budgeting, including development, approval, implementation, and monitoring. To raise public awareness of Government actions, a Citizens' Climate Budget was prepared in partnership with a CSO. Several CSOs in Nepal are active on climate change issues. The CSOs undertake research and lobby for and support the Government in the development of climate change policies and responses. The Citizens' Budget visualizes climate-related budget figures and trends in a set of simplified infographics in both Nepali and English languages.
India	Performance orientation Transparency and disclosures	The State of Odisha has started linking performance information to budget activities. It has integrated the Climate Change Relevance Share and Climate Change Sensitivity Share in the budget process, now part of regular budgeting. This will inform relevant stakeholders regarding the increase or decrease of the relevance of climate change in the budget. Climate change performance information, covering outputs and objectives, including primary and secondary objectives, are available for all budgetary schemes for Odisha. The recent adoption of outcome-based budgeting is a step towards policy-based budgeting. Odisha publishes its Climate Budget and engages civil society to comment on pre-budget documents. In its Climate Budget, Odisha has identified Climate Change Relevance Share and Climate Change Sensitivity Share for 11 key sectors. This is published as part of its regular budget process. However, the extent to which the citizens' engagement influences budget decisions is not clear.

Additional governance approaches for DRR financing are featured in Annex A based on country submittals to the Sendai Framework Mid-term Review and status reports submitted between 2020-22.

Public Finance Instruments

There exists an array of public finance instruments to support risk transferring and disaster risk reduction investments at national and subnational levels, namely: domestic resource mobilization, grants & transfers, debt financing, equity financing and public-private partnerships, and insurance. For example, Box 4 provides a snapshot of the mix of financing instruments deployed by the Government of Tonga, categorized according to whether the instruments are deployed *ex ante or ex post*.

Box 4. Tonga's Mix of DR Financing Instruments

As part of its Disaster Risk Financing Strategy (DRFS) 2021-25, the Government of Tonga reviewed its mix of prearranged instruments and post-disaster funding sources directed at disaster response and recovery.

Ex ante financing instruments:

- **Contingency fund**. The Public Finance Management Act 2002 sets a contingency fund with a maximum of 5 percent of the annual budget to cover unforeseen expenditures beyond disasters (~US$2 million in 2020).
- **The National Emergency Fund (NEF). Annual appropriation of up to ~US$2 million.**
- **Contingent financing**. Includes ADB's Policy-Based Contingent Disaster Financing Instrument, with a maximum payout of US$10 million and a pending arrangement with the World Bank on development policy financing with a catastrophe-deferred drawdown option.
- **Sovereign insurance**. Includes parametric insurance from the Pacific Catastrophic Risk Insurance Company with a maximum possible payout of $6.9 million per year.

Ex post financing instruments:

- **Budget reallocations and capital budget realignments**
- **Supplementary budgets**
- **Post-disaster international assistance**

Source: Tonga Ministry of Finance (2021).

Examples of DRR finance instruments used by governments in Asia and Pacific are elaborated in the sections that follow. Additional examples are featured in Annex B based on country submittals to the Sendai Framework Mid-term Review and status reports submitted between 2020-22.

Domestic Resource Mobilization

Domestic resource mobilization refers to sources of finance generated by national governments through various policy instruments including **taxes, fees, tariffs, land capture value, and subsidy reform.**

Government revenues comprise the predominant mode of financing for certain sectors. For example, the OECD (2021) reported that overall, ODA is a "small portion" of total expenditure on water infrastructure in Asia and Pacific, with **public taxes** representing the main source of finance for water supply and sanitation expenditure, based on data prior to 2015 (see Figure 14). It was further highlighted that "significant levels of public expenditure (>5% GDP) have occurred in several economies, notably China, Bhutan, Viet Nam, India, and the Maldives."

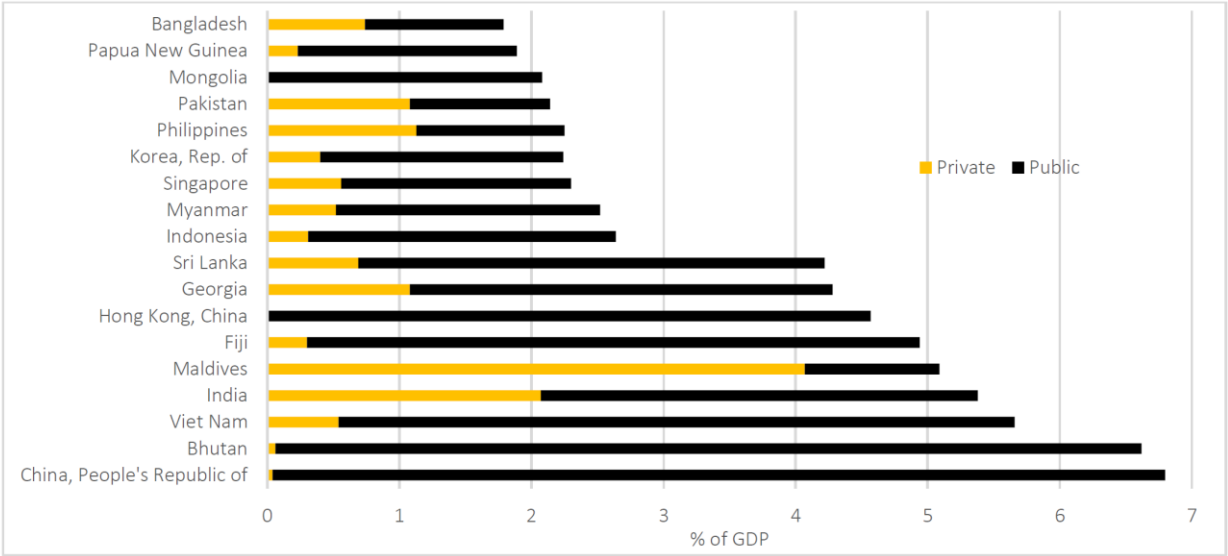


***Figure 14**. Public revenue for water supply and sanitation in Asia and Pacific (source: OECD, 2021).*

Tariffs are another source of public revenue used by national governments for funding disaster risk reduction and resilience. This is the case for making water supply and sanitation services financially sustainable; however, over half of Asia and Pacific countries reporting to a 2018 survey indicated that water supply and sanitation tariffs were "insufficient to recover 80% of operation and maintenance costs, let alone capital costs" (OECD, 2021). It was concluded that tariffs were an under-utilized public revenue source, owing to affordability constraints – "for many countries the water bill is greater than the 3% threshold heuristically recommended as the maximum level of disposal income" (OECD, 2021).

As well, several states in **India**, implemented **flat tariffs** to help conserve electricity and groundwater supplies. The tariffs "enhanced predictability in terms of quantity and quality of electricity access for both farmers and non-farmers, resulting in a significant decline in the power consumed by the agricultural sector and cost of related subsidies". Additionally, there was a decrease in groundwater consumption and groundwater well owners experienced "declined risk in terms of pump maintenance costs and power shortages (OECD, 2021).

Land value capture is another source of public revenue that is being used to fund development projects across Asia and Pacific (Table 5). The Asian Development Bank emphasizes that land value capture "offers the opportunity to strategically direct development to less disaster-prone areas, share costs for disaster-mitigating infrastructure, and provide incentives for others to invest in disaster risk-reducing measures" (ADB, 2020). It is further described that land value capture can be achieved through six different mechanisms, including: (i) the strategic sale or lease of public land; (ii) development charges to investors; (iii) the sale of development rights or density credits; (iv) land pooling or readjustment; (v) betterment levies; and (vi) tax increment financing (ADB, 2020).

***Table 5**. Land value capture examples in Asia and Pacific (source: World Bank, 2018).*

Country	Land Value Capture Approach	Descriptions
India	**Leveraging public assets**: Disposition of publicly owned assets to a private developer whereby value is realized either directly (e.g. sale proceeds) or through creation of future development value or socioeconomic benefit. **Betterment levies**: An additional tax/special rate levied to property owners within a specifically defined geographic area, which is regarded as the main concentration of beneficiaries of respective publicly funded infrastructure upgrades	**Purpose**: Aims to provide the city of Ahmedabad with an improved and accessible waterfront along the Sabarmati River, reduce erosion and exposure of the city to flood risk, upgrade sewers, and rehabilitate and resettle slums. **Value capture component**: Cash for recovery of capital expenditure and operating costs comes from sales of reclaimed and serviced land for commercial development. Completion of major infrastructural components have already led to increased land values, thus reducing the amount of land that needs to be transacted for servicing the loans. **Purpose**: The Local Municipal Corporation in Pune is considering complex improvements on the banks of three rivers flowing through the municipality (building embankments for flood protection, sewage treatment, desilting, landscaping, and enhancing connectivity between the banks). **Value capture component**: Recovery of municipal costs through charging flood premiums on top of construction permitting fees. Changes in town planning codes proposed to allow development in the 25-year flood zones on condition of recovering a flood premium from developers.
Philippines	**Leveraging public assets**: Disposition of publicly owned assets to a private developer whereby value is realized either directly (e.g. sale proceeds) or through creation of future development value or socioeconomic benefit.	**Purpose**: An underground drainage detention structure serving as a flood control facility for Bonifacio Global City. Core element of an elaborate drainage system that collects rainwater from paved urban surfaces then releases it under controlled conditions. **Value capture component**: Funding infrastructure improvements with land sale proceeds post entitlement of undeveloped military lands to real estate development area. Construction was financed by proceeds from the $800 million land sale following packaging of public-private interests into a development joint venture.
Viet Nam	**Land pooling**: A participatory process in which landowners (or occupants) voluntarily contribute a certain percentage of their land for infrastructure development and for sale to cover part of project cost. In return, each landowner receives a serviced plot of smaller area but with higher value within the same neighborhood	**Purpose**: With technical assistance from the World Bank, Tra Vinh city in Vietnam is piloting a land pooling & readjustment approach to redeveloping a centrally located low-income neighborhood, in order to address issues of flooding and lack of drainage network and access roads. **Value capture component**: As this is the first pilot project, the city plans to cover about 70% of the total investment cost from its budget in order to reduce land contribution from the land users and gain support from the community. The remaining 30% of the total cost will be covered by sale of surplus land. For agriculture land, each land user will

		contribute 33% of their land area into the project, and for residential land each land user will contribute 13%. Preliminary land value assessment shows that land price on average is estimated to increase by 3.5 to 5 times after the pilot project.

Grants and Transfers

Grants and transfers by governments are among the most common instruments for financing investments in disaster risk reduction and resilience. Grants come in various shapes and sizes, including earmarked grants, top-up incremental grants, and performance-based or conditional grants whereby certain criteria must be met, such as having a disaster risk reduction plan in place (ADB, 2020). Other types of instruments and mechanisms in the class of grants and transfers include cost-and revenue-sharing, impact investments, and more recently, payment for ecosystem services.

For instance, the Government of **Nepal** deploys a '**Minimum Conditions and Performance Grant**' for incentivising disaster risk reduction at the subnational and local level, complimenting Nepal's Local Adaptation Plans of Action (ADB, 2020). Specifically, grant funding for local governments and developers is adjusted annually based on "how their plans score across a range of criteria, including requirements for emergency services and disaster management". As further incentive, the top six performing municipalities receive varying amounts of cash awards, leading to "a range of disaster management activities, including the establishment of disaster management committees at the ward level throughout Kathmandu Valley, increasing budgets to spread public awareness of hazards, and establishing local networks for knowledge sharing of disaster preparedness".

Regarding the **payment for ecosystem services** instrument, the city of Kumamoto, **Japan** implemented a scheme to reverse groundwater depletion. It was initially launched by the private sector in partnership with farmers, but later expanded to include local government, allowing for "a more sustained response as well as broader collaboration with an increased number of stakeholders from the public and private sectors as well as civil society" (OECD, 2021). Overall, the payment for ecosystem services programme was found to have provided "effective incentives for groundwater recharge while providing greater security of supply for groundwater users".

Debt Financing

National governments can deploy debt financing instruments to catalyze investment in disaster risk reduction and resilience. Specific instruments include impact bonds (i.e., green, sustainability, and catastrophe bonds) and public credit guarantee schemes.

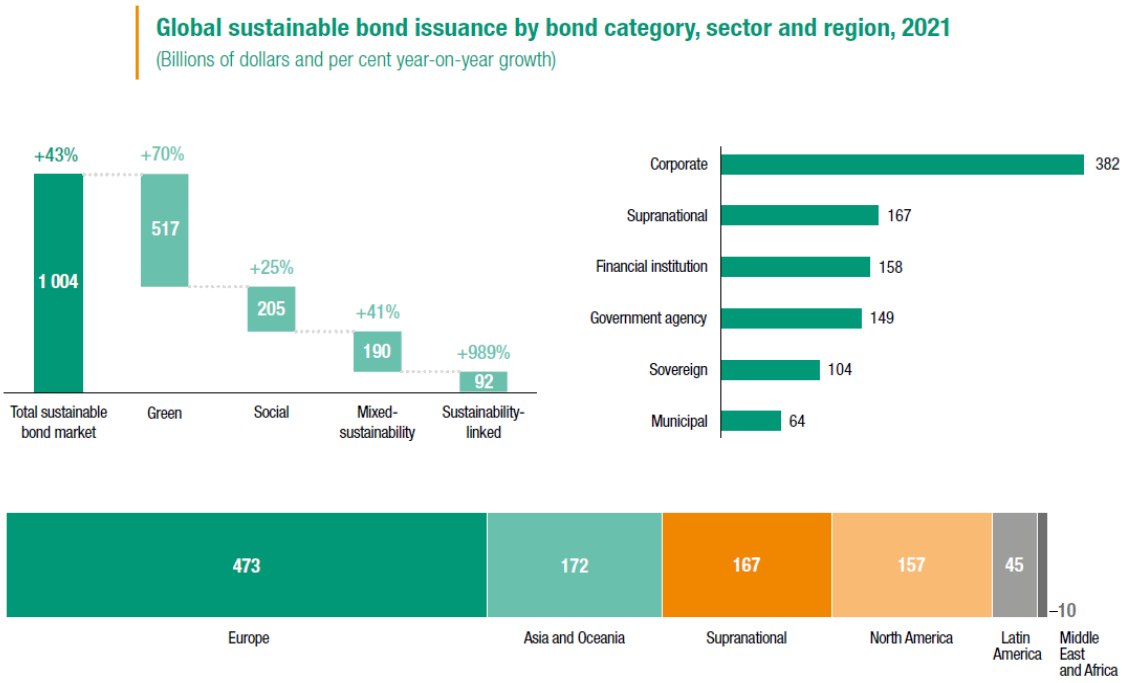
Bonds. A bond is a type of loan issued by a sovereign government and provided to another, usually smaller, entity or entities (e.g., companies, local governments). The government lender raises the necessary capital needed to issue the loan by selling bonds to the public. The bond has a pre-defined payback arrangement, including a specified time period and rate of interest paid over and above the principal cost of the bond.

There are two main types of bonds relevant for disaster risk reduction. First, bonds that are used to finance eligible green or social projects are referred to as *use-of-proceeds bonds* and include three main sub-categories (UNCTAD 2022c):

- *Green bonds*: Instruments that raise funds for projects that have environmental benefits including renewable energy, green buildings and sustainable agriculture
- *Social bonds*: Instruments that raise funds for projects that address or mitigate a specific social issue and/or seek to achieve positive social outcomes, such as improving food security and access to education, health care and financing, especially but not exclusively for target populations
- *Mixed-sustainability bonds:* Instruments that raise funds for projects that have both environmental and social benefits

Another type of bond is the sustainability-linked bond (SLBs). This class is relatively new and differs from use-of-proceed bonds in that SLBs don't have constraints on how the proceeds can be used (UNCTAD 2022c). SLBs are an innovative instrument that provides incentive to the invested project: the rate of return offered is increased if pre-set performance targets are not met (i.e., % of renewable energy installed in a certain time period). The International Capital Market Association has issued documents outlining the principles for green, social, sustainability and SLBs to help ensure that issuers of bonds provide transparent credentials and disclosures in an effort to maintain the integrity of the markets (ICMA, n.d.).

The global sustainable bond market exceeded $1 trillion in 2021 and is anticipated to exceed $1.5 trillion in 2022 (Figure 15; UNCTAD 2022c). Sustainable bonds issued by governments, government agencies and municipalities made up 31% of the global sustainable bond market in 2021 for a total of $317 billion. Regionally, the sustainable bond market in Asia and Oceania totalled $172 billion for all issuer types, including corporate and government ($100 billion in China alone), comprising 17% of the global market, second only to Europe.



Source: UNCTAD, based on information from the Climate Bonds Initiative and Environmental Finance.
Note: Total market value can vary slightly by data source and provisional value calculations.

***Figure 15**. Global sustainable bond market (source: UNCTAD 2022c).*

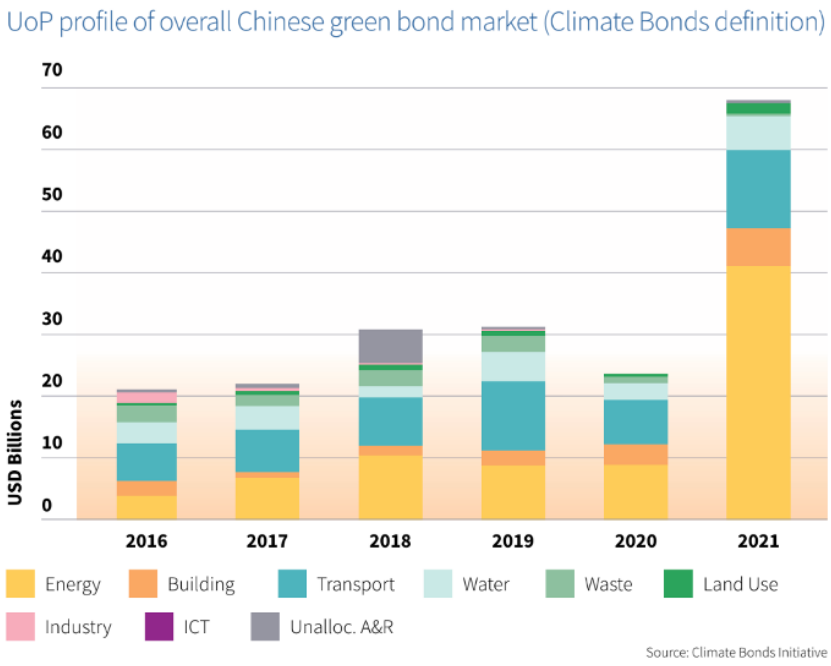
Fiji for example, was among the first developing countries to issue a '**Sovereign Green Bond**' to support climate change mitigation and adaptation. In 2017, the government raised $50 million in its first tranche, which oversubscribed by more than double. Issuance of the bond was motivated by economic losses from Tropical Cyclone Winston in 2016, comparable to one-third of its annual GDP. With Fiji comprising 300 low-lying volcanic islands and atolls, the country is at high risk from cyclones and flooding events, with nearly 20% of the population projected to face displacement due to climate change by 2050 (ADB, 2020).

In 2020, the Government of **Bhutan** announced its first '**Sovereign Bond**' to increase investment in the wake of the Covid-19 pandemic (UNESCAP, 2020a). The offering included a 3-year domestic bond of US$ 41 million (or Nu. 3 billion) at an annual coupon rate of 6.5 per cent to support increasing fiscal needs and was oversubscribed by 300%. Financial institutions were the dominant subscribers, followed by pension and insurance companies as well as civil society organizations and individual investors. While the bond was not prescriptive for sustainable or disaster risk reduction efforts, the success of the issuance served as a proof-of-concept for a developing economy with a small population base and underdeveloped capital market and paves the way for the creation of green and sustainability bonds to finance infrastructure projects, waste management, biodiversity, and climate change mitigation and adaptation (UNESCAP, 2020a).

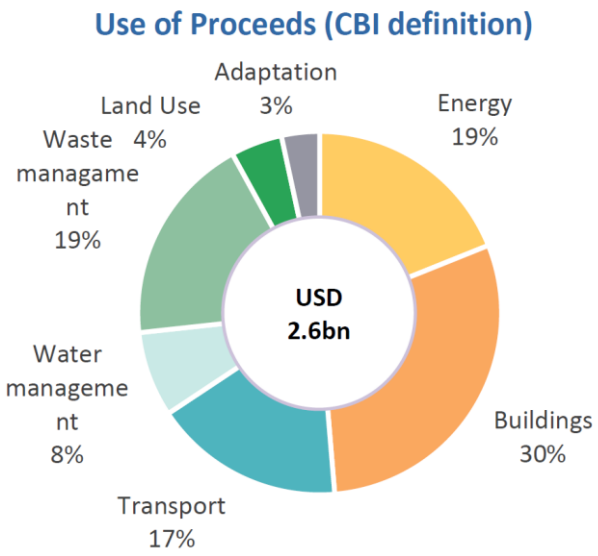
In 2020, **Singapore** established guidelines for its green bond issuance designed to support the Singapore Green Plan 2030, including investment for climate change adaptation and sustainable management of natural resources and land use (Monetary Authority of Singapore, 2022a). The

$2.4 billion, 50-year inaugural **Sovereign Green Bond** was priced at 3.04% and was oversubscribed by 2.26 times the amount offered (Monetary Authority of Singapore, 2022b).

In 2022, **China's Green Bonds Standards Committee** released its Green Bond Principles stipulating that 100% of funds raised must be used for green projects, up from 50% originally (China Dialogue, 2022). In 2021, it was reported that China's green bond market was USD44bn higher than the prior year (2020), making it the fastest growing market globally (Climate Bonds Initiative, 2022a). It was reported in 2021 that 88.3% of the proceeds were earmarked for Renewable Energy, Low Carbon Transport, and Low Carbon Building (Figure 16a, Climate Bonds Initiative, 2022b). Data from 2018 suggest that proceeds specifically funding "climate change adaptation" totalled 3% (see Figure 16b; Climate Bonds Initiative, 2018a).



(a) Use of proceeds profile for China green bond market – 2016 through 2021



(b) Use of proceeds profile for China green bond market – 2018

***Figure 16**. Land value capture examples in Asia and Pacific (source: World Bank, 2018).*

Public credit guarantee schemes. The World Bank (2015) highlights that 68% of SMEs in emerging markets are either unserved or underserved by financial institutions, with a global credit gap approaching $1 trillion. One instrument for helping to shrink this gap is a public credit guarantee scheme, a government intervention to unlock finance by absorbing a portion of a lender's losses on loans to SMEs. For example, the World Bank's First Initiative is a tool to help governments implement credit guarantee schemes through a set of principles critical to the success of such schemes (World Bank, 2015).

Public credit guarantee schemes proved particularly useful during the COVID-19 pandemic where countries across Asia and Pacific swiftly rolled out support (ADB, 2022b). For example:

- **Sri Lanka**: The Monetary Board of the Central Bank of Sri Lanka implemented a Credit Guarantee and Interest Subsidy Scheme to accelerate lending by banks to businesses adversely affected by the COVID-19 pandemic. A credit guarantee was provided to banks ranging from 80% for smaller loans to 50% for relatively large loans.
- **Japan**: For SMEs having a decline in sales of 20% or more from the previous year, they are eligible to make use of a financing guarantee up to 100% under a framework of up to 280 million yen.
- **Republic of Korea**: Expansion of financial loans and guarantees for SMEs and affected households and businesses (W58 trillion).
- **Malaysia**: $7.52 million provided as a guarantee under the Supply Chain Finance Program.
- **Timor-Leste**: Extended access to the Credit Guarantee System to microenterprises, increasing the type of economic activities eligible for the program.

Equity Financing and Public-Private Partnerships

Equity financing represents a class of instruments whereby national governments can hold shares in public-private partnerships or in utilities and other infrastructure assets that attract capital market investments, extending its investment capabilities beyond debt and grant financing instruments (OECD, 2021). There exist a range of instrument types within the equity class, including blended finance, co-investment, aggregation, and securitization.

Blended finance is a strategic use of development funding, such as from ODA and philanthropic organizations, with a dual aim of mobilizing additional capital for investments and strengthening the financial systems upon which investments rely (OECD, 2021). Public sector investment in a blended finance approach effectively improves the risk-return profile of investments, making risk reduction and resilience projects more attractive to commercial finance (OECD, 2021).

In another example, the ADB designed the **Green Finance Catalyzing Facility** to create localized finance solutions that could drive green growth by leveraging public-private sectoral funds (ADB, 2017a; as cited in OECD, 2021). The facility proactively generates bankable green projects to attract public, institutional, and commercial finance, rather than raising finance based on the financial strength of the project sponsors. Initially piloted through the **China's Shandong Green Development Fund** Project (ADB, n.d.(a)), eligible projects under the facility include water and sanitation for decreasing pollution, climate change and disaster resilience, and land use for protecting the environment and biodiversity.

The **Shandong Green Development Fund** itself was designed "to implement an innovative, replicable and scalable form of co-financing facility that will tap new funding sources, both public and private, leveraging catalyst concessional sources of finance for a pipeline of viable climate-resilient and low-emission investments" (ADB, 2020). Specifically, investment for adaptation is intended to be at least 25% of the fund's portfolio, including for coastal protection, flood control, water resilience, and greening or heat island (ADB, 2020).

Similar to the above example, the ADB's **ASEAN Catalytic Green Finance Facility** was launched in 2019 to attract private capital by mitigating risks through a blended finance approach (OECD, 2021). An initiative of the ASEAN Infrastructure Fund, the facility provides ASEAN member governments with technical assistance and access to over $1 billion in loans from co-financing partners (ADB, n.d.(b)). Green infrastructure projects are effectively de-risked, making them more attractive to private capital investors by providing technical assistance to identify and prepare commercially viable projects and loans to cover upfront capital costs (ADB, n.d.(b)). Eligible projects under this facility include projects that promote renewable energy, energy efficiency, sustainable urban transport, water supply, waste management, and climate-resilient agriculture.

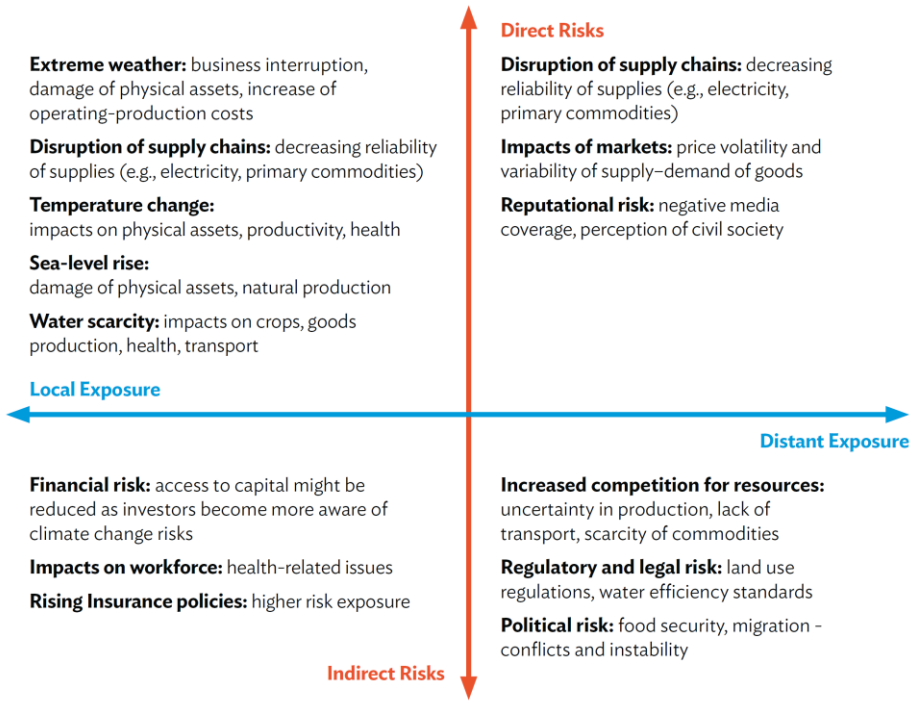
In **Nepal**, a **blended finance** approach was used to help support vulnerable hydropower facilities (UNEP Finance Initiative, 2019). A $2.1 million grant from the 'Building Climate Resilient Communities through Private Sector Participation' programme funded by the Pilot Program for Climate Resilience, enabled a $6.6 million loan from the International Financial Corporation.

In **China**, **securitization** is used as a mechanism to aggregate a bundle of small projects that previously could not provide any liquidity to their owners (Climate Bonds Initiative, 2018b; in ADB, 2020). As of 2018, 11 asset-backed securities had been issued totalling US 2.4 billion secured on

receivables from renewable energy, public transport, and water and wastewater management (Climate Bonds Initiative, 2018). For example, the Beijing Enterprises Water Group, which operates 19 water treatment plants via takeover-operate-transfer and build-operate-transfer types of public-private partnership contracts, issued a green asset-backed security on several of its plants. In this case, the security is "backed by the receivables from those water treatment services fee, with the proceeds being invested into nine infrastructure projects for water pollution prevention, water resource recycling, and water adaptation (Climate Bonds Initiative, 2018; in ADB, 2020)."

Section Four: Private Financing Review

The private sector has a significant stake and interest in reducing risks from disaster. For instance, in the context of climate change, there are a range of direct and indirect risks to businesses, both locally and at a distance (see Figure 17, ADB, 2022a). Small-and medium-sized enterprises (SMEs) are particularly vulnerable to climate change for a number reasons: their limited geographic range; lower likelihood of having taken preventive measures or lacking insurance for disaster-related losses; fewer cash reserves or accessible funds through credit and loans; and lower tolerance for disruption (PWC 2013, IRP 2016, UNDP 2013; in UNDRR, 2020a).

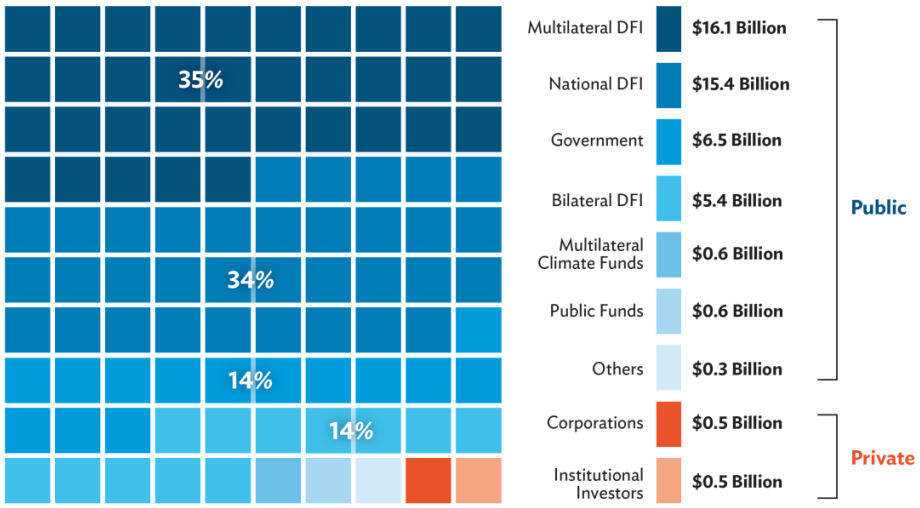


Source: Adapted from Tall et al. (2021).

Figure 17. *Direct and indirect physical risks of climate change on businesses (source: ADB, 2022a).*

Despite the stakes, overall engagement of the private sector in climate change adaptation efforts has been limited. In the context of financial contributions, the ADB (2022) reports that of the approximately $46 billion in average annual climate change adaptation finance, only around 2% of the comes from the private sector (see Figure 18, ADB, 2022a; see also World Bank GFDRR, 2021)[19]. This observation seems to also be reflected in project-level financing, for instance, only 2 of the Green Climate Fund's 74 adaptation projects were developed by private sector entities. Market-related factors were cited as contributing to this overall low participation rate, including fewer investable opportunities and predictable return flows, fewer reactive business models, lack of predictability, and the up-front costs of adaptation projects (Binet et al. 2021; in ADB, 2022a).

[19] It should be noted that data on adaptation finance from the private sector is largely missing (Climate Policy Initiative 2021; in ADB, 2022)."



DFI = development finance institution.
Source: Climate Policy Initiative (2021).

Figure 18. *Average annual climate change adaptation finance, 2019-20. (source: ADB, 2022a).*

Fortunately, there are a growing number of innovative examples from around the world on private sector governance and financing instruments for supporting disaster risk reduction, including in Asia and Pacific. Motivation to act is driven by return on investment, positive social and environmental impacts, the recommendations of the global Task Force on Climate-related Disclosures, as well as shareholder activism (ADB, 2022a). This section features examples of progress since the Sendai Framework came into force in 2015.

Governance Approaches in the Private Sector

Larger private sector firms have deployed a range of governance approaches for engaging in disaster risk reduction, including specifically in the arena of climate adaptation. Examples include risk disclosures, integration of Environmental, Social and Governance (ESG) principles and approaches, enterprise risk management and business continuity planning, as well as foresight methods including stress testing and scenario analysis.

In its review on the resilience of SMEs to disasters, the UNDRR (2020a) concluded that among the key success factors for resilience building was combining Enterprise Risk Management and Business Continuity Management mechanisms to better incorporate and increase the focus on prevention. Encouragingly, in a 2020 survey of SMEs in India and the Philippines, approximately half of businesses responded that they had carried out some form of risk assessment prior to new investments.

For example, the **Philippine Disaster Resilience Foundation** (PDRF) has trained more than 7,000 private sector companies in **Business Continuity Planning**, focusing on a range of hazards. The Philippine Government convened relevant agencies and private sector organizations to improve

public-private collaboration across business sectors, a collaboration which continues to build resilience amongst SMEs in the wake of the COVID-19 pandemic (GAR 2019, ARISE Philippines; in UNDRR, 2020a).

On the downside, evidence suggests that a focus on ensuring business continuity alone is neither sufficient nor cost effective given the limited capital of SMEs in the face of multiple hazards and systemic risks (UNDRR, 2020a). Capacity building for **integrating enterprise risk management together with business continuity planning** to mainstream risk prevention and better connect risk analysis and reduction efforts is particularly important for resilience building in the context of private sector governance (PwC, 2020; in UNDRR, 2020a).

Disclosure of Environmental, Social, and Governance (ESG) criteria was a growing trend in the Asia and Pacific region over the period 2010 through 2020, particularly in the case of Hong Kong since 2016 (Bloomberg, 2021). ESG guidelines are also evolving in countries across the region: relating to green finance and green bonds in Hong Kong and China and adoption of climate-related disclosures in Japan and Taiwan, among others (Bloomberg, 2021). These trends have added to the need for global disclosure standards, and in 2022, the International Sustainability Standards Board (ISSB) issued its exposure draft on *General Requirements for Disclosure of Sustainability-related Financial Information* (IFRS, 2022). Current draft requirements call for entities to disclose "the resilience of its strategy (including its business model) to significant sustainability-related risks", among other aspects.

In the context of climate-related disclosures, the G20 Finance Ministers and Central Bank Governors asked the Financial Stability Board (FSB) to review how the financial sector could better take account of climate-related issues. In response, the FSB established the **Task Force on Climate-related Financial Disclosures** (TCFD) to create voluntary framework for climate-related financial disclosures to help investors and other stakeholders better understand material risks to businesses (TCFD, 2022). The TCFD recommended eleven specific disclosures across four categories including governance, strategy, risk management, and metrics & targets.

The TCFD highlights that companies supporting its disclosure framework come from a broad range of sectors with a combined market capitalization of $26 trillion, including over 1,500 financial institutions, responsible for assets of $220 trillion, and 92 of the 100 largest public companies (TCFD, 2022). Geographically, the Asia and Pacific region has the highest percentage of supporters at 47%, primarily from Japan (Figure 19).

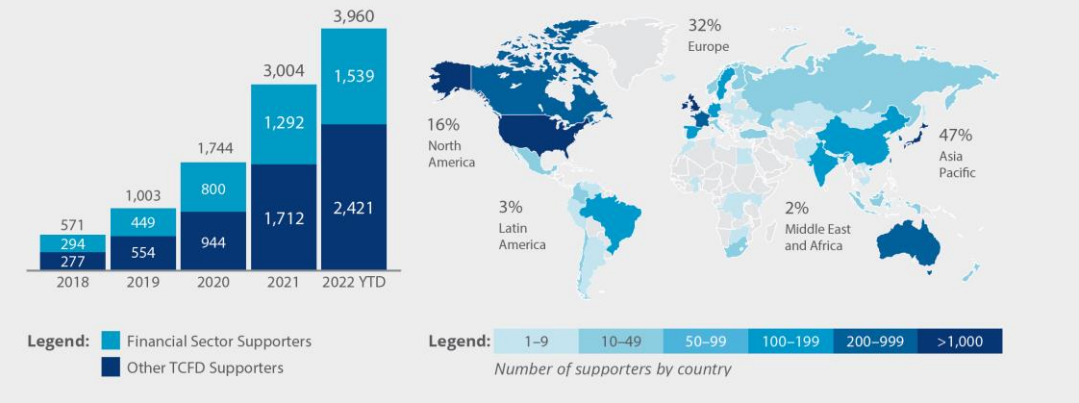


Figure 19. *Number of TCFD supporters per region (source: TCFD, 2022).*

National governments and regulators around the world have started to support the TCFD through various mechanisms. Examples of such support across the Asia and Pacific region are summarized in Box 5.

Box 5. National governments in the Asia and Pacific Region supporting Recommendations of the Task Force on Climate-related Financial Disclosures.

- **Australia:** In November 2021, the Australian Prudential Regulation Authority (APRA) published guidance for banks, insurers, and superannuation trustees on managing financial risks associated with climate change.
- **Hong Kong:** In November 2021, the Mandatory Provident Fund Schemes Authority issued a circular with high-level principles for mandatory provident fund trustees on integrating ESG factors into their investment and risk management processes.
- **Hong Kong:** In November 2021, the **Hong Kong Exchanges and Clearing** published guidance to support listed companies in implementing the TCFD recommendations and developing climate-related disclosures. The guidance indicates that "[i]n light of the direction towards mandatory TCFD-aligned climate-related disclosures by 2025, we encourage our listed issuers to commence reporting in accordance with the TCFD recommendations."
- **India:** In July 2022, the Reserve Bank of India (RBI) released a *Discussion Paper on Climate Risk and Sustainable Finance* to seek feedback on several topics, including climate-related financial disclosure.
- **Japan:** In November 2021, the Japan Financial Services Agency published its strategic priorities for July 2021-June 2022 in which it indicated it would encourage companies listed on the "Prime Market" segment of the Tokyo Stock Exchange to enhance the quality and quantity of disclosure based on the TCFD recommendations or an equivalent framework.
- **Malaysia:** In June 2022, the Joint Committee on Climate Change published a guide to support implementation of climate-related disclosures aligned with TCFD recommendations.
- **New Zealand:** In October 2021, the New Zealand Government passed legislation making climate-related disclosures mandatory for large publicly listed companies, insurers, banks, non-bank deposit takers, and investment managers.
- **Singapore:** In December 2021, the **Singapore Exchange** amended its rules requiring issuers to provide climate-related disclosures — based on TCFD — on a comply or explain basis for their financial year beginning on January 1, 2022. For the financial year beginning on January 1, 2023, issuers in the financial; agriculture, food, and forest products; and energy industries will be subject to mandatory climate-related reporting.
- **Thailand:** In February 2022, the Bank of Thailand issued a consultation paper on the financial landscape that describes policies to support three objectives for the financial sector. One of the objectives relates to the financial sector helping businesses and households transition to a digital economy and effectively manage environmental risks.

Source: TCFD (2022)

Finance Instruments

There exist a range of financing instruments whereby the private sector can support disaster risk reduction efforts, including related to climate change adaptation and building resilience across the SDGs. Among the instruments to be explored in this section are:

- **Foreign Direct Investment (FDI)**: FDI is an important type of private capital financing for developing countries, normally defined as foreign acquisition of at least 10% of the assets of a firm (ADB, 2007).
- **Equity instruments**: Involves raising capital through the sale of shares in a project, accomplished through equity funds, including various forms of public-private-partnerships.
- **Debt instruments**: Involves raising capital by selling debt to investors, who in return, are promised repayment with interest. Specific instruments include bank loans, public credit guarantee schemes, bonds, micro-finance, mortgage finance that incent risk reduction.
- **Sustainable Funds**: Consists of equity or bond investments that are packaged together as mutual funds or exchange-traded funds.
- **Philanthropy:** Involves direct project financing provided by companies, without expectation of financial repayment, to meet corporate social responsibility goals and in turn, desired socio-economic and environmental outcomes.
- **Digital finance**: Involves the use of financial technology (i.e., fintech) to achieve desired outcomes. Fintech includes the application of mobile banking, crypto currency, blockchain networks, among other technologies.

Foreign Direct Investment

FDI flows to developing countries in Asia increased by 19% from 2020 to 2021 to a record high of USD $619 billion (UNCTAD 2022a). As depicted in Figure 20, South-east Asia experienced a 44% increase during this period, followed by East Asia at 16% and Central Asia at 12%, while investment in South Asia declined by 26%. Among eleven small-island developing states in Oceania, FDI returned to levels before the COVID-19 pandemic with a 64% increase to USD $517 million, with Fiji being the largest recipient up by $401 million, (UNCTAD, 2022b).

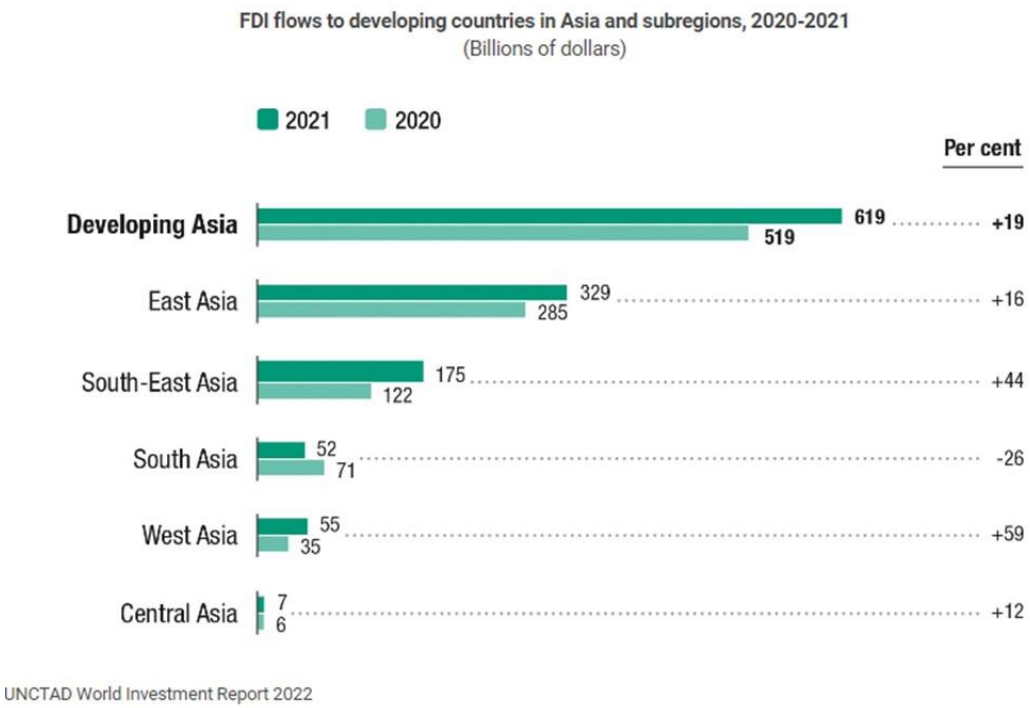


Figure 20. *FDI flows to countries in Asia and Pacific*
(Source: UNCTAD World Investment Report 2022; as cited in UNCTAD, 2022a)

Importantly, FDI flows into sectors which are important for achieving the SDGs rose by 74% to $121 billion, owing to investments in renewable energy. But how does FDI contribute to disaster risk reduction, including investment in relevant SDG sectors and for climate adaptation? Table 6 lists investment project announcements in Asia, including greenfield projects and international project deals for 2019 through 2021. For all SDG-related sectors across developing Asia, investment project announcements totalled $167 billion in 2021, primarily in renewable energy. **For SDG sectors relating to water and sanitation, food and agriculture, health and education, investment project announcements in 2021 totalled $17.8 billion (11% of total investment announcements; UNCTAD, 2022b).**

Table 6. *FDI flows to countries in Asia for SDG-relevant sectors – in USD millions of dollars (Source: UNCTAD World Investment Report 2022; as cited in UNCTAD, 2022b)*

SDG-relevant sector	Greenfield projects				International project finance deals			
	2019	2020	2021	2020–2021 growth rate (%)	2019	2020	2021	2020–2021 growth rate (%)
Total								
Value	**57 325**	**44 295**	**45 954**	**4**	**56 504**	**69 651**	**120 967**	**74**
Number of projects	**896**	**596**	**687**	**15**	**137**	**149**	**254**	**70**
Power[a]								
Value	12 094	8 424	583	-93	19 120	18 465	17 589	-5
Number of projects	20	15	9	-40	25	21	19	-10
Renewable energy								
Value	11 157	9 156	13 929	52	19 184	34 294	76 568	123
Number of projects	67	53	50	-6	77	101	182	80
Transport services[b]								
Value	13 085	6 246	8 029	29	8 597	6 671	10 094	51
Number of projects	212	108	154	43	16	9	19	111
Telecommunication								
Value	6 833	10 584	8 807	-17	6 057	8 797	13 538	54
Number of projects	173	115	150	30	3	7	18	157
Water, sanitation and hygiene (WASH)								
Value	1 479	267	3 048	1041	3 098	547	191	-65
Number of projects	13	4	11	175	12	7	4	-43
Food and agriculture								
Value	8 345	6 388	7 539	18	397	850	953	12
Number of projects	226	172	153	-11	3	2	7	250
Health								
Value	3 818	2 582	3 177	23	52	9	2 035	22 514
Number of projects	148	90	100	11	1	1	5	400
Education								
Value	514	649	842	30	-	18	-	..
Number of projects	37	39	60	54	-	1	-	..

Source: UNCTAD, information from the Financial Times Ltd, fDi Markets (www.fdimarkets.com) for announced greenfield FDI projects and Refinitiv SA for international project finance deals.

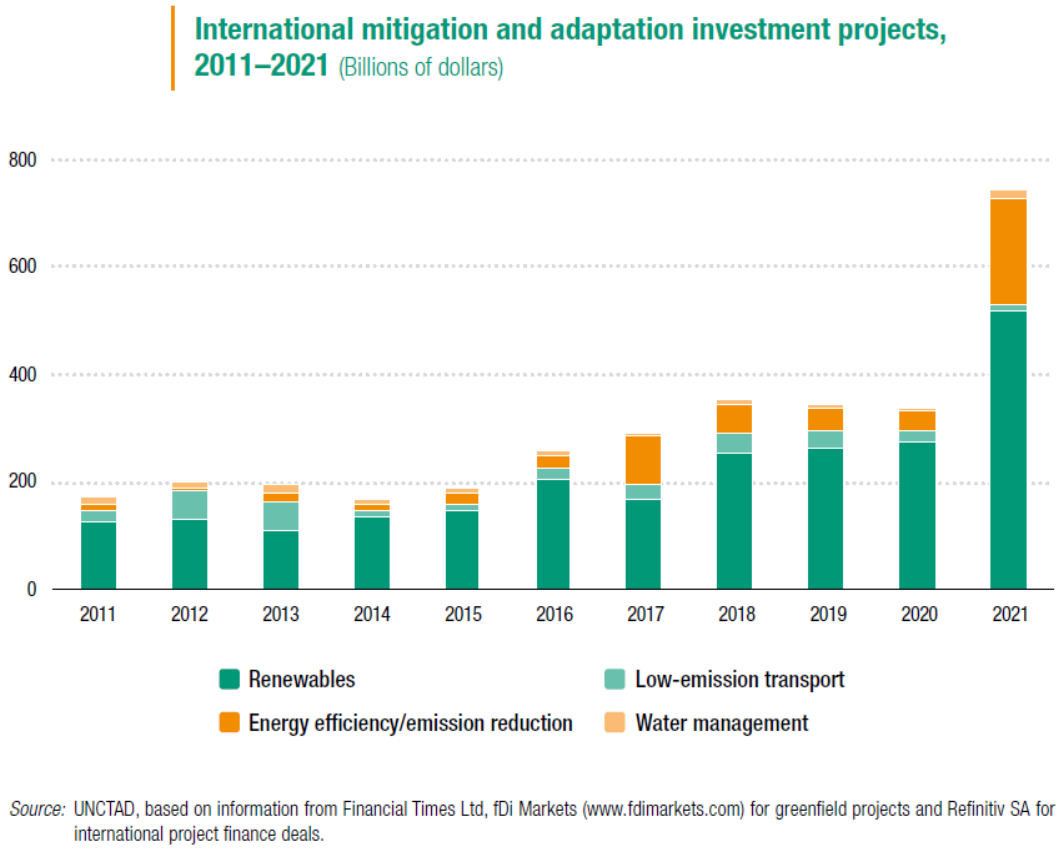
[a] Excluding renewable energy.

[b] Transport services for greenfield projects and transport infrastructure for project finance.

In addition to tracking FDI flowing to SDG-related sectors, UNCTAD's World Investment Report also tracks FDI flows to climate change mitigation and adaptation[20]. As illustrated in Figure 21, at the global level for the period 2011 through 2021, mitigation projects accounted for the vast majority of investment—"more than 95 per cent of international climate investments, with the remainder in adaptation" (UNCTAD 2022c). However, it is also noted that in developing regions, "the share of adaptation projects is higher (12 per cent, compared with 1 per cent in developed economies) owing to the greater prevalence of international water management projects".

The difference in investment levels is attributed to the existence of a clearer revenue model for mitigation projects and that adaptation projects are seen as public goods, "characterized by steep upfront costs, long investment timelines, lack of a clearly identifiable revenue stream or unattractive risk-return profiles" (UNCTAD 2022c).

[20] Climate change adaptation flows are represented by two categories: (i) Water management, including investments in water pipelines, water supply, district cooling, desalination, water storage, disposal and treatment; and (ii) Other adaptation, including investments to improve the climate resilience of existing infrastructure, and coastal protection and climate resilient agriculture, such as flood/drought resistant crops (source: UNCTAD 2022c).



Source: UNCTAD, based on information from Financial Times Ltd, fDi Markets (www.fdimarkets.com) for greenfield projects and Refinitiv SA for international project finance deals.

Figure 21. *International climate mitigation and adaptation investment projects (Source: UNCTAD, 2022c)*

Among DRR-related examples across Asia and the Pacific, FDI in **Sri Lanka** financed the Hambantota COVID-19 Vaccine Plant Project at a cost of 154 million, allowing the facility to source up to 9 million COVID-19 vaccine doses (UNCTAD, 2022c).

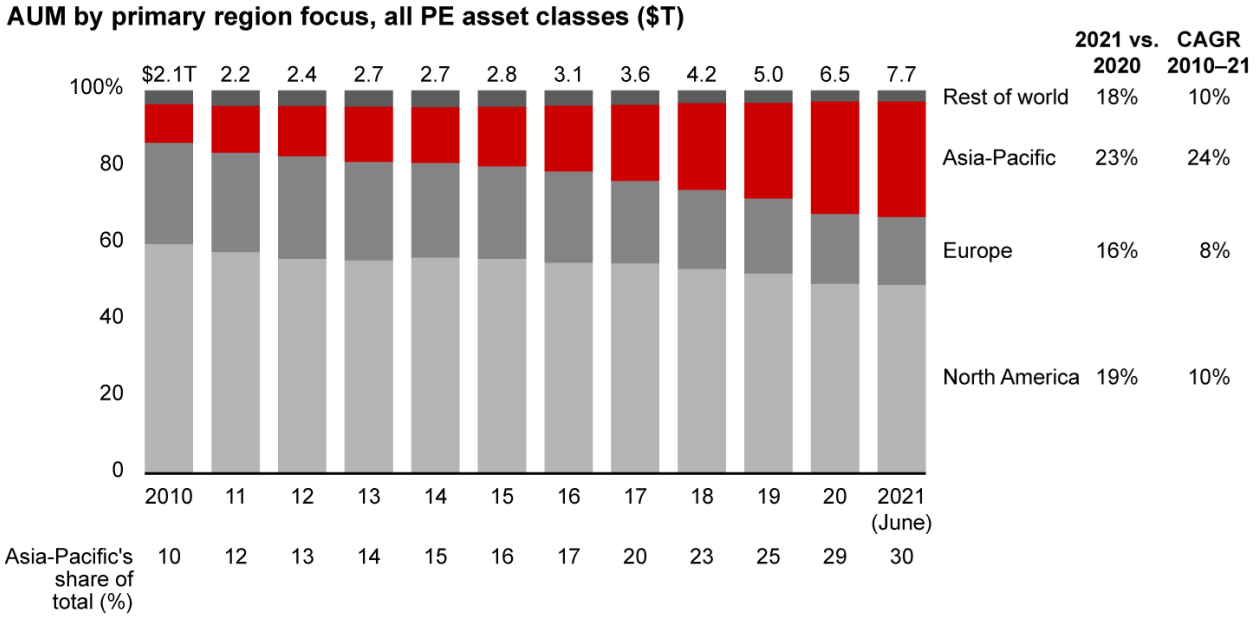
In **Malaysia**, the Chukai Private Specialist Hospital Project was made possible through FDI to finance its 24 million cost, including 100 beds, giving residents in the southern part of Terengganu access to high quality health care and specialist treatment (UNCTAD, 2022c).

And in the **Maldives**, FDI flows enabled $2 million in financing for the Sustainable Economic Empowerment and Development (SEED) Project to support households affected by COVID-19. Assistance was provided to "2,000 MSMEs and 250 smallholder farmers through the Business Center Corporation's outreach initiatives, implemented in a build-own-operate mode together with the Government of Japan and the United Nations Development Programme (UNCTAD, 2022c).

Equity Financing

Equity instruments involve raising capital through the sale of shares, either through formal public offerings (i.e., an Initial Public Offering, or IPO, via a stock exchange) or by attracting investors who provide capital in return for a share of ownership in the company or venture. Equity instruments include equity funds and public-private partnerships.

Globally, equity assets under management reached $7.7 trillion in 2021, and notably, capital focused on Asia-Pacific now commands a 30% share ($2.31 trillion), with growth reported at 2.4 times faster than North America and 3.0 times faster than Europe (see Figure 23; Bain & Company, 2022). This shift towards Asia-Pacific is believed to reflect the rapid rise of technology and venture investing (Bain & Company, 2022).



Notes: Asia-Pacific includes Asia and Australasia; rest of world includes Africa, Caribbean and South America, Middle East and Israel, and diversified multiregional funds
Source: Preqin

Figure 22. *Global share of equity assets under management by region*
(Source: Bain & Company, 2022)

Unfortunately, the Asia-Pacific's share of the global equity market only provides a sense for the untapped potential. The majority of the capital in Asia-Pacific is currently focused on technology, representing over half of the deals done in 2021 and concentrated primarily on e-commerce, software, and online services (Bain & Company, 2022).

While no examples of equity funds focused on disaster risk reduction or climate adaptation were found in Asia and the Pacific, globally there are a several leaders paving the way.

For instance, the **Lightsmith Climate Resilience Fund**, issued by the Lightsmith Group, a U.S.-based global sustainable private equity firm, was the very first growth equity fund focused on

climate resilience and adaptation (Business Wire, 2022). The fund currently focuses on six technology areas, including water efficiency and smart water management, resilient food systems, agricultural analytics, geospatial intelligence, supply chain analytics, and catastrophe risk modeling and risk transfer. It is based on an investment strategy called CRAFT - *Climate Resilience and Adaptation Finance & Technology Transfer Facility* (CRAFT), developed with support of the Global Innovation Lab for Climate Finance, Nordic Development Fund, the Global Environment Facility, Conservation International, and the International Climate Finance Accelerator (Business Wire, 2022). At its 2022 closing, the largest investor in the Lightsmith Climate Resilience Fund was the Green Climate Fund who described the fund as "a game changer", a credible statement given that annual private investment globally for adaptation was less than $500 million per year as reported by the Climate Policy Initiative (Business Wire, 2022).

For regionally focused funds, the **Acumen Resilient Agriculture Fund** was the first equity fund designed to build the climate resilience of smallholder farmers (ARAF, n.d.). Managed by Acumen Capital Partners, the $58 million fund is "anchored by the Green Climate Fund, and supported by FMO, the Soros Economic Development Fund, PROPARCO, the Children's Investment Fund Foundation, Global Social Impact, IKEA Foundation, and others" (ARAF, n.d.).

Debt Financing

Debt financing involves raising capital by selling debt to investors, who in return, are promised repayment with interest. Specific debt instruments that can be leveraged to support disaster risk reduction goals include bonds**,** bank loans, public credit guarantee schemes, micro-finance, and mortgage finance.

Bonds. In the private sector context, a bond is a type of loan issued by an investor and provided to another entities (e.g., companies, local governments). The investor raises the necessary capital needed to issue the loan by selling bonds. The bond has a pre-defined payback arrangement, including a specified time period and rate of interest paid over and above the principal cost of the bond.

Of the global sustainable bond market of $1 trillion in 2021, $382 billion or about 38% was issued by corporations (UNCTAD, 2022c). As well, of the total sustainable bond market of $1 trillion, $172 billion was issued in Asia and Oceania, including all types of issuers, corporate and otherwise (UNCTAD, 2022c).

Issuance of green bonds has increased significantly since 2017 as depicted in Figure 23, with a significant portion of the market issued by corporations (UNCTAD, 2022c). But how much of this market is used to finance disaster risk reduction specifically? A study conducted by the Stockholm Environment Institute in 2020 found that 5% of all green bonds issued from 2010 through 2019 (162 of 3266 issuances) could be categorized as supporting adaptation (SEI, 2020). And of theses issuances considered adaptation focused, the private sector comprised just 13%. Figure 24 shows the sector focus of corporate green bond issuances in 2019, illustrating the small number of issuances focused on adaptation relative to non-adaptation focused green bonds. That all said, the authors acknowledge that the estimates do come with some caveats: "it captures a fraction of potential adaptation funding as it only includes projects where adaptation is the main purpose" and risks

reinforcing “an incorrect perception of adaptation as a separate aspect of projects, rather than a cross-cutting and integrated aspect that should be accounted for in many projects” (SEI, 2020).

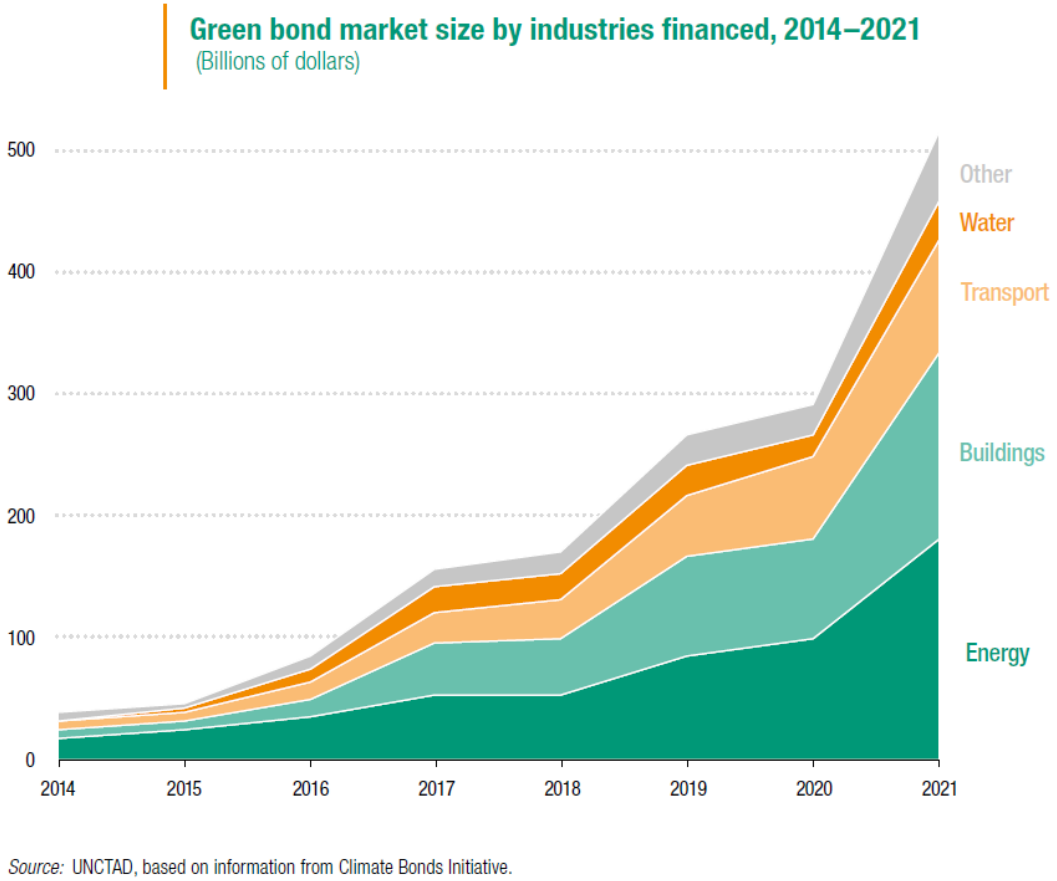
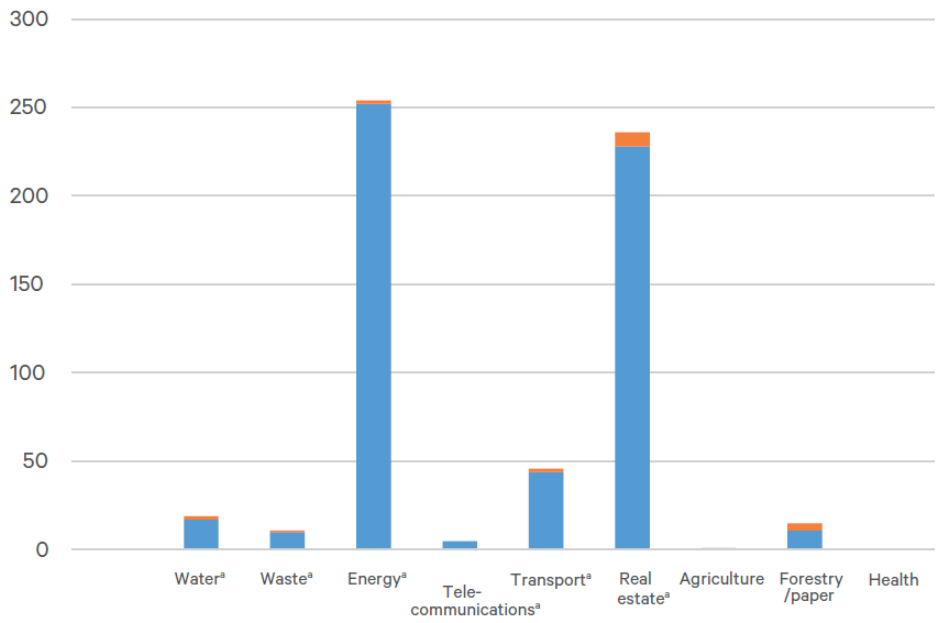


Figure 23. *Annual green bond issuance by issuer (source: UNCTAD, 2022c)*



	Water[a]	Waste[a]	Energy[a]	Tele-communications[a]	Transport[a]	Real estate[a]	Agriculture	Forestry /paper	Health
Green bonds including adaptation	2	1	2	0	2	8	0	4	0
Green bonds not including adaptation	17	10	252	5	44	228	1	11	0

Notes: This assessment covers only corporate issuances.
[a] denotes that it is a sub-sector of infrastructure.
Source: Environmental Finance green bond database, 2019.

Figure 24. *Allocation of green bonds issued for adaptation by sector (source: SEI, 2020)*

In a green bond issuance by **Hong Kong's Swire Properties**, the bond's framework included investments for flood defence and stormwater management and highlighted that "a comprehensive assessment during the review process should reflect initial risk assessment results, which identified water availability, heatwaves, flooding and specific extreme weather events as risks" (Sustainalytics 2018; in SEI, 2020). The bond also included investment related to water conservation and wastewater treatment.

In another example, **DSB Bank in Asia** issued a green bond that allowed for "development, production and purchase/installation of products or technologies that enable adaptation to climate change, including information support systems such as climate observation and early warning systems". It also included "construction, investment or operation of adaptation-related projects that contribute to a reduction in vulnerability to climate change" (Sustainalytics 2017; in SEI, 2020).

In **Singapore, City Development Ltd**, a property developer and manager, issued a green bond that allowed expenditures that reduce the water consumption, linked with "local water availability as a climate risk and the need for demand management" (Sustainalytics 2018; in SEI, 2020).

In Japan, the government-owned company, **Central Nippon Expressway Co. Ltd**. issued a green bond that included investment "to upgrade and strengthen the highway network, including bridges, embankments and cut-outs that are vulnerable to climate risks" (GCA, 2021).

The green bond catalogue for the **People's Bank of China**, while not making a distinction between adaptation and mitigation, uses "a classification system of eligible activities, which covers both climate goals as well as broader environmental projects, such as those addressing air pollution" (GCA, 2021).

For overall green bond issuance globally, Asia and Pacific accounts for a significant portion of the market for bonds with an adaptation focus, both for corporate and non-corporate issuances and has the "highest regional year-on-year growth in the rate (35%) of issuance" with China, Australia, Japan and India being the top performers (Climate Bonds Initiative, 2018c). Furthermore, East Asia and the Pacific in particular, is responsible for 41% of issuances.

Sustainable Funds. Sustainability-themed capital market products are another type of instrument with the potential support disaster risk reduction in the years ahead. This instrument consists of equity or bond investments that are packaged together as mutual funds, pension funds, or exchange-traded funds. In 2021, assets under management in the global sustainable funds market reached over $2.7 trillion through 5,923 different funds, up 53% from the previous year (Figure 26; UNCTAD, 2022c). The vast majority of the market, however, is concentrated in Europe and the United States. For Australia, New Zealand, and Japan combined, the sustainable funds market totaled $65.8 billion in 2021, while in the rest of Asia, sustainable funds assets grew to $63 billion, representing a 70% increase from the previous year. China and the Republic of Korea make up the majority of the Asia market, with China having almost $50 billion in assets under management making it the third largest market globally (UNCTAD, 2022c). Currently, the sustainable funds market makes up only about 4% of the assets under management in the global funds market.

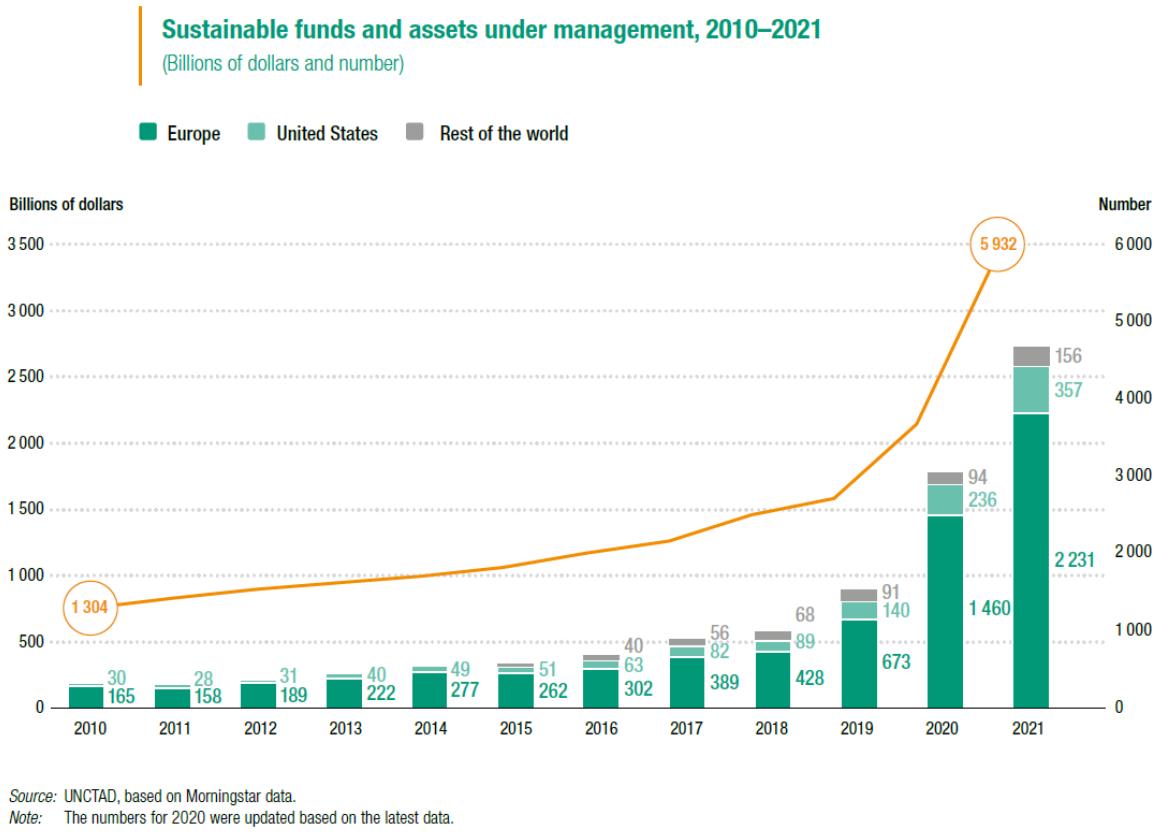


Figure 25. *Sustainable funds and assets under management globally (source: UNCTAD, 2022c)*

The SDG allocation of 818 sustainable equity funds ($145 billion in holdings, representing 27% of total assets under management) was examined by UNCTAD in 2020 with the results depicted in Figure 26. While challenges remain in accurately classifying assets by SDG, the analysis showed that the health sector commanded the majority of the investment ($77 billion), including for health infrastructure, medical services, pharmaceuticals, and medical devices (UNCTAD, 2021). This was followed by investments in renewable energy ($32 billion), food and agriculture ($19 billion), water and sanitation ($9 billion), ecosystems and biodiversity ($3 billion), transportation infrastructure (1 billion), and education ($1 billion). The specific allocation of these global assets to risk reduction, resilience or adaptation was not determined.

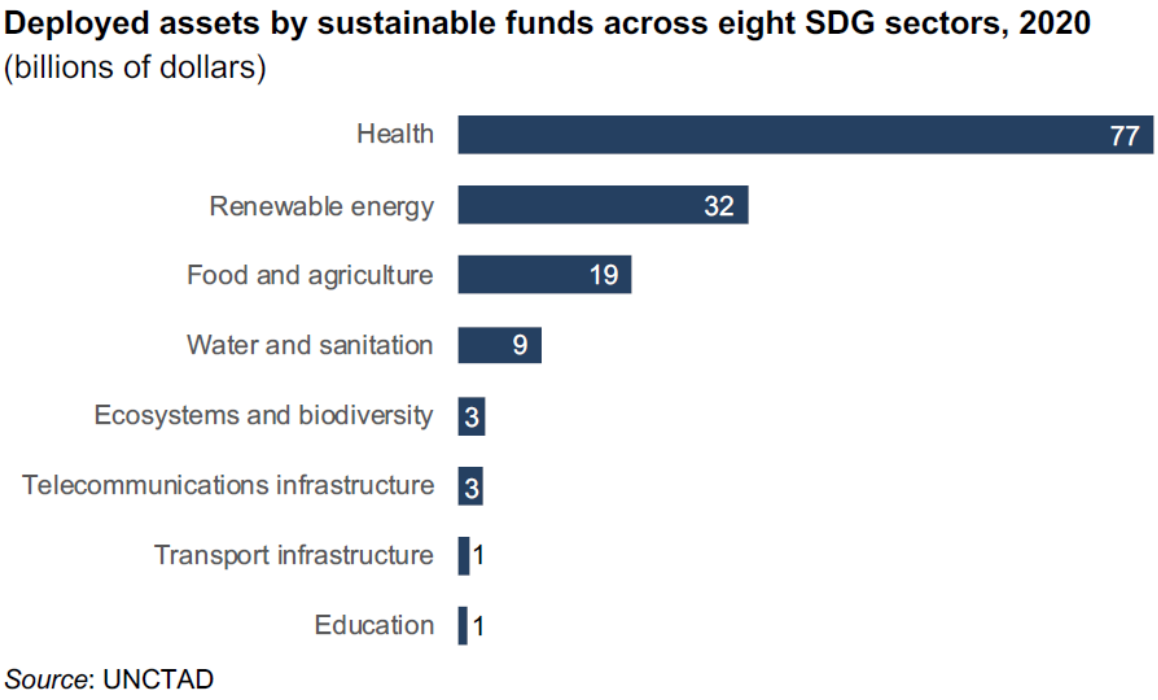


Figure 26. *Sustainable funds and assets under management globally (source: UNCTAD, 2021)*

Exchange-traded funds (ETFs). ETFs are a new type of instrument and are different than mutual funds in that they can be traded on a stock exchange like a regular stock. ETFs have a high potential to be used to finance disaster risk reduction investments. The number of ETFs having a focus on environmental, social and governance (ESG) issues increased from 345 in 2019 to 552 in 2020 (UNCTAD, 2021). And, it was identified that 208 of these funds targeted the SDGs specifically, with a primary focus on SDGs 13 on climate action, SDG 7 on affordable and clean energy, and SDG 5 on gender equality (UNCTAD, 2021). In the Asia and Pacific region, it was reported that as "many as 92 ESG-labelled ETFs were launched in Asia Pacific last year, more than the combined new ETFs over the past four years, taking the total of such ETFs to 166 by end of 2021" (Finews.asia, 2022). For example, investment firm Blackrock, had nine APAC-domiciled sustainable ETFs and three APAC-domiciled sustainable index mutual funds in the Asia and Pacific region (Finews.asia, 2022).

Insurance

The insurance industry, including for-profit and mutual-cooperative companies, have several leavers at their disposal to support disaster risk reduction and resilience. For example, a partnership between the International Cooperative and Mutual Insurance Federation (ICMIF) and UNDRR in 2020 identified a suite of **seven mechanisms whereby insurance can advance beyond financial protection from disasters to providing incentives and financing for the prevention of**

disaster (ICMIF and UNDRR, 2020). The seven mechanisms are featured in Box 6 and include three direct mechanisms for insurance products to reduce disaster risks and four indirect mechanisms whereby insurance providers can help reduce disaster through corporate action. While developed as guidance for the mutual and cooperative insurance sector, the seven mechanisms are also relevant to the private for-profit insurance industry.

Box 6. Seven mechanisms for supporting disaster risk reduction and resilience through cooperative and mutual insurance

The International Cooperative and Mutual Insurance Federation (ICMIF) and UNDRR have a multi-year collaboration to help address the urgent challenge of reducing disaster risks in the midst of an expanding and intensifying global risk landscape. With its member-driven operating model, the cooperative and mutual insurance sector is uniquely positioned to take a lead in charting a practical path from risk protection to prevention.

Based on a combined view of insights gleaned from the literature and an analysis of mutual and cooperative insurance case studies from around the world, a set of practical mechanisms were identified for how the cooperative and mutual insurance sector could help drive prevention and disaster risk reduction. These include:

Direct mechanisms – for insurance products to reduce disaster risks:

1. Apply variable pricing of insurance to provide incentives for risk reduction
2. Include prerequisites and exemptions to provide incentives for risk reduction
3. Ensure investment reduces and prevents risk and builds resilience

Indirect mechanisms – for insurance providers to reduce disaster risks:

4. Raise awareness of the systemic nature of risks and provide transparent information and advice for reducing hazards, exposure, and vulnerability
5. Build and share capacity and technology for risk modelling, analysis and monitoring
6. Promote and enhance local social capital for responding to disasters and innovating to reduce risks
7. Collaborate with the public sector to signal unsustainable development and support decision making towards disaster risk reduction and risk-informed investment while closing protection gaps

Source: ICMIF and UNDRR (2020)

ICMIF and UNDRR (2020) describe several examples of how these seven mechanisms play out in practice across the Asia and Pacific region. For instance, ICMIF member **Tokio Marine Nichido in Japan,** has invested in the protection of mangrove plantations to reduce the risks posed by storm surges to areas further inland. Specifically, the **Tokio Marine & Nichido Fire Insurance Co. Ltd.** implemented a mangrove planting project over a 20-year period across Indonesia, Thailand, The Philippines, Vietnam, Myanmar, Fiji, India, Bangladesh and Malaysia (in UNEP Finance Initiative, 2020). The company's investments have supported the planting of 10,930 hectares of

mangrove forest, generating total economic value exceeding 118.5 billion yen benefiting approximately 1.41 million people in the region (Tokio Marine Holdings, 2019). Multiple co-benefits were realized through the investments, including carbon sequestration, preserving biodiversity and habitat, supporting livelihoods, and "functioning as green levees that protect communities from tsunamis and storms" (Tokio Marine Holdings, 2019). The company intends to continue the project to "serve as insurance for the future of the earth for 100 years".

In the **Philippines, the Center for Agriculture and Rural Development Mutual Benefit Association** (CARD MBA) is "the largest mutual microinsurance provider in the Philippines with 83 percent of the market share. Founded in 1999, CARD MBA now has over 6 million members providing life insurance to 22 million individuals" (ICMIF, 2022). Regarding risk reduction exemptions, the company includes an exemption in its automobile insurance policy package whereby death caused by an accident while drink-driving or driving without a licence is not covered. This provides incentive to the policyholder to reduce transportation-related risks. As well, CARD MBA's Credit with Education Programme "supports members with a budget of USD 2.1 million under a range of themes, including a risk reduction and resilience theme which helps build skills related to disaster preparedness, stress debriefing and conducting fire and earthquake drills" (ICMIF, 2022).

In the context of the private for-profit insurance sector, **Suncorp Australia** has advanced several direct and indirect mechanisms for supporting risk reduction. For example, the company offers a *Cyclone Resilience Benefit* rewards customers in North Queensland with premium reductions of up to 20% for making their homes more cyclone resilient. To date, 43,244 customers have received a premium reduction from Cyclone Resilience Benefit (Suncorp n.d.). It also provides a *no-fee, low-interest bank loan* designed to help North Queensland customers finance mitigation improvements made to their homes to make them more resilient to cyclone damage (Suncorp n.d.). The new low-cost personal loan features an interest rate of 4.99 per cent per annum and Suncorp waives all establishment and account keeping fees.

Furthermore, in an industry-wide effort, the **Oasis Platform for Climate and Catastrophe Risk Assessment in Asia** is co-developing "new and open catastrophe risk models for flood in the Philippines and cyclone in Bangladesh and analysing the impacts of climate change" (Oasis Loss Modelling Framework Ltd., 2019). The intent of the platform is to build connections among in-country scientific expertise and data with international expertise in catastrophe risk modelling to build capacity for maintaining and developing "new risk models using open-source technology and to take ownership of their risk understanding in the long term" (Oasis Loss Modelling Framework Ltd., 2019). While the platform project in Asia is supported by the German government, the implementers, the Oasis Loss Modelling Framework is a not-for-profit organisation owned by 40 of the world's leading insurers, reinsurers, brokers and financial institutions (Oasis Loss Modelling Framework Ltd., n.d.).

Philanthropy

The Asian Development Bank highlighted in 2022 that the private sector has become more systematic in its support to disaster risk reduction, "moving beyond corporate social responsibility (CSR) activities to companies supporting (local) disaster risk reduction measures either through their own outreach schemes or through dedicated community organizations" (ADB, 2020).

In the Philippines, the business-led nongovernmental organization, **Philippine Business for Social Progress**, delivers dedicated disaster risk reduction and management relief assistance which provides financial support for relief, rehabilitation and response initiatives after a disaster event (ADB, 2020). As well, the **Philippine Disaster Recovery Foundation** created the first national private sector *Emergency Operations Center* coordinating and building capacity in disaster prevention, mitigation, preparedness, response, recovery, and rehabilitation and offers a dedicated knowledge and learning resource center called *Prelab* for promoting resilience-building business continuity management, disaster risk reduction, and climate change adaptation (ADB, 2020).

To explore trends in disaster-related private philanthropic grants in Asia and the Pacific, **Give2Asia**, one of the region's largest strategic advisors for private donors, analysed 589 grants it advised from 2005 through 2019 (Give2Asia, 2020). Philanthropic grants for disasters totalled $55 million over the approximately 15-year period showing a range of financing across the region (Figure 28). There were four primary sources of grants including corporations ($31.9 million), crowdfunding by Give2Asia ($14.6 million), high-net worth individuals and family foundations ($5.5 million), and crowdfunding by local not-for-profit organizations ($3.5 million) (Give2Asia, 2020). And of the $55 million in philanthropic grants, approximately 7% or $3.92 million was tagged as supporting "resiliency", including risk reduction, preparedness, and sustainable infrastructure. An additional 10% of the grants were tagged as multi-phased, including water-sanitation-hygiene, DRR and preparedness, and sustainable infrastructure which together made up 32% of the multi-phase funding. The majority of grants, approximately 71% ($39.3 million) went toward recover efforts involving such sectors as infrastructure education, and economic security and livelihoods. With just 12.5% ($6.87 million) of the grants supporting disaster relief efforts, overall, the allocation of philanthropic grants suggests a shift in focus beyond immediate relief; however, with only 7% of grants "not tied directly to or a result of a specific disaster" it was further concluded that "vulnerable communities are not receiving adequate funding to better withstand future disasters" (Give2Asia, 2020).

To address the gap in philanthropic funding focused on risk reduction and "move the needle toward resiliency", Give2Asia has been implementing its *DisasterLink* program in eight vulnerable Asian countries to help focus grant giving on "innovative programming at the community level, strengthening networks and capacities of local organizations, and educating donors on the importance of funding preparedness activities" (Give2Asia, 2020). Since inception, the *DisasterLink* program has mobilized $3.5 million for disaster readiness at the local level (Give2Asia, 2020).

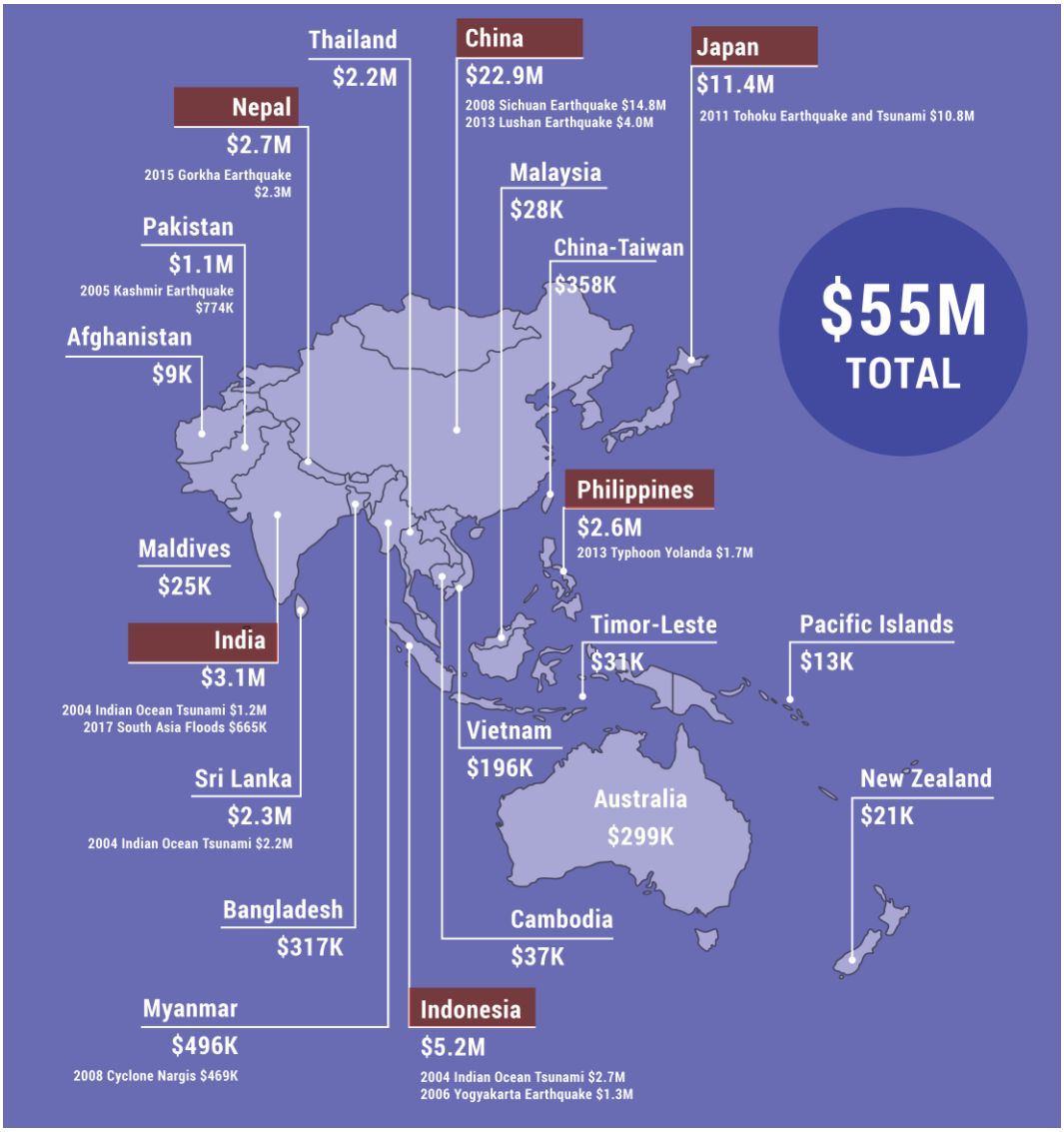


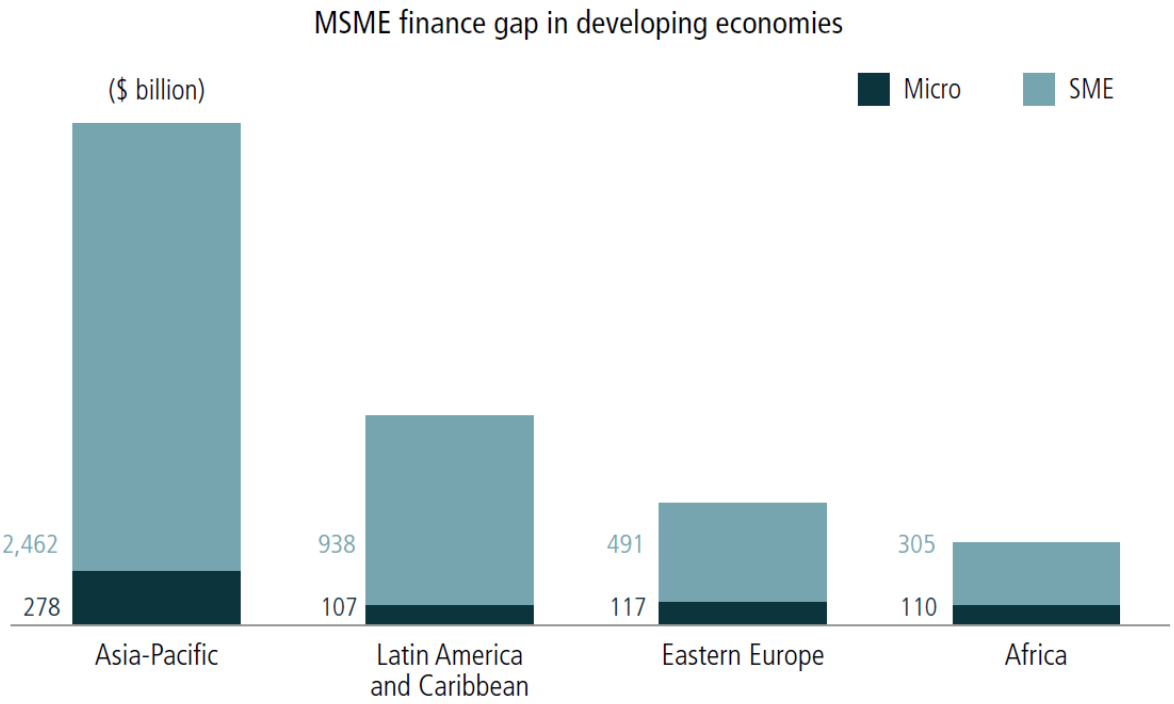
Figure 27. *Total disaster giving by country based on 589 grants advised by Give2Asia (source: [Give2Asia, 2020](#)).*

Financial Technologies and Inclusion

Financial technologies, otherwise referred to as fintech, are providing new ways to deliver and use financial products and services and enhance financial inclusion for micro, small and medium-sized enterprises (MSMEs) and vulnerable individuals and families. As noted previously in the review of public finance approaches, fintech was an effective instrument in the wake of the COVID-19 pandemic by enhancing access to financial tools for MSMEs, helping to reduce vulnerability and build resilience.

Access to finance for MSMEs has been a challenge for many years now, including in Asia and the Pacific where 57% of the estimated global MSME financing gap resides representing a staggering $2.5 trillion and $278 billion shortfall for small and micro-enterprises, respectively (Figure 29;

UNESCAP, 2021b). As an illustration, 63 million MSMEs in Indonesia didn't have access to institutional credit amid the COVID-19 pandemic, representing 74% of all MSMEs in the county (PWC, 2019; in UNESCAP, 2021b).



Source: The author, recomposed from IFC (2017)
Note: MSME finance gap is based on the United Nations regional groupings.

Figure 28. *Finance gap for MSMEs in developing economies (source: UNESCAP, 2021b)*

Against this stark backdrop, fintech played an increasingly important role in delivering much needed finance to MSMEs. There exist a wide array of fintech including big data and data mining, alternative data for credit scoring, artificial intelligence and machine learning, open banking, clouds storage, blockchain distributed ledgers, cryptocurrency, mobile payment, crowdfunding and peer-to-peer lending, digital banking, and Regtech for efficient regulatory compliance (UNESCAP, 2021b).

For example, in **Bangladesh, City Bank and bKash** launched a collateral-free digital lending project during the pandemic whereby certain small business customers were eligible for a loan of $120 and with equal monthly payments deducted automatically from their bank accounts (UNESCAP, 2021b). Borrowers were notified by text message before each automatic payment.

The Asian Development Bank highlights that "digital financial services have spread widely across Asia and the Pacific, and are expected to fill much of the unmet financing demand from MSMEs and accelerate financial inclusion" (ADB, 2017b; in UNESCAP, 2021b). Importantly, non-traditional actors are providing fintech opportunities that have the potential to advance financial inclusion,

including telecom companies, mobile network operators, and cash agents offering products and services such as peer-to-peer (P2P) lending, e-commerce finance, online supply chain finance, and equity crowdfunding (UNESCAP, 2021b). For example, national payment gateways have been established in several countries including **Gerbang Pembayaran Nasional in Indonesia**, **PayNet in Malaysia**, the **National Retail Payment System in the Philippines**, and **PromptPay in Thailand**, along with supporting systems for digital identification system including in the **Philippines (PhilSys)** and **Thailand** (UNESCAP, 2021b).

More specifically, in **Thailand** the **PromptPay** digital payment system was expanded in 2021 by creating a linkage with Singapore's Paynow platform to enhance cross-border transactions (ADB, 2021). This led to other new fintech in Thailand, including the **Digital Personal Loan Program** and the **Digital Factoring Ecosystem Development Project**. The digital loan program enables banks and nonbank financial institutions to begin offering new digital loans to underserved communities, with over 100,000 new small loans of about $100 per person distributed in 2021 (ADB, 2021). The digital factoring ecosystem is supported by the Bank of Thailand and other stakeholders via a standard which enables digital processing of invoices to reduce the risk of fraud (ADB, 2021).

A **Digital Access Tool** is being piloted by **MiBank and Women's MicroBank in Papua New Guinea** with support of the Bank of Papua New Guinea and ADB. This biometric identification (ID) system for financial inclusion enables "faster onboarding of clients in remote areas, where people often have no means of identifying themselves" (ADB, 2021).

In the **Philippines**, cloud technologies are being used for core banking and financial inclusion. The **Cantilan Bank** migrated its core banking system to the cloud for increased field mobility and end user services such as automated teller machine withdrawals, bill payments, and online and/or merchant payments. With the support of the Banko Sentral ng Pilipinas and ADB, Cantilan Bank became the Philippines' first bank to operate its core systems in the cloud and paved the way for 46 other financial institutions to gain central bank approval to develop their own cloud based core banking systems (ADB, 2021).

India's government in 2015 launched its **Digital India Program** to accelerate digital transformation financial inclusion. By providing accounts for the unbanked, micro insurance for previously excluded, and loans and credit guarantees for MSMEs, combined with a national identify program and mobile connections, the program "enabled a significant increase in financial access in most rural parts of the economy where people can access not only their bank accounts but also make digital payments" (ADB, 2021).

In the arena of open banking, **Bank Indonesia** introduced its **Payment System Blueprint 2025** to help ensure strong link between fintech and banks to "contain the escalation of shadow-banking risks" (ADB, 2021). Regulations were introduced for the use of digital technology, including application program interfaces and partnership models between fintechs and banks in an effort "to support broader integration of economic activity and financial inclusion while also fostering greater digital transformation in the banking industry" (ADB, 2021).

Indonesia has also advanced fintech in the form of equity **crowdfunding**. The Financial Services Authority of Indonesia (OJK) reported that three ECF fintech companies (Santara, Bizhare, and Crowddana) had helped 111 small and medium-sized enterprises (SMEs) to raise Rp154 billion

of funding in total from 16,965 investors (Kontan 2020; in ADBI, 2022). Operationally, an SME that receives a capital injection through the ECF scheme "gives part of its ownership to investors in the form of company shares" enabled by an OJK regulation that allows securities-based fintech crowdfunding, including Islamic debt securities (*sukuk*) (ADBI, 2022).

Regulatory Incentives That Mobilize Institutional Investors' Resources into the Long Run DRR Investments

The total assets of banking, insurance, and pension funds are around 140,9 trillion dollars. Transferring some of this total to long-term disaster risk reduction (DRR) investments will greatly reduce the risks of disasters on economic stability and human life.

With climate change, disaster risks have increased for all countries. In this context, among the key policy options needed to reduce the impact of disasters on economic and financial stability is to provide some financial regulatory incentives to institutional investors that will accelerate the mobilization of their resources for long-term DRR investments.

Banking Sector

The State of Banking Sector in Asia and the Pacific

The Asian financial sector is dominated by short-term bank lending. The short duration of banks' liabilities limits their capacity to finance long-term investments such as home loans and resilient infrastructure investments. Asian banks focus on commercial lending. Banks' contractually long-term funding in emerging markets in Asia amounts to only 4% of GDP, while it is about 10% in the United States and 27% in the Europe (Sahay, et al., 2015).

Subdued global growth and low interest rates were resulting in a more challenging operating environment for Asia Pacific banking systems since 2008. The prolonged period of easy monetary policies and low interest rates in advanced economies spurred a search for yield which has led to a return to high leverage for firms and a surge of capital inflows into emerging markets. If major central banks such as the Federal Reserve Board and the European Central Bank increase their interest rate hikes to prevent inflation without considering the world economy, it can lead to higher corporate problem loans which can adversely affect the health of banking sectors and stock and bond markets in the Asia and Pacific

The bank centered financial systems also lead to a supply-demand gap in lending to small and medium-sized enterprise (SMEs) which are the backbone of a resilient national economy in every country due to their nature of stimulating domestic demand through job creation, innovation, and competition (Aras, 2017).

The Asia-Pacific banks industry had total assets of $84,3 trillion in 2021[21]. Banks' regulatory capital levels are generally adequate across Asia-Pacific. The average Tier-1 capital[22] ratio for Asia-Pacific markets has risen from approximately 11.2 percent in 2010 to approximately 12.8 percent in 2018. The average return on risk-weighted assets (RoRWA) across the region was 1.5

[21] https://www.marketresearch.com/MarketLine-v3883/Asia-Pacific-Banks-Summary-Competitive-32537625/

[22] Tier 1 capital refers to the core capital held in a bank's reserves and is used to fund business activities for the bank's clients. It includes common stock, as well as disclosed reserves and certain other assets.

percent in 2018, but profitability varies widely. For example, banks in Australia, Hong Kong and Indonesia earned over 2.5 percent RoRWA in 2018 (Jacop Dahl, et al., 2019).

Box 7. The Basel Regulations

The Basel regulation, which was first prepared in 1988, is called Basel I. However, this regulation shows how to calculate capital adequacy by considering only credit risk. This regulation considers loans given to companies and financial institutions in OECD member countries to be less risky than loans given to other countries and requires less capital to be allocated for these loans. In this respect, it can be seen as a regulation that distorts competition in favor of developed countries. However, since it was easy to implement, it was recommended for the banks of less developed countries. Under Basel I, banks that operate internationally were required to maintain at least a minimum amount of capital (8%) by considering only credit risk based on their risk-weighted assets.

In the face of the criticisms that Basel I is not very risk sensitive, market and operational risk factors have been added to Basel I by Basel Committee on Banking Supervision (BCBS), of which most developed and European countries were members in these days, and credit risk has been made more risk sensitive. In addition, two new pillars were added to the Basel regulations. While Pilar 1 only describes how capital adequacy should be calculated, Pillar 2 includes regulations on how to manage credit, market and operational risks. Pilar 3 contains information about which information banks should disclose regarding their capital adequacy ratio. This regulation is called the Basel II regulation.

The Basel II is shown by some to be the most important reason for the spread of the 2008 crisis to Europe. In this context, the biggest criticism is that European Banks seem to have too much regulatory capital because Basel II obscures the definition of regulatory capital (that is, this capital does not have the power to absorb losses). The second criticism is that Basel II does not contain any regulation on liquidity. Because, as seen in the Lehman Brothers bankruptcy in 2008, although the capital adequacy of the banks was good, banks were faced with the risk of bankruptcy by entering a sudden liquidity problem due to the volatility in the financial markets.

The definition of ambiguous regulatory capital in Basel II has been made clearer. In addition, new regulations have been introduced that consider liquidity risk and economic cycles. Also, considering the negative impact of volatility in financial markets on financial stability, strict measures have been introduced for market risk regulation. Especially considering the role of banks in the development of the capital market, the market risk regulation has potential to adversely affect the development of these markets in developing countries. The new regulation, which was created as a result of the additions made to Basel II, was named Basel III.

By drawing lessons from the global financial crisis in 2008, the number of countries that are members of the Basel Committee was increased first. However, since underdeveloped countries are not sufficiently represented in the Basel Committee, it cannot be said that the Basel regulations still consider the economic and financial conditions of these countries.

Incentives for Long Term DRR Investments to Mobilize Banking Sources

Basel III and the 2008 crisis have two major negative effects on the financing of SDGs and long-term DRR investments. Especially since the volatility in the stock market cannot be predicted in advance, the market risk regulations of the banks have been tightened, and the trading costs of the banks in these markets have increased. For this reason, when the market risk regulation that came into force in 2023 is evaluated together with the renunciation of the expansionary monetary policy implemented by the central banks, it is to be expected that the development of capital markets will slow down. Therefore, the long-term flow of resources from capital markets to SDGs and DRR financing will further decrease.

Box 8. The 2008 Financial Crisis and its Impact on the Basel Regulations and Risk Appetite

The 2008 financial crisis showed the financial regulators how banks caused the 2008 crisis by manipulating ambiguous Basel II regulations. Thus, this has made financial regulators very conservative. This situation has caused financial regulations to be made only on the perception of financial stability according to the 2008 crisis environment. For this reason, financial regulators were late in adding climate change risk to the definition of financial stability. They also do not consider on the need to include the risks posed by increased disasters **due to climate change in Basel III regulations.**

In this context, financial regulators can improve the definition of financial stability and develop a methodology that will clearly incorporate disaster risks into this definition. This can be started by adding a topic on how disaster risks will affect financial stability in the financial stability reports published by regulatory authorities on a semi-annual or annual basis.

In this context, supervisors are still debating the use of the so-called green support factor since 2018 to encourage banks to extend green loans. Accordingly, it is planned to apply less risk weight[23] for investments that meet the definition of green investment (both in the standard approach and in the internal ratings-based (IRB) approaches approach[24]). In this way, banks will allocate less capital to be held in their CAR to green investments. However, as stated above, many financial regulators are still using the definition of financial stability dating from the 2008 financial crisis, and thereby, they support that the green support factor will impair financial stability as it will increase the non-performing loans of banks. However, for holistic and long-term financial stability, the green support factor can be included in Pillar 1 regulations with an appropriate regulation that considers the financial risks.

Likewise, a resilient support factor can be considered in this context and included in Pillar 1 regulations in order to encourage the infrastructure investments to be made in a resilient way against any disaster.

[23] According to Basel regulations, while calculating the capital adequacy of banks, the assets of banks (Credits or financial instruments that they hold for a long time in the asset part of their balance sheets, etc.) are weighted according to their risks. More capital is held for assets with higher risk weights in their CAR. This increases the capital cost of banks. This capital cannot be used by the bank. It is set aside for unexpected risks that may arise in the future.

[24] These approaches are the methods used to calculate the capital adequacy ratio of banks. In the standard approach, the risk weights of the assets are determined in the Basel Regulations according to the risk of the assets, while in the IRB approach, banks can calculate these risks within the framework of models within the framework of certain rules.

In this context, the European Central Bank included the infrastructure support factor[25] in the Pillar 1 regulation of Basel in 2020. According to this regulation, if the project to which a bank will provide a loan is determined to contribute to environmental objectives (mitigation/adaptation to climate change, sustainable use and protection of water and marine resources, transition to a circular economy – waste prevention and recycling, pollution prevention and control, and environmental protection), the risk weight of the loan to be given to this project is reduced from 100% to 75%. In this way, the capital costs of these loans to the bank have been reduced[26]. This regulation can also include a resilient infrastructure support factor and implemented in the Asia Pacific region. In order for this regulation to be easily implemented by banks, the definition and features of resilient investments should be clearly defined.

Under Pillar 2, regulatory authorities in disaster-affected countries in the region are required to integrate disaster risk considerations into their banking risk management regulations. In this way, for example, disaster risks will be included in the lending processes of the banks, and the investments of the credit users will be encouraged to be resilient.

Further, it may be appropriate to determine metrics on a regional or global basis for various critical infrastructure investments in order to determine resilient projects that will apply less risk weight. Within the scope of Pillar 3, it is important to disclose these metrics to be used for the definition of resilient investments. Banks can thus create additional resources by informing potential depositors or shareholders who are sensitive to disasters.

Insurance Sector

The State of Insurance Sector in Asia and the Pacific

The insurance sector has managed approximately 33 trillion dollars in assets and can be seen as the world's largest long-term investor, together with pension funds and banking sector[27]. Insurance companies' assets across Asia Pacific are expected to grow from $10.5trn in 2017 to $13.7trn in 2025 (Carter, 2020).

The Asian Development Bank estimates that by 2030, approximately US$1.7trn should be invested annually in infrastructure across Asia. Investing in low-carbon and climate resilient infrastructure investments has the potential to generate direct economic gains of $26trn by 2030, compared to the usual business flow, as it will prevent thousands of deaths and hundreds of billions of dollars in losses from disasters triggered by climate-related hazards (Global Commission on the Economy and Climate, 2018).

Insurance Companies have the potential to play a major role in financing climate-resistant infrastructure with their assets and liabilities. For example, resilient infrastructure offers an attractive investment opportunity for insurers because it provides predictable and stable cash flows that meet the long-term liabilities of their balance sheet while generating an illiquidity premium simultaneously. In addition, as underwriters, insurers are in a good position to

[25] Please See Capital Requirement Regulation 2, Article 501(a) for more information

[26] Because banks will hold less capital for the loans they give to these investments in their CAR calculations.

[27] Mobilizing Insurance Investment In Sustainable Infrastructure The Role Of The United Nations, Lauren Carter, 2020, UNDP

understand the advantages of investing in resilient infrastructure compared to other financial institutions. In this way, with careful planning, insurance policies and insurance companies' investments in resilient infrastructure mutually reinforce each other.

As greater resilience will reduce risks, such reduced risks are reflected in insurance premiums, providing a strong financial incentive for resilient investment. However, for this planning to be successful, market conditions must be suitable for it. For example, in some parts of Asia, the lack of long-term assets to invest in for insurance companies causes companies to be unable to match their long-term obligations. At the same time, regulatory authorities' restrictions on overseas investments also prevent insurance companies from using their resources globally.

Insurance Regulations in Asia and the Pacific

The Asia and Pacific region is a very diverse place in every way. There is no Asia as a whole and every market is different. In this respect, it differs from other regions. For example, the growth of insurance sector moves at different rates, and insurance regulatory environments develop at different stages and evolve at different rates.

Although there are different implementations, the insurance regulations in the region were generally affected by the solvency I and II regulations prepared by the European Union (see Box 9). The regulations of the developed countries in the region are close to the solvency II[28], while the insurance regulations of the less developed countries are close to the solvency I.

Box 9. The Solvency Regulations and the Insurance Sector

Solvency I is a regulation that only considers the insurance risk and does not consider the capital and risk management of the insurance company. It obliges the insurance company to keep only a certain percentage of its liabilities as solvent capital. This gives prudent insurers a competitive disadvantage and policyholders little assurance. To close this gap in Solvency I, the European Union has prepared the Solvency II regulation. This regulation is inspired by the Basel II regulation prepared for banks. Thus, the risk management and disclosure practices of insurance companies are also included in the scope of regulation. Based on these: the foundation of Solvency II is the following three pillars:

1. Capital adequacy requirement: The insurance company must cover the capital requirements from credit risk, market risk, insurance risk and operational risk.

2. Supervisory reviews: Each company must develop and use risk management techniques when monitoring and managing their risks.

3. Disclosure requirements: The insurer needs to provide financial, and other, information to the market.

Although the Solvency II regulation is more risk sensitive than Solvency I, its implementation is both costly and requires human resources trained in the management of risks. From this point of view, it is recommended that countries whose insurance sector is not very developed consider the international Solvency 1 regulation when regulating their insurance regulations.

[28] Countries whose regulations are close to Solvency II: Australia, China, Singapore, Hong Kong SAR, Japan, Korea, Malaysia, New Zealand and Thailand.

Incentives for Resilient Infrastructure Investments to Mobilize Insurance Resources

In some countries, there are not enough local long-term assets to meet the long-term obligations of insurance companies. The lack of available assets to match the liabilities of the insurance sector is a challenge across Asia. In addition, the balance of supply and demand for long-term resilient investments in the region is deteriorating due to the restrictions imposed on insurance companies on overseas investments in some countries (Table 7).

Table 7. *Examples of international development organizations providing financing support for disaster risk reduction in Asia and the Pacific* Source: *(Source: PwC, 2022).*

Countries	**Cap on overseas investments (% of total investments)[29]**
China	15%
Indonesia	20%
Malaysia	10%
Singapore	20%
South Korea	30%
Thailand	20%

In order to increase the flow of finance to resilient investments on a global basis and to ensure the balance of supply and demand, it may be appropriate set more favorable restrictions for resilient infrastructure investments in developing countries.

On the other hand, considering that less developed countries have limited access to rating agencies and that these ratings increase investment costs, it may be more appropriate to make a regulation in the insurance regulations similar to the change made in the Standard approach to the credit risk of Basel III regulations[30]. In this context, it would be appropriate to develop a non-rating-based approach that reduces mechanical dependence on rating agencies, provided that insurance companies do their due diligence and adequate detailing[31].

In addition, when determining the risk weights for the investments of insurance companies, lower risk weights for resilient investments would encourage insurance companies to invest in resilient investments (For example, loans for resilient investments). Because in this way, the capital cost of insurance companies for these investments will decrease. For example, with the change it made in the Solvency II insurance regulation of the European Union, it introduced "qualified infrastructure investment" criteria, which allows insurance companies to invest in infrastructure projects with risk features tailored to the specific risk profile of the asset class and in return insurance firms benefit from reduced capital costs for both debt and equity. However, since this special regulatory treatment is limited to investments in the OECD and the European

[29] These figures show the figures for 2016.

[30] According to the related regulation, various loans have different the risk weights. The risk weights are used to determine how much capital should be allocated for loans. They can be determined without considering the ratings of credit rating agencies. Likewise, it is recommended that the risk weights of the assets of insurance companies be made without considering the ratings of the rating companies.

[31] This recommendation is made for countries with a solvent II-like regulation.

Economic Area, projects in emerging or less developed countries can`t benefit. From this point of view, it is important that such arrangements are made without hindering the financial flow to developing or underdeveloped countries.

For insurers residing in or operating in developing or underdeveloped countries, **local government regulations often restrict what institutional investors, including insurers, can invest in, and often encourage investment in local government bonds**. In this regard, UNDRR can work with the insurance sector, regulators, government ministries and project developers in developing or less developed countries to create supportive regulatory regimes that encourage local insurers to invest in resilient infrastructure. For example, necessary changes can be made in the market risk regulation in order to encourage the investments to be made by the insurance company in resilient bonds, and the capital required to be allocated for these bonds can be reduced by considering financial stability issues.

Related to advocating for favorable capital charges for climate resilient infrastructure investments, the UNDRR can work with insurance sector experts to develop and or endorse reporting standards and taxonomies that clarify the which investments are resilient. In this respect, the taxonomies for DRR can be used to determine which infrastructure investments are resilient by insurance companies, and favorable capital charges are applied to these investments.

In this context, UNDRR and insurance sector experts can engage on various platforms such as the G20, or directly with the regulatory authorities and the International Association of Insurance Supervisors (IAIS), to ensure that resilient investments have favorable risk weights by defining the resilient infrastructure as a separate asset class for insurance companies to allocate less capital to be held in their CAR to more resilient investments. Similarly, UNDRR can also advocate for punitive capital for non-resilient investments.

Pension Funds

The State of Pension Funds in Asia and the Pacific

The 300 largest pension funds in the world saw their assets under management increase by 8.9% to a record $23.6 trillion in 2021 (CIO, 2022). In terms of total asset under management and number of funds, Asia-Pacific remains the second largest region, accounting for 26.6% of all assets, while North America continues to rank first with 43.8%. The assets under management of Asia and the Pacific funds in the top 20 increased by 10.6% in 2021, meaning those funds represented 44% of assets managed overall by the top 20 funds, compared to 43% in 2018 (WTW, 2021).

Defined benefit (DB) assets[32] among the top 300 funds increased by 7.1% in 2019, while defined contribution assets (DC)[33] increased by 9.2%. DB funds constitute 64.2% of the total asset under

[32] A defined-benefit plan is an employer-sponsored retirement plan where benefits are calculated on factors such as salary history and duration of employment.

[33] A defined contribution (DC) plan is a retirement plan that's typically tax-deferred, like a 401(k) or a 403(b), in which employees contribute a fixed amount or a percentage of their paychecks to an account that is intended to fund their retirements.

management. DB assets dominate in North America and Asia-Pacific, where they represent 74% and 65%, respectively (WTW, 2021).

Japan Government Pension Investment Fund is the world's largest pension fund, with assets exceeding $1.73 trillion. South Korea's pension fund is in the third place in terms of asset size of approximately $800 billion dollars.

Equities account for 49.8% of pension funds' assets in Asia and the Pacific, while bond investments account for 41.6%. The remaining 8.7% consists of alternatives and others. While the same rates are 54.7%, 19.6% and 25.6% for North America, these rates are 48.8%, 39% and 12.1% in Europe, respectively (Asian Investor, 2022). These figures show that pension funds in Asia and the Pacific are more conservative in their investments compared to their competitors in other continents. Another important feature that distinguishes the pension funds in Asia and the Pacific from the pension funds in North America and Europe is that many pension funds in Asian markets are state run pension schemes.

Rising inflation and subsequent central bank action could jeopardize the funding position of pension funds in the long run as global growth stalls. Pension funds are under intense governance pressure from all sides, with the ESG increasingly politicized in some regions meeting more concrete and urgent calls for climate action. Most pension funds are looking for ways to increase the diversity of their investments in the context of economic slowdown.

Pension Fund Regulations

There is no uniform international regulation for pension funds, as in the banking industry or, to some extent, the insurance industry. Instead, it consists of quantitative restrictions applied to pension fund investment portfolios, which are applied differently by each country, and regulations aimed at limiting conflicts of interest between plan members and pension fund managers. Particularly in Asia and the Pacific, there are investment-restriction policies regarding large pension funds investing in risky assets. This situation prevents investing in alternative assets other than the equity and bond market and reduces the supply of alternative assets in Asia and the Pacific.

Incentives for Long Term DRR Investments to Mobilize Pension Fund Resources

It has been discussed for many years how pension funds will be engaged in SDGs financing. However, pension funds are not sufficiently utilized both in SDGs financing and long-term DRR investments. The reasons for this are: (1) Unclear impact on financial return; (2) Lack of know-how on the concept of SDGs (DRR concept can also be added to this); and (3) Lack of added value[34]. One of the most important reasons why financial returns are unclear for pension funds is that some of the DRR investments hold public goods features and positive externalities. In order to mobilize the resources of pension funds for long-term DRR investments, it is necessary to develop policies to overcome these three obstacles.

[34] Pension Funds and Sustainable Development Goals Be smarter, speak louder, push harder!, Jacqueline Duiker, Lucienne de Bakker, Bram van den Boogaard, 2018

Although not very positive results have been seen so far, some promising practices enlighten us on how the resources of these funds should be mobilized to SDGs financing. These promising applications can also be replicated in mobilizing these resources for long-term DRR investments. But first, the models to be applied in mobilizing the resources of pension funds to long-term DRR investments should consider their fiduciary responsibilities, achieving a strong rate of return, and avoiding risk. Therefore, **in order to attract this risk-averse capital to long-term DRR investments, a balance must be found between the impact of DRR investments on sustainable development and risk-adjusted returns.**

In this respect, long term bonds issued for long term resilient investments may be suitable financial instruments to match the long-term liabilities of pension funds with their assets. However, some large pension funds impose even tighter limits on investments in securities from non-OECD countries. For example, the debt and capital securities of non-OECD countries traded in regulated markets of pension funds in Italy are limited to 5% of fund assets. In Korea, equity and debt trade in any foreign country is limited to 10%. This means that if developing countries issue bonds for long term resilient investments, the investments of large mutual funds in these securities in some OECD countries will be limited. ***It is thought that it could be more appropriate to make these restrictions by considering the risk of the financial instrument rather than making them on a country basis, and it should be ensured that developing countries benefit from long-term resilient investments from pension fund sources.***

On the other hand, a successful model in channeling resources of pension funds to SDGs financing is to form an investment fund by establishing partnerships among themselves. The best example of this model is Danish SDG Investment Fund. How the investment fund works is shown in Box 10.

Box 10- Danish SDG Investment Fund

In 2017, six of Denmark's largest pension funds invested some 671 million euros in a new investment fund created by the Danish government to contribute to the SDGs. The Danish SDG Investment Fund is being managed by the Investment Fund for Developing Countries (IFU), Denmark's state investment programme for developing markets. A good return is expected, as well as the contribution it will make towards solving some of the big challenges the world is facing. It will also enable Danish companies to explore new markets. "By establishing partnerships with the government, IFU and pension investors, a strong set of skills and organisation behind the investment is ensured," says one of the pension fund's finance directors, Anders Damgaard.

The fund is structured so that the private investors get a preference on return, meaning any returns up to 6% go solely to the private investors, with greater returns also going to IFU. Thus far, it has invested in clean energy in Pakistan, education and hospitals in Africa, and solar energy in Ukraine.

Source: Asian Investor (2022), Devex (2020)

In such funds, public finance within the fund is used to increase the risk-adjusted rate of return by reducing the risk for the private pension funds. The government can use two innovative guarantee tools for this purpose: loss equity and capped return arrangements. With loss equity, a portion of the public's stake in the fund will cover the first loss position. In this way, the number of projects with the potential but with a high probability of default risk will increase, while pension fund investors will be prevented from losing money. In a capped return arrangement, however, the public's return from the fund can be limited so that co-investors (pension funds) receive a higher share from the investments. Such funds can be used to finance long-term DRR investments by attracting sources of pension funds that focus on achieving a strong rate of return and avoiding risk.

In this context, governments could prioritize the establishment of structured funds using innovative guarantee mechanisms such as first loss equity and capped return arrangements in order to mobilize the resources of pension funds to long-term DRR investments.

Currently, many pension funds are shifting to consider environmental, social, and governance factors (ESG) in their investments. This is partly due to the growing desire of pension fund beneficiaries to understand where their money is invested and pressure from the press and NGOs playing a significant role. In this context***, since pension funds have started to consider ESG factors in their investments, it is thought that efforts to add and expand the concept of resilience among ESG factors will have an essential role in directing pension fund resources to DRR investments.***

Section Five: International Development Financing Review

Financing for disaster risk reduction in the region also comes from several international development organizations including multilateral development banks (MDBs) and international financial institutions (IFIs), United Nations Agencies, and international organizations and funds (see Table 8).

Table 8. *Examples of international development organizations providing financing support for disaster risk reduction in Asia and the Pacific.*

Multilateral Development Banks and International Financial Institutions	**International Organizations**	**United Nations Agencies**
Asian Development Bank (ADB)	Global Environment Facility	World Health Organization
World Bank (WB)	Association of Southeast Asian Nations (ASEAN)	World Trade Organization
European Bank for Reconstruction and Development (EBRD)	South Asian Association for Regional Cooperation (SAARC)	United Nations Development Programme
Corporacion Andina de Fomento	South Asian Ministers of Education Organization (SEAMEO)	United Nations Environment Programme
European Investment Bank (EIB)	Organization for Economic Cooperation and Development	United Nations Office for Disaster Risk Reduction
Inter-American Development Bank (IADB)	Green Climate Fund (GCF)	United Nations Economic and Social Commission for Asia and the Pacific
Asian Infrastructure Investment Bank (AIIB)		United Nations Office for Sustainable Development (UNOSD)
International Monetary Fund		
New Development Bank (NDB)		
Islamic Development Bank (IsDB)		

These organizations provide different types of support to national and subnational governments including via strategic partnerships, financial support, and knowledge resources (Figure 29).

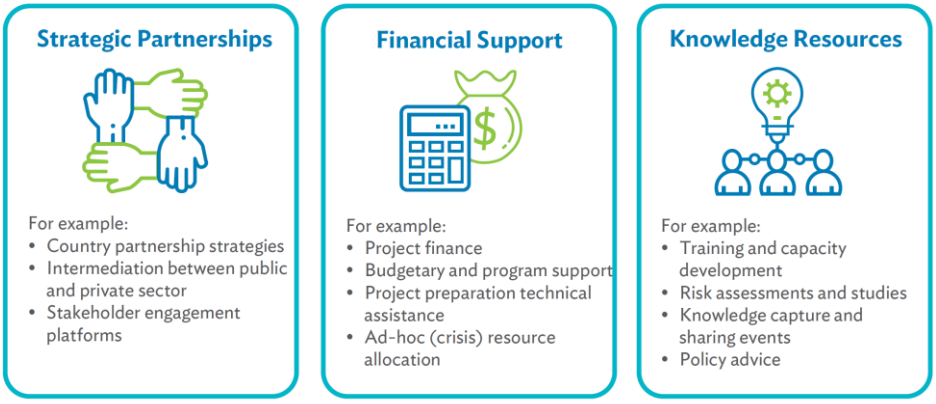


Figure 29. *Types of DRR support provided by international development organizations (from: ADB, 2020).*

Regarding financial support, several MDBs and IFIs channeled funds to countries across Asia and the Pacific during the COVID-19 pandemic to enhance the capacity of public health systems and also to foster economic recovery (Figure 30). In 2020, this financing support totaled almost $40 billion (UNESCAP, 2020b). Half of this funding originated from MDBs and IFIs from within the region, including from ADB, AIIB, and NDB, with 96% delivered in the form of loans with grants and debt relief (UNESCAP, 2020b). During this same period, MDBs and IFIs accounted for 80% of global adaptation finance, totalling $36.8 billion (Climate Policy Institute, 2021).

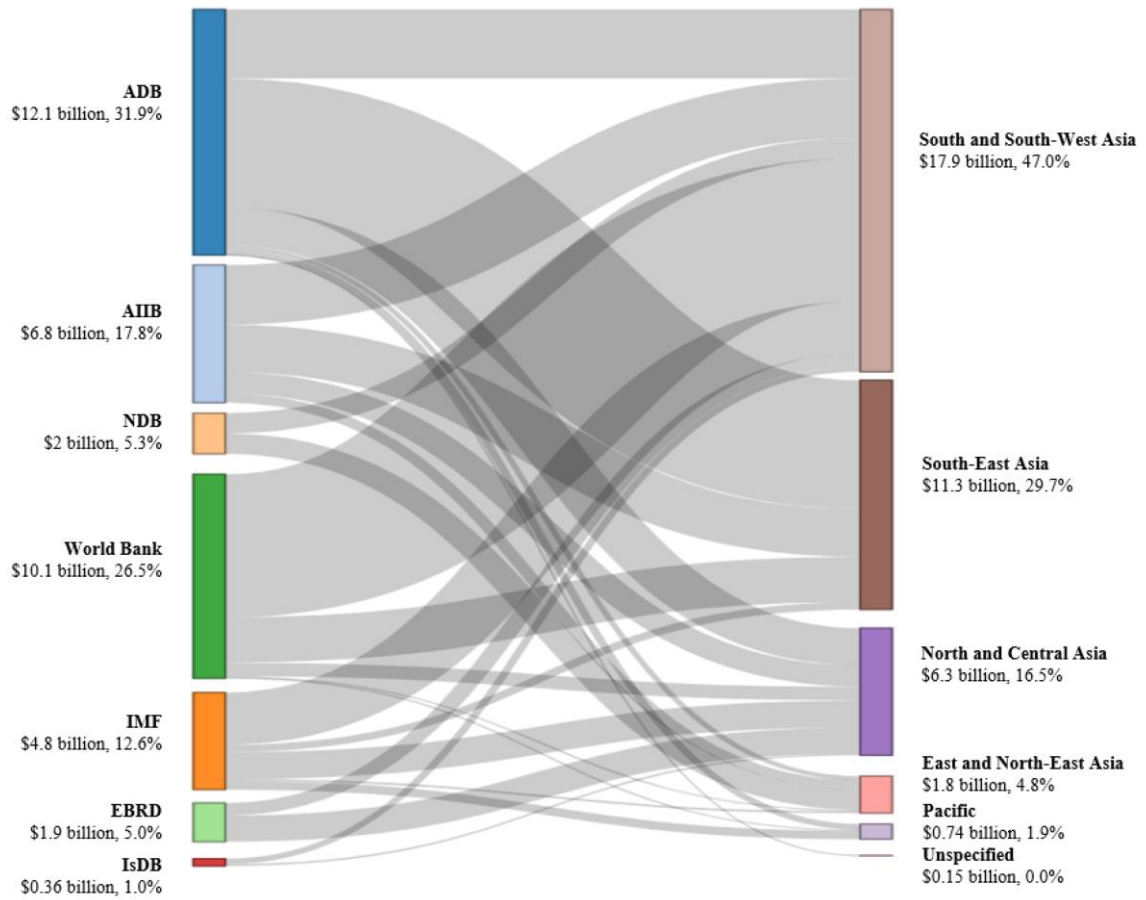
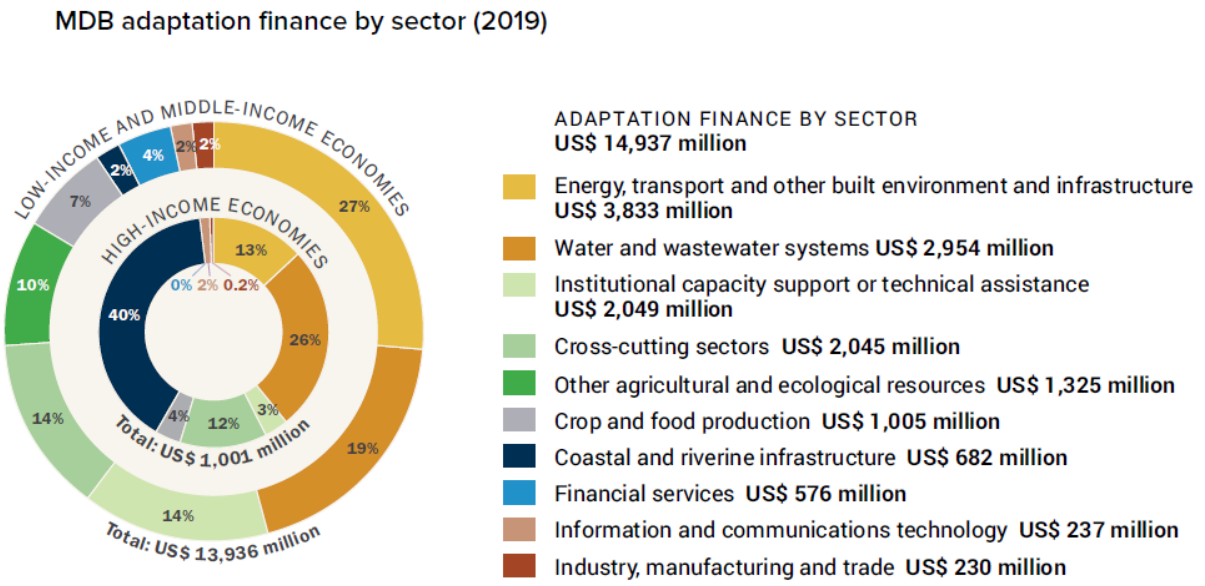


***Figure 30**. COVID-19 financing from MDBs and IFIs in 2020 (from: UNESCAP, 2020b).*

From a sector perspective, the focus of adaptation finance varied depending on country income level (Figure 31). For low and middle-income economies, adaptation finance targeted two main sector categories including: (1) energy, transport and other built environment and infrastructure and (2) water and wastewater systems (World Bank GFDRR, 2021). But for high-income countries, the top two sectors included: coastal and marine infrastructure; and water and wastewater systems.



Source: Reproduced with permission from the 2019 Joint Report on Multilateral Development Banks' Climate Finance (AfDB, ADB, AIIB et al. 2019).

***Figure 31**. MDB adaptation financing by sector - global (from: World Bank GFDRR, 2021).*

Together, these international organizations use a wide range of instruments to deliver finance to national and subnation governments and grassroots organizations. And like national governments and private sector companies, international development organizations deploy a range of governance approaches to guide and improve their efforts toward supporting disaster risk reduction. The suite of governance approaches and financing instruments used by international development organizations in Asia and the Pacific are elaborated in this section.

Governance Approaches

Similar to national governments and private sector companies, a range of governance approaches were used by international development organizations to guide and inform financing for disaster risk reduction, including financing strategies and frameworks, strategic partnerships, and institutional and expenditure review, to name but a few.

First, **institutional strategies and operational plans** help guide the financing efforts of multilateral development banks and international financial institutions. For example, the **Asian Development Bank** (ADB) **Strategy 2030**, entitled "Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and Pacific", lists seven operational areas of focus (ADB, 2018). While all seven operational areas can be said to help reduce disaster risks, three areas address risk reduction directly, including: Operational focus #3 on tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability; and Operational focus #5 on promoting rural development and food security.

The **Islamic Development Bank** (IsDB) issued its first **Sustainable Finance Framework** establishing its best practices for the use of proceeds for sukuk as well as processes for project evaluation and selection, management of proceeds, and reporting (IsDB, 2019). Under the

framework, all physical assets are screened using a customized tool to "inform project design on potential climate change, environmental and disaster risks and ensure that robust climate adaptation and resilience measures are incorporated in project formulation and design".

The first corporate strategy of the **Asian Infrastructure Investment Bank** (AIIB), entitled "Financing Infrastructure for Tomorrow" describes in its mission statement that "by investing in sustainable infrastructure, AIIB unlocks new capital, new technologies and new ways in which to address climate change and to connect Asia, and the world" (AIIB, 2020). The strategy further acknowledges that among the risks to the Asian infrastructure market are climate change and other disasters, noting that "failure to adapt technologies, policies and regulations to anticipate and address these risks could create stranded assets or possible delays or damage to infrastructure projects".

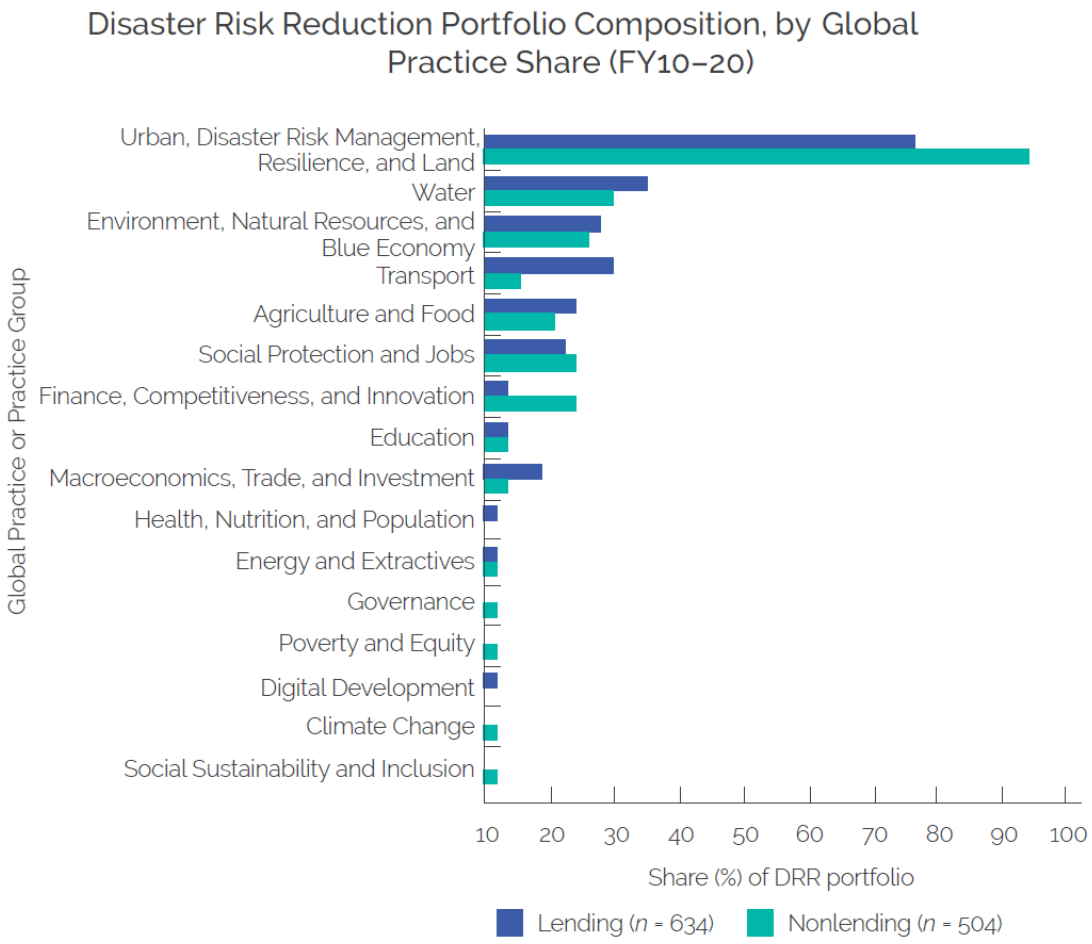
Strategic partnerships are another governance approach used among international development organizations to enhance support for disaster risk reduction and climate change adaptation at country and regional levels.

For example, at the **ADB, country partnership strategies** (CPS) serve as the primary platform for designing operations to deliver development results at the country level (ADB, n.d.(c)). The preparation and implementation of a CPS provides opportunities to initiate a dialogue with developing member countries on disaster risk reduction and to factor disaster risk management considerations into ADB assistance (ADB, 2017c). This mainstreaming is facilitated through a practical guidebook outlining key entry points for integrating disaster risk management in a CPS and also describing a process for conducting a disaster risk management assessment if such an assessment has not already been conducted by the developing country member (ADB, 2017c).

At a thematic level, the **InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance** was launched in 2017 and as of 2022 had more than 120 members including multilateral institutions, the private sector, civil society organizations, country governments, academia and think tanks, implementing partners and programs, and initiatives and networks (InsuResilience, n.d. (a)). The partnership's High-level Consultative Group (HLCG) sets its strategic direction and is comprised of representatives across its membership categories, including finance ministers, the head of UNDRR, the vice-president of Sustainable Development at the World Bank, the president of the World Resources Institute, among others. Among the partnerships knowledge products is a global spatial database of financing strategies and instruments aimed at disaster risk reduction and climate change adaptation (InsurResilience, n.d.(b)).

Expenditure reviews are another governance approach used by international development organizations to evaluate and improve their financing strategies and operational frameworks. Notably, the **World Bank's Independent Evaluation Group** (IEG) completed an evaluation of the bank's support to reducing disaster risk reduction for the period 2010 through 2020 (World Bank IEG, 2022). The IEG's evaluation reported that the World Bank "approved a large portfolio of DRR activities that help clients mitigate, prepare for, and recover from disasters caused by natural hazards" including 543 operations targeting investment project financing (IPF), 82 operations for development policy financing (DPF), and 9 operations on Program-for-Results financing. The thematic composition of all 1130 operations relating to disaster risk reduction is depicted in

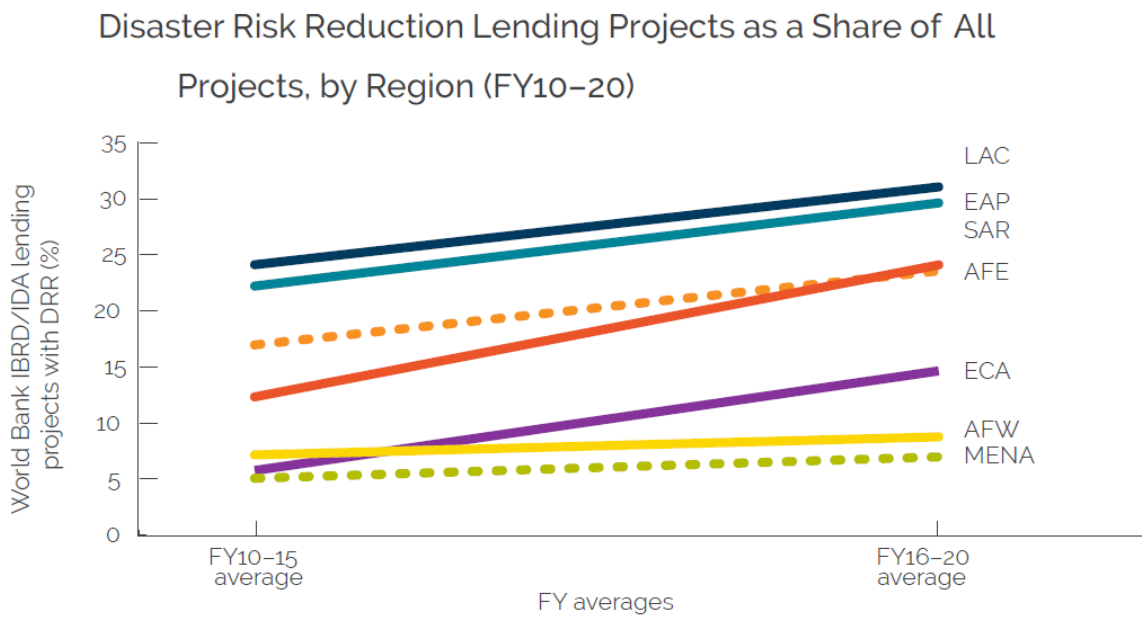
Figure 32a showing that urban disaster risk reduction projects made up “almost half of the total portfolio” with water, transport, and environment, natural resource and blue economy projects being the next three most targeted areas of disaster risk reduction (World Bank IEG, 2022). The evaluation also revealed that overall, the bank had “more than tripled its support for DRR over the evaluation period”. Lending projects in the East Asia and Pacific region comprised approximately 30% of the World Bank’s lending portfolio in 2020, up from approximately 22.5% in 2010.



Source: Independent Evaluation Group.

Note: DRR = disaster risk reduction; FY = fiscal year.

***32a**. DRR portfolio by practice area for 2010-2020.*



Source: Independent Evaluation Group.

Note: AFE = Africa East; AFW = Africa West; DRR = disaster risk reduction; EAP = East Asia and Pacific; ECA = Europe and Central Asia; FY = fiscal year; IBRD = International Bank for Reconstruction and Development; IDA = International Development Association; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SAR = South Asia.

***32b**. Regional DRR lending trends for 2010-2020.*

***Figure 33**. Results of the World Bank's Independent Evaluation Group report on disaster risk reduction support from 2010-2020 (from: World Bank IEG, 2022).*

Finance Instruments

International development organizations have leveraged a wide array of financing instruments to support disaster risk reduction and disaster risk transfer helping build resilience, including in the areas of debt financing, fund and grant support, insurance and reinsurance, crowdfunding, and programmatic technical assistance-to-loan support. In most instances these instruments strive for coherence among both disaster risk reduction and climate change adaptation efforts. This section features examples of such financing instruments developed and implemented since 2015.

Debt Financing

Debt financing from multilateral development banks and international financial institutions for countries typically involve loans, sometimes with concessional facilities, deferred drawdown options, incentivized/discounted lending rates, loan cancellation, and debt restructuring. The use of specialized bonds by MDBs and IFIs is also growing, including green, resilience and SDG bonds.

For example, the ADB has developed **contingent disaster financing** (CDF) to provide "quick and flexible funding to support disaster preparedness and response for its developing member

countries" (ADB, 2020). With such contingent loans, policy reforms and loan processing are done prior to a disaster event with the loan triggered by the disaster occurrence. This instrument emerged out of past experiences such as the ADB-financed **Cook Islands Disaster Resilience Program** which provided the government with "rapid access to financing resources to meet short-term, post-disaster recovery needs ". The support is meant to catalyze the improvement of the country's national disaster risk management system by through enhanced planning, response, and recovery from disasters. The contingent component of the loan requires the government to "implement measures for improved disaster risk management governance, capacity development, resilience improvements to infrastructure assets, and expanded financing of disaster risk reduction" (ADB, 2020).

The World Bank offers a **Deferred Drawdown Option for Catastrophic Risk (Cat DDO)** instrument which serves as a contingent line of credit to provide immediate liquidity to member countries of the International Bank for Reconstruction and Development (IBRD) following a state of emergency declaration by governments (World Bank, n.d.(a)). The loan is contingent on the government having a disaster risk management program in place. The Cat DDO provides bridge financing of up to $500 million or 0.25% of GDP while other sources are mobilized and is typically used to finance losses from repeat disasters. This mechanism proved particularly beneficial during the COVID-19 pandemic when "nearly all Cat DDOs were triggered in 2020" (World Bank IEG, 2022). In the **Philippines,** four Cat DDOs have been accessed over the past decade and lessons have been learned along the way. For instance, the instrument was at first interpreted to be general budget support and so was triggered almost immediately after a relatively minor disaster (World Bank IEG, 2022). By its fourth Cat DDO stemming from typhoon Rai in 2021, the triggering criteria was more refined and cautious and informed by loss modelling calculations (Artemis, 2021).

Development Policy Financing (DPF) is another loan instrument used at the World Bank, providing "rapidly-disbursing financing to help a borrower address actual or anticipated development financing requirements" (World Bank, n.d.(b)). Of the bank's 634 lending products that included DRR activities between 2010 and 2020, 82 were DPF arrangements (World Bank IEG, 2022). Total lending via DPFs in East Asia and the Pacific remained steady at approximately $10 billion in the five years prior to and following 2015, while in East and Central Asia lending declined by approximately $5 billion (Figure 33; World Bank, 2021c).

Importantly, it was reported that DPF arrangements that include deferred drawdown options for catastrophic risk and other lending instruments, such as technical assistance, provide the opportunity to engage with ministries of finance and budget and economic planning agencies on the topic of disaster risk reduction and even catalyze implementation (World Bank IEG, 2022). For example, in the **Philippines** it was observed that DPF and IPF (Investment Project Financing) "generated mutual leverage, with a CAT DDO providing the policy framework for disaster-sensitive community-driven development and conditional cash transfers, while these mechanisms were implemented through IPF" (World Bank IEG, 2022). Similarly, in **Sri Lanka** the DPF instrument "helped achieve the adoption of a national disaster management plan and a national spatial data infrastructure concept that was lagging for years, while technical assistance supported implementation of the plan and data infrastructure" (World Bank IEG, 2022).

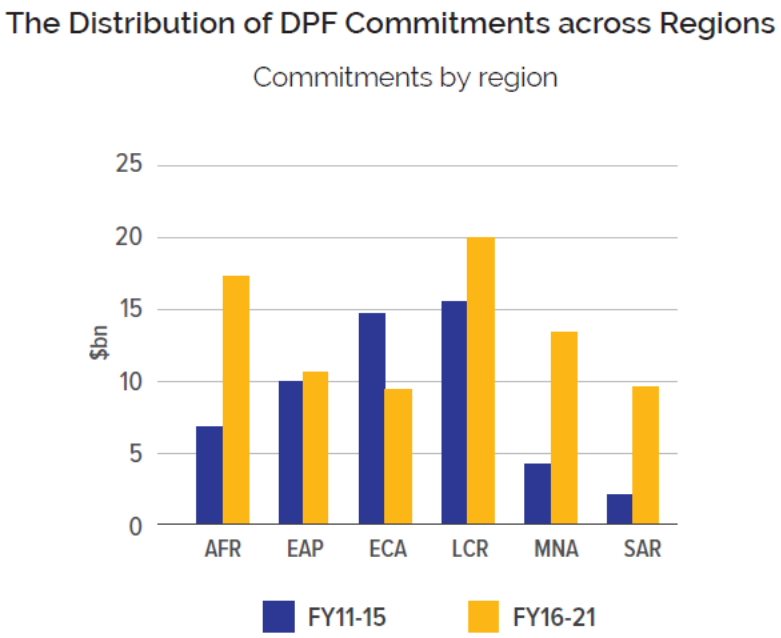


***Figure 33**. World Bank Development Policy Financing across regions (from: World Bank, 2021c).*

International development organizations are also involved in the creation and management of **green and SDG bonds**. Globally, development banks contributed $35 billion to the green bonds market in 2021, representing approximately 8% of the market, down from around 30% of the green bond market in 2015 (Climate Bonds Initiative, 2021). This decline in market share appears mostly due to growth in sovereign-issued bonds over the same time. For context, the Asia and Pacific region became the second highest issuer of green bonds with approximately $120 billion in 2021 (global green bond issuance was $522 billion; Climate Bonds Initiative, 2021).

For example, in the Philippines, the World Bank's International Financial Corporation supported the issuance of the "internationally rated triple-A **Philippine peso-denominated green bond**", together with direct investments from the Philippines Energy Development Corporation (EDC) and its shareholders to support adaptation and resilience-related measures at one of its plants. (GFDRR, 2021). Issuance of the 15-year, $15 million bond was motivated by the 2017 disaster from Tropical Storm Urduja, which caused significant damage to the Malitbog Geothermal Power Plant. Among the measures implemented by the EDC were updating its risk analysis and modelling and making "targeted investments in the most critical points of the infrastructure that would result in the greatest reduction of value at risk, based on cutting-edge, high-resolution LIDAR mapping and deluge modeling" (GFDRR, 2021).

In 2020, the **Asian Development Bank** assisted the government of **Thailand** in designing, issuing and monitoring its first **sustainability bond** totalling $964 million. Issued by the Ministry of Finance Public Debt Management Office, the first-of-its-kind bond in Southeast Asia was part of Thailand's recovery efforts for the COVID-19 pandemic and "in a manner aligned with the 2015 Paris Agreement and the UN Sustainable Development Goals" (Open Development Mekong, 2020). Overall, ADB's green bonds have helped finance $10 billion in climate change mitigation

and adaptation projects since it was initiated in 2015 (ADB, 2022). In the Blue Bond market, ADB issued its first Australian and New Zealand dollar issuance in 2021 in the amount of $300 million (ADB, 2022d).

Furthermore, the **ADB's Green and Blue Bond Program** provides financing for projects implemented by member countries that support climate change mitigation and adaptation, including resilient energy and water infrastructure, agriculture, and transport, as well as investments that include marine and coastal ecosystem management and restoration, pollution control for marine and coastal environments, and sustainable coastal and marine development (ADB, n.d.(e)).

Funds

Funds comprising grant resources, including global funds and trust funds are another important instrument used by international development organizations to help support disaster risk reduction and climate change adaptation. For example, the **Local Climate Adaptive Living Facility** is supported by the United Nations Capital Development Fund (from: UNCDF, n.d.(a)). In Bhutan, for instance, this fund delivers financing to 100 local governments (UNCDF, n.d.(b)).

Table 9 provides a summary of several different funds that have helped support disaster risk reduction and climate change adaptation across Asia and the Pacific.

Table 9. *Examples of funds in Asia and Pacific.*

Fund Name	Description
NDRMF *(From: ADB, 2020)*	• In partnership with **Asian Development Bank** • Aligned with the National Disaster Management Plan 2012–2022 and the Draft National Flood Protection Plan IV 2016–2026, • Finances up to 70% of the cost of eligible projects and, additionally, is working to transfer residual risks through insurance arrangements. • $200 million loan from ADB, now supported by multiple donors • Aims to reduce the socioeconomic and fiscal impacts of natural hazards and climate change by increasing institutional and physical capacities of public sector entities and non-public sector entities
Pooling Fund for Disasters in Indonesia *(From: World Bank, 2021a)*	• **World Bank** $500 million lending operation (2021) • The loan supports the establishment of a Pooling Fund for Disasters, that was legally created in August 2021 through a Presidential Regulation. • Central mechanism that will help ensure effective and transparent flow of money to relevant government agencies, including faster social assistance payments for victims of disasters, and improve preparedness planning. • To support Indonesia's efforts to build and strengthen its financial response to natural disasters, climate risks, and health-related shocks such as the COVID-19 pandemic. • The Pooling Fund will leverage domestic and international insurance and capital markets to increase its financial capacity. The lending operation will also invest in activities to improve planning, such as introducing budget tracking for disaster-related expenditures.

Global Risk Financing Facility (GRiF) *(From: World Bank, 2021a)*	• **World Bank** managed $14 million multi-donor trust fund, supported by the governments of Germany and UK • Helps countries design and implement financial solutions to manage disasters and climate shocks • Co-financing efforts to help build the government's technical capacity in managing funds to protect the most vulnerable groups.
Asian Development Fund *(From: ADB, 2020)*	• **Asian Development Bank** • Established in 1974 and provides grants and concessional loans to lower-income developing member countries • A disaster risk reduction financing mechanism within the ADF was included in the 12th period (2017–2020). • Initially, $164 million was allocated to the ADF disaster risk reduction financing mechanism, which was then increased to $195 million in 2019. • One strategic area of a new thematic pool under ADF 13 (2021-2024) focuses on grants to incentivize disaster risk reduction in ADB's poorest and most vulnerable developing member countries.
Urban Climate Change Resilience Trust Fund *(From: ADB, 2020)*	• **Asian Development Bank** • $150 million multi-donor trust fund (2013–2021) administered by the ADB under the Urban Financing Partnership Facility • Support to medium-sized, rapidly growing cities to better integrate resilience into the planning and design of their infrastructure from strategy development to implementation. The fund also provides soft investments around institutional resilience capacity, as well as knowledge sharing and support in monitoring and evaluation. • In **Viet Nam**, fund aims to reduce disaster risk by mitigating flood risk and improving water infrastructure and services. Integrates nature-based solutions within, or in place of, gray infrastructure to enhance water cycle management and reduce disaster risk. Linking up disaster risk reduction efforts with disaster risk financing, UCCRTF support has also been directed at developing a disaster risk insurance model for public assets.
Asia-Pacific Climate Finance Fund *(From: ADB, 2020)*	• Asian Development Bank multi-donor trust fund established in 2017 • The objective of the fund is to support the development and implementation of financial risk management instruments that can help unlock capital for climate investments and improve resilience to the impact of climate change. • The aim of the ACLIFF is to i) reduce carbon emissions and increase adaptation measures, ii) leverage climate investment by reducing the risks of adoption and uptake of climate technology in high-priority sectors outlined in nationally-determined contributions and other national climate plans, and iii) offer demand side support for climate risk insurance to address remaining climate risks which could not be efficiently managed by the current adaptation infrastructure.
InsuResilience Investment Fund *(from: Gov. of Canada, n.d.)*	• German KfW Development Bank • Objective of improving access to and the use of insurance in developing countries. • Invests through equity or debt in insurance or reinsurance companies that provide or introduce insurance solutions that help clients mitigate climate-related risks.
Adaptation Fund *(from: Gov. of Canada, n.d.)*	• Accessed through national implementation entities or other accredited agencies such as the World Bank or the Asian Development Bank. • Designed to finance climate change adaptation projects and programs based on the priorities of eligible developing countries. • Private sector companies may seek funds in form of innovation grants, technical assistance grants, project formulation grants and project scale-up grants.

	• Has committed US$ 923.5 million to projects and programmes (Adaptation Fund, n.d.)
Local Climate Adaptive Living Facility *(from: UNCDF, n.d.(a))*	• United Nations Capacity Development Fund • Aims to promote climate change–resilient communities and economies by increasing financing for and investment in climate change adaptation at the local level in LDCs and other countries. • Serves as a mechanism to integrate climate change adaptation into local governments' planning and budgeting systems, increase awareness of and response to climate change at the local level, and increase the amount of finance available to local governments for climate change adaptation. • Combines performance-based climate resilience grants (PBCRGs), which ensure programming and verification of climate change expenditures at the local level, with technical and capacity-building support.

Finance provided at below market rates to governments by multilateral development banks and international financial institutions is referred to as **concessional finance**. Such instruments play an important role in disaster risk reduction and resilience by supporting critical projects that might not otherwise proceed without specialized financing (World Bank, 2021d).

For example, , the World Bank's **International Development Association** (IDA) provides loans on concessional terms, lending money to developing countries at zero or very low interest rates repayable over 30 to 40-year periods (World Bank, n.d.(c)). Overall, World Bank lending in the East Asia and Pacific and South Asia regions over the period 2010-19 addressed multiple hazard types in 50% of their partner countries, including floods, cyclones, drought, earthquake, volcanic eruptions, tsunamis, and landslides (World Bank IEG, 2022).

Forecast-based financing is a new type of public transfer that is based on in-depth forecast and risk analysis (UNICEF, 2023). First initiated in a programme developed by the International Federation of Red Cross and the German Red Cross, forecast-based financing has three main components: (i) triggers – a danger level based on risk analysis and impact assessments of past events; (ii) suite of actions – a pre-determined package of support that is triggered when the danger level is reached; and (iii) financing mechanism – an ex-ante financing instrument that automatically allocates funding to the suite of actions (UNICEF, 2023). For example, a pilot forecast-based financing initiative in **Bangladesh** delivered an emergency cash transfer with a 10-day advance warning of riverine flooding, resulting in improved food security, reduced lending costs, and lower anxiety (Tanner et al., 2019, in UNICEF, 2023). In **Mongolia**, two emergency cash transfers were made by the Red Cross and FAO in 2018 to herding families triggered by a forecast of extreme winter conditions, resulting in a benefit of USD $7.1 for every dollar transferred by FAO (FAO, 2018, in UNICEF, 2023).

Risk Transfer Instruments Helping Build Resilience

As featured for the private sector, international development organizations also help support insurance instruments across Asia and the Pacific, including through re-insurance facilities. Insurance coverage helps reduce vulnerability to disasters but can also, to a certain extent, help build resilience through pricing and policy incentives.

For example, a **public-private-partnership** was created for construction of the **Sendai Airport in Japan** and the procurement process used a novel approach to incent disaster risk reduction (World Bank, 2017). With the region highly exposed to earthquakes, the project's **procurement bid process required that a disaster risk management plan be in place as a prerequisite for obtaining insurance**. Positive points were awarded in the bid process for operators that provided "a detailed, proactive disaster risk management plan that would prevent damage and accidents" (World Bank, 2017). It was reported that the winning bidder proposed a "specialized airport operation center that included aviation security, guards, disaster risk management, and a facility management that would lead to stable operation of the airport" (World Bank, 2017).

Crowdfunding

With the Internet and advance of social media platforms, **crowdfunding** has emerged as a new source of financing for sustainable development, including for disaster risk reduction and resilience.

For example, in 2021, the **Viet Nam Fund for Promoting Education** partnered with UNDP and the Viet Nam media and news company, Dan Tri, to launch a crowdfunding campaign to build 100 new storm- and flood-resilient houses for poor and near-poor families in the coastal province of Quang Binh (UNDP, 2021). The province's Le Thuy district was devastated by record-level storms and flooding in 2020, with floodwaters rising more than 2m above the walls of homes in the area. As of 2021, more than 3,400 low-cost 'resilient houses; have been built through a joint partnership among the Green Climate fund, UNDP, and the Viet Nam government since 2018. The houses are engineered to includes special flood-proof floors that are 1.5 m above the highest flood level and reinforced roofs to withstand typhoon-strength winds. Organizations such as World Share, a Korean non-governmental organization, have provided financial donations in a first phase of support for affected communities in the province of Quang Binh. A website has been setup as a donation portal for the campaign with information updated also via the Dan Tri e-newspaper.

Programmatic technical assistance-to-loan support

Programmatic approaches are used increasingly by international development organizations, including multilateral development banks and international financial organizations, to help support disaster risk reduction, building on and coordinating the results of disaster risk assessments (ADB, 2020).

Programmatic technical assistance-to-loan support creates multi-year partnerships with national and subnational governments, such as via the ADBs' **Urban Climate Change Resilience Trust Fund** where water-sensitive urban design is used to help mitigate flood risk and improve water infrastructure and services, including nature-based solutions (see Table 8 above). Similarly, the World Bank's **Climate Resilience Multiphase Programmatic Approach for Sri Lanka** brings together five components to protect people against flood risk in priority river basins, including: (i) forecasting and early warning, (ii) flood risk mitigation investments, (iii) land acquisition and resettlement assistance, (iv) project management, and (v) contingent emergency response (World Bank, 2022).

Section Six: Islamic Finance

Islamic finance has been described as one of the fastest growing elements of global finance with total assets growing at a rate of 11.3% year-on-year as of 2021 and worth USD 3.06 trillion (IFSI, 2022). Its main sectors comprise **Islamic Banking, Sukuk, Islamic funds assets, and Takafuk** (insurance) (IFSI, 2022).

Islamic financing is also referred to as Shari'ah-compliant financing and operates under Islamic law, subject to the following principles (ADB, n.d.(f)):

- *Prohibition of interest* - Instead of imposing interest, Islamic banking utilizes profit and loss sharing (PLS) as a method of resource allocation and financial intermediation.
- *Fair and transparent dealings / avoidance of speculation and uncertainty* - Islam prohibits uncertain or ambiguous transactions, gambling and speculative behavior. Consequently, Islamic banking principles require that parties to a transaction should have symmetric information to guard against exploitation of the weak.
- *Real economic activity with underlying assets* - Making money out of money is unacceptable; financial transactions must have a direct link to an economic transaction with underlying assets.
- *Ethical investments* - Investments in industries considered to be detrimental to the welfare of the community, such as weapons and armaments, alcohol, gambling and pornography, are prohibited.

Islamic Banking

The global Islamic Banking sector reported $2.1 trillion in assets by the fourth quarter of 2021 (IFSI, 2022). **Malaysia's** Islamic Banking assets represent 11.2% of global Islamic Banking assets, while Bangladesh, Indonesia, Pakistan, and Brunei comprise 2.7%, 1.9%, 1.3%, and 0.4%, respectively (IFSI, 2022). The domestic market share of Islamic finance in parts of Asia are depicted on Figure 34, ranging from less than 1% of the domestic market in Thailand and Sri Lanka to 58% and 32% in **Brunei and Malaysia**, respectively (IFSI, 2022).

The Overseas Development Institute reported that in 2015, the Saudi Arabia-based **Islamic Development Bank Institute** (IsDB) created its Climate Change Division within the Resilience and Social Development Department to "scale up efforts on climate change mitigation and adaptation across its member countries", many of which are in the Asia and Pacific region (ODI, 2019). Importantly, in joining the Climate Finance Tracking Working Group, the IsDB was able to track that its climate finance was estimated at $644 million, with 47% allocated to climate adaptation (African Development Bank et al., 2018; in ODI, 2019). Then in 2019, the **IsDB i**ssued its first **Sustainable Finance Framework** and thereby establishing its best practices for the use of proceeds for sukuk as well as processes for project evaluation and selection, management of proceeds, and reporting (IsDB, 2019). Most recently, in 2021 the IsDB highlighted the following in relation to fintech (IFSI, 2022):

…fintech has the potential to contribute to addressing climate hazards and natural disasters. Islamic fintech companies are increasingly present in the ecosystems, although there are some barriers that need to be lifted for wider spreading. Examples include crowdfunding platforms that match sadaqah, zakāh and waqf donors with credible charity partners. Campaigns funded through such platforms include activities that are eligible for climate finance, such as borehole construction in water-stressed areas, or access to low-cost, clean energy. Remittances through Islamic fintech can also support households in adapting to climate hazards or acquiring low-cost clean energy technology.

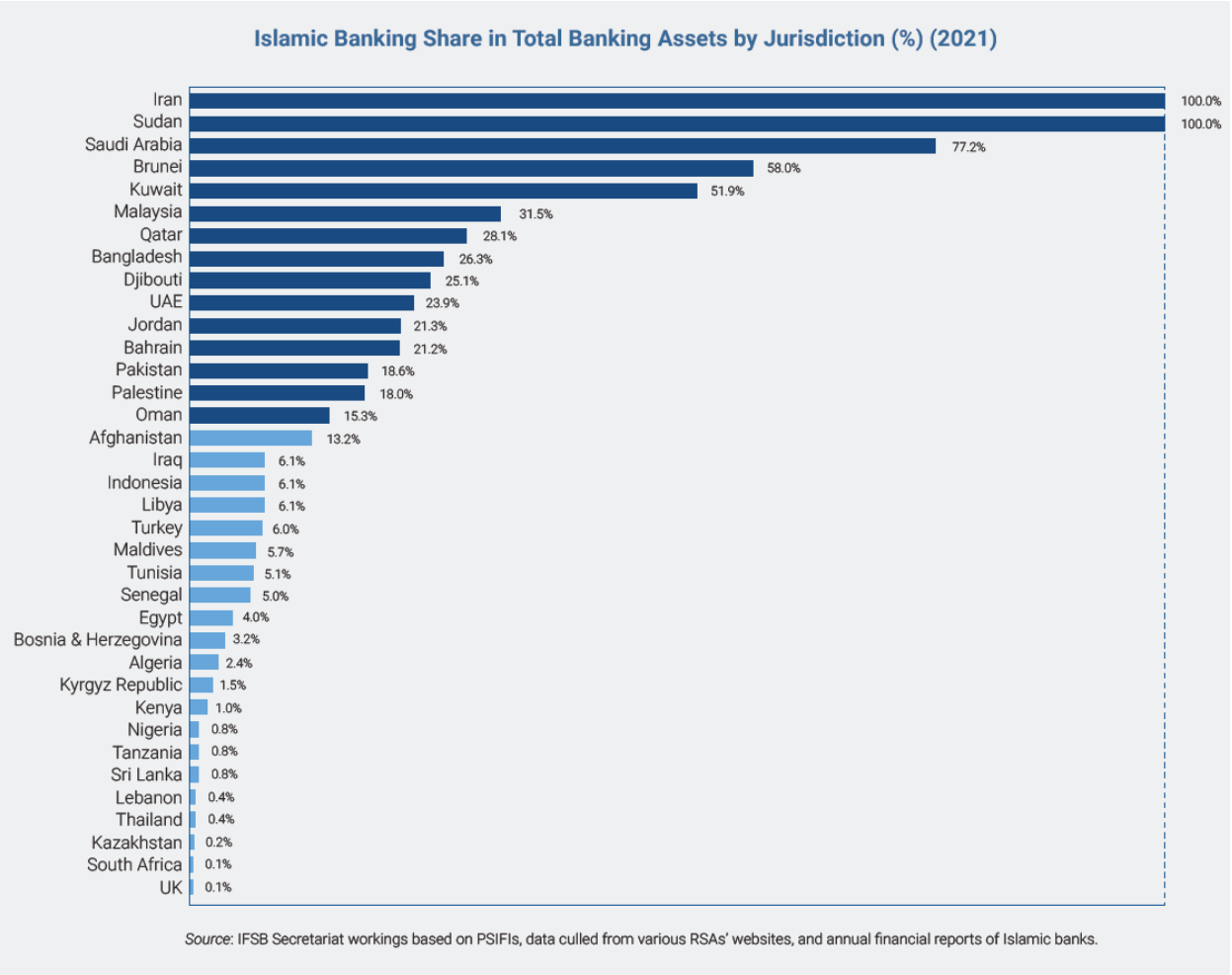


Figure 34. *Islamic Banking share of total domestic banking assets (from IFSI, 2022)*

In the **Philippines**, the Asian Development Bank (ADB) has implemented a knowledge and support technical assistance (KSTA) initiative since 2017 designed to "enable responsible growth of the Islamic finance industry as an additional vehicle for savings, infrastructure financing, portfolio diversification, and to promote financial inclusion" (ADB, 2022e). And in **Pakistan**, the ADB initiated a similar KSTA initiative with a focus on "assisting the government with developing a measured, inclusive, and sustainable Islamic Finance industry; building capacity for service delivery; and raising awareness of Islamic Finance as a viable alternative to conventional finance" (ADB, 2022e).

Sukuk

Sukuk is a particularly interesting financing instrument from the perspective of supporting disaster risk reduction. Sukuk is "an issue of commercial paper that provides the subscriber with the ownership or part ownership, together with rental income, of underlying assets" (ADB, n.d.(f)). Compared to a conventional bond, in a sukuk, the return to investors is the profit or income from an underlying asset rather than the interest. And importantly, the utilization of proceeds must be Shariah-compliant.

Figure 35 illustrates the global composition of sukuk: 44% of issuers are **sovereign nations**, with **corporate** and **multilateral organizations** comprising 42% and 14%, respectively (IFSI, 2022). Of the sovereign sukuk issuance, **Indonesia and Malaysia** constitute 19.6% and 17.8% of the global market, while for corporate sukuk issuance, **Malaysia** retains the largest share at 43.9% of the global market (IFSI, 2022).

The trend in sukuk issuance from 2018 through 2021 among leading issuers is shown in Figure 36. Sukuk issuance increased each year for all leading countries with Malaysia the global leader at $72.6 billion in 2021 (Refinitiv, 2022). The sukuk market in Indonesia and Pakistan reached $23.4 and $5.8 billion, respectively in 2021 (Refinitiv, 2022).

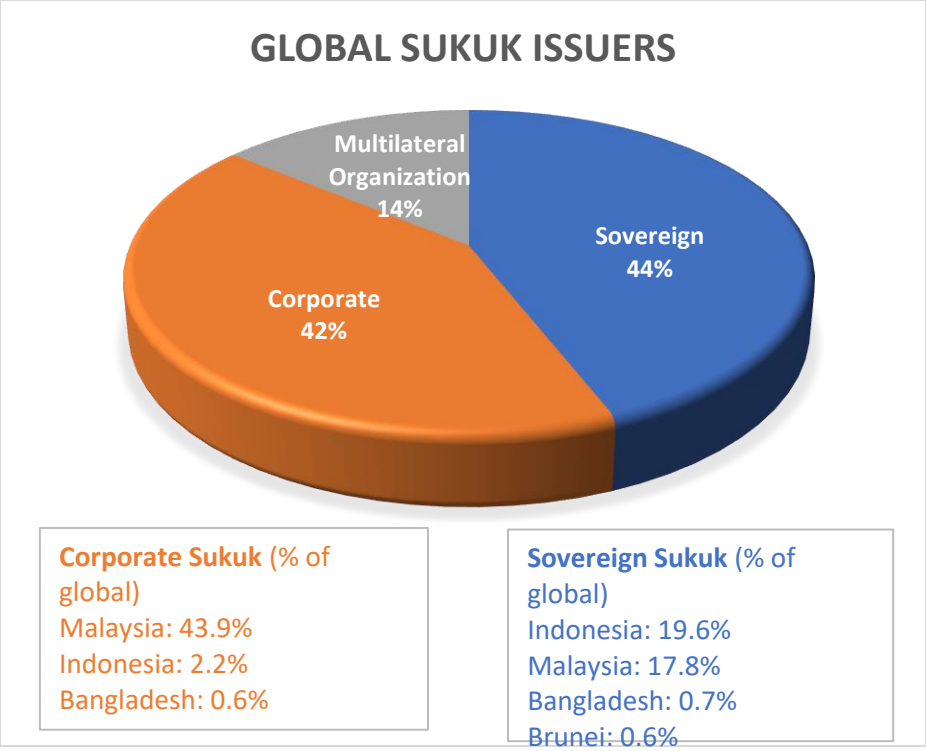


Figure 35. *Global sukuk issuers by type and global share of leading Asia and Pacific countries (data source: IFSI, 2022.)*

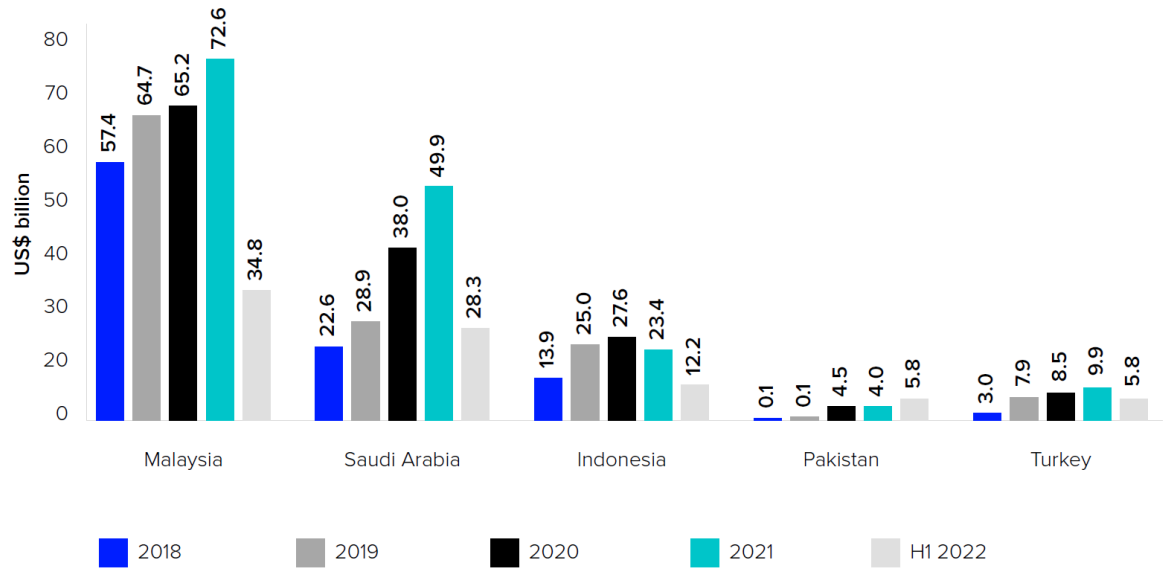


Figure 36. *Trends in sukuk issuance among leading countries (from: Refinitiv, 2022)*

Specifically, in the arena of sustainability-related sukuk, the market has evolved over the past years with global issuance in 2021 reaching approximately USD 5.3 billion (IFSI, 2022). Asia and Pacific countries have been active in this regard: **Malaysia** debuted the first sustainability-related sukuk amounting to $1.3 billion; **Indonesia** issued a $750 million green tranche as part of its $3 billion issues during the first half of 2021; and Bangladesh saw its first corporate green sukuk issued to finance solar projects (IFSI, 2022).

Importantly, UNDP (2020) highlight how SDG-aligned sukuk "can be an important source of long-term capital for governments and companies engaged in Covid-19 response, recovery and resilience. UNDP's support of the Government of **Indonesia's Green Sukuk** is cited as a prime example, including a US$1.25 billion issuance in 2018. Furthermore, the World Bank reports that green sukuk has the potential to finance "a wider range of projects from solid waste management to sustainable land use to biodiversity conservation" (World Bank, 2020c). While data on the specific allocation of green sukuk to disaster risk reduction, including climate change adaptation, is not available yet, current eligibility criteria for green sukuk bonds indicate the potential: **Indonesia's Green Bond and Green Sukuk Framework** includes "resilience to climate change or disaster risk reduction" and **Malaysia's Sukuk Framework** already covers "…community and economic development" (Azhgaliyeva, 2020).

Islamic Funds

The Islamic Financial Services Industry reported that the total assets under management of Islamic Funds grew to approximately $120 billion in 2021, up from $60 billion a decade prior (IFSI, 2022). Of the global market in 2021, Malaysia held a 27.7% share, with Indonesia and Pakistan retaining a 2.3% and 1.8% global share, respectively. Furthermore, sustainability-related Islamic Funds totalled $6.9 billion in assets under management.

In 2016, a landmark blended finance program called the **Lives and Livelihood Fund (LLF)** was launched by a group of financing partners including the IsDB, the Bill & Melinda Gates Foundation, the Abu Dhabi Fund for Development, the U.K. Foreign Commonwealth and Development Office, the King Salman Humanitarian Aid and Relief Centre, and the Qatar Fund for Development (ADB, 2022e). The fund targets the 33 least developed and lower-middle-income **member countries of the IsDB, including Afghanistan, Bangladesh, and Pakistan**. Through the LLF, countries are eligible for a blended finance package comprising a 35% grant portion from IsDB partners and the remainder made up of IsDB funds to help reduce financing costs for health, agricultural, or infrastructure projects that support a range of sustainable development goals, including SDG 1, 2, 3, 6 and 9 (ADB, 2022e). It was reported that as of 2020, the fund had provided $1.54 billion towards 29 projects in 22 countries.

Takaful Helping Build Resilience

Relating to **takaful** (insurance), global contributions in 2020 totaled 24.2 billion (IFSI, 2022). For the Asia and Pacific region, takaful makes up 23.9% of the **Malaysian** insurance sector representing contribution volume of approximately $3 billion (Figure 38, IFSI, 2022). In **Indonesia**, takaful is 3.4% of the insurance sector with a contribution volume of about $1.5 billion. **Brunei**'s takaful market is 45.8% of its domestic insurance market, but with much lower contribution volume relative to the other markets (IFSI, 2022).

While there is no information available on the current role that takaful plays in supporting disaster risk reduction and climate change adaptation, the ADB notes that **takaful "holds great potential for climate adaptation efforts**, especially among member countries that are highly vulnerable to climate change such as Bangladesh, where one in seven people would be displaced due to sea level rises alone" (ADB, 2022e).

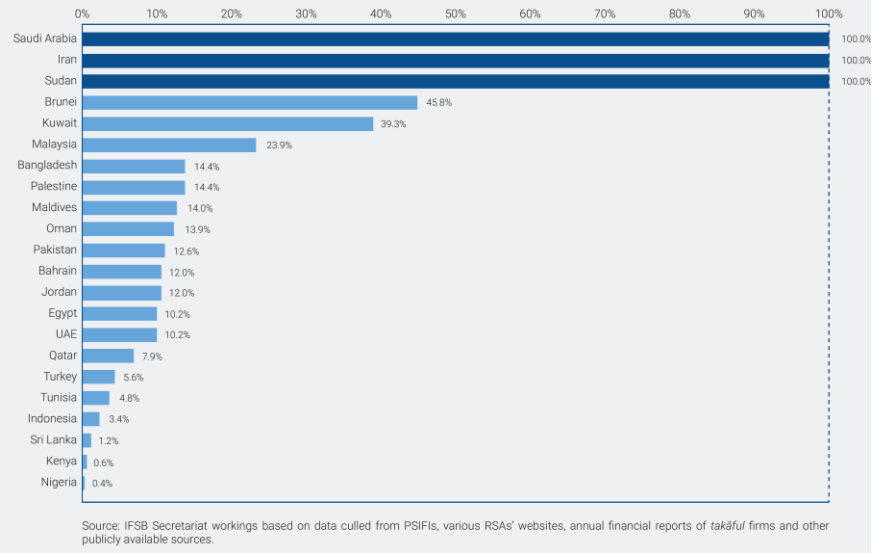


Figure 37. *Takaful share of total domestic insurance sector (source: IFSI, 2022).*

Zakat and Waqf

Philanthropic support, referred to as Zakat (mandatory almsgiving) and Waqf (charitable endowment) are also cited as having potential to support disaster risk reduction in the context of emergency response and response/recovery, respectively (UNDP, 2020).

For example, in the context of Covid-19, **Indonesia's national Zakat collection agency** has partnered with UNDP and demonstrated how Zakat stakeholders can systematically link their projects with the Sustainable Development Goals, including in response to crises (UNDP, 2020). The ADB further notes that zakat in Indonesia is estimated at $22 billion annually, and with ongoing greening programs of the central zakat authority, BAZNAS, there is further potential for this instrument to support the objectives of a green, resilient and inclusive future (ADB, 2022e).

Overall, it is believed that zakat has the potential to reduce the exposure of disadvantaged social groups to the impacts of climate change through targeted climate-smart investments (whether

in communities or households) and at the same time address consequences of climate disasters through emergency support and humanitarian aid (ADB, 2022e).

Waqf charity endowments are described as potentially important contributors to long-term resilience in the form of financial or non-financial assets such as land and buildings being permanently dedicated to social purposes (UNDP, 2020). And it is believed by some experts, including the UK Islamic Finance Council, that the integration of waqf and zakat in the finance sector "can also play a major role in realizing the SDGs agenda, and the harmonization of standards, the emergence of fintech, or the development of philanthropic instruments can all accelerate the transition toward an SDGs-aligned IFSI industry, a positive-step toward more focus on climate action and green, resilient and inclusive post-COVID recovery" (ADB, 2022e).

Section Seven: Challenges & Barriers and Opportunities & Enablers for DRR Financing in Asia and the Pacific

This section presents a high-level synthesis of challenges & barriers as well as opportunities & enablers gleaned from the review of the literature on financing for disaster risk reduction, climate adaptation, and resilience. As well, select challenges and opportunities as cited by national governments in their submittals to the Sendai Framework Mid-term Review (and status reports submitted between 2020-22), are featured in Annex C.

Challenges & Barriers in DRR Financing

All world economies have been significantly affected by the COVID-19 epidemic. **COVID-19 has shown us that disasters have the potential to affect not only economic stability but also financial stability**. The increase in disasters caused by climate change emphasizes the importance of designing policies that can reduce the effects of possible disasters on the economy and financial sector. However, to create such policies, **it is important first to estimate the impacts of disaster scenarios on macroeconomic and financial stability and to prepare economic and financial policies by considering these estimations**. In this context, in order to find out the effects of possible disasters on economic and financial stability, developing countries need to be supported in disaster-related data collection, comprehensive risk assessments and the development of catastrophic models.

Besides, with climate change, disaster risks have increased for many countries. **Regulatory authorities have been still working to integrate climate change risks into financial regulations**. In this context, among the key policy options needed to reduce the impact of possible disasters on economic and financial stability is to provide some financial regulatory incentives to institutional investors that will accelerate the mobilization of their resources for long-term DRR investments.

In 2019, the Global Commission on Adaptation and the UNEP Finance Initiative concluded that investment in climate change adaptation was limited and that this is attributable to a range of barriers including: **(i) inadequate support, (ii) policy and practice barriers, (iii) market barriers, (iv) nascent application of climate risk management practices, and (v) low capacity for risk management in public and private sectors** (UNEP Finance Initiative, 2019). Across these five high-level categories are 12 specific barriers, each of are applicable to broader disaster risk reduction for multiple hazard types (Table 10). At a systemic level, it was highlighted that "the continued reliance on short time horizons as the basis for financial decisions remains a significant contributor to the failure of policymakers, investors, corporations, and project developers to fully consider and respond to climate risk".

Table 10. *Barriers to scaling up financing for adaptation and resilience (from: UNEP Finance Initiative, 2019).*

Barrier Categories	Barriers
Inadequate Support for Action on Adaptation/ Resilient Investment	1 Insufficient public financial support
	2 Insufficient incentives for private finance to act
	3 Moral hazard surrounding physical climate risks
Policy and Practice in the Financial Industry	4 Weak legal/regulatory frameworks and guidance
	5 Lack of meaningful disclosure of climate risks
	6 Absence of harmonized and robust metrics and standards
Market Barriers	7 Perceived lack of profitable investments
	8 Perceived low commercial readiness of adaptation and resilient solutions
Nascent Application of Climate Risk Management Practices	9 Weak management of physical climate risks
	10 Insufficient availability and adoption of climate risks data and tools
Low Capacity for Climate Risk Management	11 Low capacity within Financial System Governance Bodies
	12 Low capacity within financial actors

Domestic Public Finance

For policymakers specifically, the UNEP Finance Initiative study noted that it continues to be a challenge for policymakers to estimate whether ex-ante approaches to reduce risks and build resilience will be cost effective given the barriers that exist (UNEP Finance Initiative, 2019).

Despite this difficulty, it is important to develop robust, forward-looking analytical approaches to analyze the costs and benefits of ex-ante investments. For example, estimates of how much post-disaster losses would have been reduced if governments had made pre-disaster preventive investments in their DRRFS will give policy-makers an idea of whether current DRR investments are sufficient. Further, the government`s explicit and implicit contingent liabilities, which will turn into direct costs when disasters occur in case of not making appropriate DRR investments, and the effect of these liabilities on fiscal risk will be evaluated in DRRFS. DRRFS also provides governments with various alternative policies to build fiscal resilience and strengthen financial management against disaster risks, considering DRR investment financing and risk financing tools and mechanisms, including budgeting frameworks and other fiscal policies.

In addition, forward-looking analytical approaches such as budget stress testing that predict the effects of possible disasters on public revenues and expenditures will inform countries in advance how spending and tax policies can be implemented during disasters. In this way, countries become financially and economically prepared for disasters.

On the other hand, land value capture is a relatively novel area of domestic public finance that warrants attention here given that the stability and steady growth potential that land inherently represents. Despite its potential for serving as a source of finance for domestic governments,

land value capture faces a range of challenges (World Bank, 2018). First, leveraging such public assets through land pooling or implementation of betterment levies, typically require specialized knowledge to interpret the size and timing of market demand, capacity which many municipal governments might not posses. Regulatory limitations on the disposition of public assets may slow and even stall efforts to leverage land assets for supporting disaster risk reduction and the sale of municipal land can result in the loss of control over future development. Additionally, public opposition to such land disposition often occurs, raising political opposition.

In relation to the emerging practice of **shock-responsive social protection** (SRSP), UNICEF (2023) highlights a number of challenges facing the uptake of disaster risk finance generally, and SRSP specifically:

- Development and coverage of 'regular' social protection systems remains fundamental to SRSP.
- Disaster risk financiers and SRSP practitioners need better understanding and capacities in each other's respective disciplines.
- Disruptive initiatives such as SRSP may be cost-effective, but they challenge the status quo.
- Coordination multi-stakeholder initiatives, such as SRSP, require investments in coordination if they are to succeed.
- Financial products for disaster risk are increasing – but there is no focus on the poor.
- Disaster risk finance is a new and technical area of work where skills are at a premium.
- **A balance of investments is necessary, to reduce risks as well as transfer risks.**
- A trade-off usually exists between effective targeting and rapid response.
- Making disaster risk finance and SRSP affordable in the short term may require subsidizing costs.
- The volume and quality of disaster data to make financing decisions is insufficient.
- Financing from disaster risk strategies must reach people in need including through SRSP.
- Programme and financial management structures and timelines need to be fully understood to ensure timeliness of support.
- Micro insurance schemes should be reviewed for its appropriateness to the poorest.

Private Sector Finance

The review undertaken in this report laid bare the enormous, **under-leveraged potential of private sector finance** for disaster risk reduction and climate change adaptation. In exploring ways to accelerate private sector investment in adaptation in Asia and the Pacific, the Asian Development Bank (ADB) identified five specific barriers including (from ADB, 2022a):

- **Positive externalities:** Much of the adaptation benefits are considered as public goods and difficult to monetize; also, adaptation is highly context- specific and the market for climate- resilience solutions often struggles to scale up.
- **Tragedy of the horizon:** Short-term time horizons linked to capital investment and/or loan timelines is incompatible with the often long time frame within which physical climate

risks manifest or return on investment materializes (e.g., new heat-resilient cash crops taking long time to develop and deliver profits).

- **Incorrect pricing of climate risks and valuation of resilience:** Current economic and financial modeling of investments do not reflect the cost of physical climate risks nor account the benefits of enhanced climate resilience (e.g., through longer service life, lower O&M costs, or reduction or prevention of service disruptions).
- **Lack of conducive incentives:** Businesses could be encouraged to invest in adaptation with conducive financial incentives, such as results-based concessional loan or grants for conducting market analyses, and permission to charge services delivered through investing in climate resilience (e.g., toll collected from vehicle users of all-weather tunnel in a flood-prone area made resilient by a highway maintenance company).
- **Perverse incentives:** The provision of certain financial incentives can lead to maladaptation or simply discourage development that is resilient to climate change. Financial disincentives can take the form of subsidies and tax breaks, such as subsidized flood insurance, which may lead to disincentives to invest in building flood resilience, including avoiding development in a flood-prone area.

In the context of **MSMEs**, (UNDRR, 2020a) surveyed business in Asia and the Pacific to better understand the main obstacles preventing them from investing in disaster risk reduction measures, be it for internal or external purposes. In India, the main obstacles were the perception that disasters are just **not considered an immediate priority** and the **difficulty in identifying effective measures** for risk reduction (UNDRR, 2020a). Whereas in the Philippines, among the main obstacles facing MSMEs was a **lack of capacity and resources for mainstreaming** disaster risk reduction, exacerbated by a general **lack of awareness of risks and the potential impacts** on their business (UNDRR, 2020)a.

Leveraging **fintech and enhancing financial inclusion** are ways to build the resilience of MSMEs and vulnerable households. The COVID-19 pandemic revealed many existing challenges in fully realizing the potential in these areas. Among the hurdles noted by experts were a general **low-level of digital and financial literacy** across countries (albeit heterogeneous) and **insufficient infrastructure** for digital payments, internet connectivity, and broadband penetration, particularly in Southeast Asia (ADBI, 2022). Furthermore, a lack of trust in digital finance, specifically in relation to data privacy and consumer protection, is also cited as a factor impeding fintech and financial inclusion (ADBI, 2022).

In terms of potential, the **sustainable funds market** offers significant potential for the region, despite currently being only about 4% of the global funds market in terms of assets (UNCTAD, 2022c). Among the barriers to realizing the potential of this private market for financing disaster risk reduction efforts are (from UNCTAD, 2022c):

- "Most of these funds are self-labelled, and the **lack of consistent standards** and high-quality data to assess their sustainability credentials and impact has given rise to greenwashing concerns and credibility issues. International cooperation is needed to enhance interoperability and harmonization of regulations and standards across countries to facilitate international investment

- Most developing economies are absent in the sustainable fund market, owing to their **limited market size and the perception of relatively high risks** in their capital markets. Small developing economies may consider developing a regional market for sustainable investment.
- The relative **scarceness of company-level sustainability data** in developing economies does not work to their advantage either".

The **green bonds market** is fast becoming a significant source of financing for disaster risk reduction and climate adaptation in Asia and the Pacific. Among one of the challenges facing growth and achieving targets in this sector is classifying and tracking investment that indirectly supports risk reduction, a challenge that also faced domestic resource mobilization potential. SEI (2020) describes that **tracking only captures a fraction of potential adaptation funding** as only direct investments are included. However, the very effort of tracking adaptation investments "reinforces an **incorrect perception of adaptation as a separate aspect of projects**, rather than a cross-cutting and integrated aspect that should be accounted for in many projects" (SEI, 2020). Experts noted that the **EU Taxonomy** on environmental sustainable economic activities should help with its list of indicative adaptation activities, as would increased **impact reporting or assessment** to identify if investments have considered adaptation (SEI, 2020).

Financing by International Development Organizations

Insights from the World Bank's 2010-2020 evaluation of its support for reducing disaster risks from natural hazards illuminates a range of challenges and barriers encountered from the perspective of a multi-lateral development bank. Among the findings of the bank's Independent Evaluation Group were the following (from World Bank IEG, 2022):

- **"Lack of evidence on impacts of DRR support and policy reforms**: Most DRR operations are not providing sufficient information to understand the level of DRR being achieved, which inhibits an understanding of DRR contributions to development impacts.
- **Focusing on the most vulnerable groups**: The World Bank is increasingly identifying and addressing the needs of some groups that are disproportionately impacted by disasters; however, for other groups, there is slow progress and limited reporting on DRR benefits.
- **Insufficient attention to operation and maintenance aspects**: DRR investment projects often effectively support infrastructure construction, but they do not explicitly address operations and maintenance that are required for long-term resilience.
- **Variation is lacking in the types of risk prevention activities supported:** The World Bank has been more effective in developing early warning systems infrastructure than in delivering early-warning system services (for example, forecasting and community preparedness activities).
- **The insurance protection gap is still significant**: Disaster insurance activities have had a limited impact because insurance programs have had difficulty in reaching scale. However, these activities have made progress in awareness raising, capacity building, and product development".

Islamic Financing

The Asia Development Bank emphasizes that **Islamic finance** "represents an important source of development capital, which could assist in achieving sustainable development and funding the region's expanding infrastructure needs" (ADB, n.d.(f)). Among the barriers that need to be addressed to realize the potential of Islamic finance are: (i) **tax and regulatory regimes which treat sukuk unfavorably**; (ii) managing **liquidity risks** brought about by, among other factors, a limited availability of a Shari'ah compatible money market and intra bank market; and (iii) **harmonizing Shari'ah rulings** to enhance predictability and enforcement of legal transactions (ADB, n.d.(f)).

Specifically relating to the issuance of green sukuk, the World Bank (2020) illuminates several challenges, including:

- "Project-based green sukuk issuances are **too closely linked with only renewable energy and green real estate** projects. Green sukuk can finance a wider range of projects from solid waste management to sustainable land use and biodiversity conservation;
- The **lack of classification of green assets and projects** by financial institutions prevent the pooling of green assets for green sukuk issuances. National green taxonomies will assist in easing and standardizing green asset identification;
- Other challenges include r**estrictive issuance** criterion. S**teep learning curves** for new issuers; marginally **higher costs** due to review and reporting costs".

Opportunities & Enablers for DRR Financing

The literature review of approaches and instruments for financing DRR revealed a comprehensive suite or opportunities and enablers for leverage support from domestic, private, and international development sources. Table 11 provides a synthesis of 90 specific opportunities and enablers for DRR financing. These actions are organized in seven categories and multiple sub-categories, including:

- **Policies and regulations**: Domestic finance to accelerate adaptation; Domestic use of international development finance to accelerate adaptation; Strengthened fiscal management and good governance; Prudential and financial policy; Fiscal and monetary policy; Designing blended finance in conjunction with efforts to improve the enabling environment; Raising financial resources and dealing with debt.
- **Standards and Practices**: Standardized terminology and metrics; Developing, Adopting, and Employing Climate Risk Management Practices; Setting standards; Disclosure and reporting; Increasing transparency to make a valid business case for commercial investment using blended solutions.
- **Measurement, Assessment and Tagging**: Managing what you measure; Developing and adopting forward looking analytical approaches such as stress tests and financing strategies, adaptation metrics and standards; Undertaking risk-sensitive budget reviews; Undertaking climate expenditure reviews and budget tagging.

- **Awareness and Capacity Development**: Building capacity among financial Actors; Highlighting and promoting investment opportunities.
- **Collaboration and Demonstration**: Strengthening climate and disaster resilience is a cross-sector endeavor; Collaborating with partners to devise localized technical solutions; Establishing policy-level co-ordination and co-operation processes for blended finance.
- **Private and Mutual/Cooperative Sector Financing**: Enabling efficient private adaptation and mobilizing private finance; Enabling private investment in climate adaptation and resilience; Seven mechanisms for supporting disaster risk reduction through mutual and cooperative insurance; Fintech and financial inclusion; Philanthropic giving.
- **Islamic Finance**: Unlocking Islamic Finance potential for climate mitigation, adaptation and resilience.

The synthesis is informed by a range of credible sources and elaborates specific actions that can be taken by various actors to enhance DRR financing in the Asia and Pacific region.

***Table 11**. Opportunities and Enablers for financing disaster risk reduction, climate adaptation and resilience*

Opportunities and Enablers	**Actors and Actions**
Policies and regulations	
Domestic finance to accelerate adaptation (UNEP Finance Initiative, 2019)	• Domestic financial ministries and related governance bodies: Ensuring the economic and financial impacts of climate risks are integrated into financial policy. Undertaking climate risk screening of domestic public investment programs and integrating into procurement standards. Addressing any existing regulations which promote maladaptation investments or increase the vulnerability of communities more at risk from physical climate impacts. • Domestic financial ministries and related governance bodies: Enhancing the role of public financing mechanisms/institutions to incentivize adaptation and resilience investment, including by allowing public financial institutions to more actively employ blended finance approaches to "crowd in" private capital through de-risking and risk-sharing approaches. • Domestic financial ministries and related governance bodies: Where none exist, consider creating specialized financing mechanisms (e.g. resilience banks, aggregation funds/vehicles) to catalyze and accelerate adaptation investment, particularly for highly vulnerable communities. • Domestic financial ministries and related governance bodies: Supporting the development of a robust resilience bond market, including by incentivizing with credit enhancement issuances by municipalities, PPP projects related to key resilience/resilient infrastructure investments, and others. • Domestic financial ministries and related governance bodies: Supporting the expanded use of catastrophe bonds and contingency funds to increase resilience and reduce vulnerability to the impacts and costs of physical impacts from climate change.
Domestic use of international	• Domestic financial ministries and related governance bodies: Promoting greater use of blended finance approaches among DFIs and MDBs to

development finance to accelerate adaptation (UNEP Finance Initiative, 2019)	accelerate and catalyze adaptation investment in emerging markets, LDCs, and small island states. • Domestic financial ministries and related governance bodies: Ensuring climate risk screening assessments are undertaken for international public investment channels (e.g., DFIs, MDBs), and monitoring such risks. • Domestic financial ministries and related governance bodies: To help catalyze private adaptation investment in emerging markets, promoting efforts to develop aggregation models or funds, as well as public-private financing models that facilitate scale and pooling/ diversifying risks from emerging markets. • Domestic financial ministries and related governance bodies: Where there are gaps in the financial ecosystem in emerging markets, supporting the creation of financial mechanisms (e.g., aggregation vehicles/funds for adaptation, resilience banks, infrastructure banks, SME finance, micro-finance) in partnership with DFIs/MDBs specifically designed to invest in adaptation/resilience, and "crowd in" private investment at the local level. • Domestic financial ministries and related governance bodies: Supporting efforts to address challenges limiting access to adaptation funding at the local level by addressing barriers
Strengthened fiscal management and good governance (ADB, 2020) (Centre for Sustainable Finance, 2020)	• Government bodies: Regardless of the financing instruments used—from traditional inter-governmental transfers to green bonds and blended finance—it is imperative that government bodies continue their efforts to *strengthen fiscal management and good governance*. This can ensure both the efficacy and continuity of critical disaster risk reduction efforts and the maximization of related investments. *Transparency, accountability, rule of law, and the enforcement of standards and regulations* remain the basis on which sustainable finance can build. • Finance ministries: need to enhance public sector funding and debt management strategies, including through debt instruments with risk-sharing features, and diversification of government revenue streams away from high-risk sectors
Prudential and financial policy (UNEP Finance Initiative, 2019) (Centre for Sustainable Finance, 2020)	• Financial system governance bodies: Monitor and analyze NBFIs and identify those institutions which have concentrated portfolios with potentially high exposure to climate risks and which may pose contagion risks to other parts of the financial system. • Financial system governance bodies: Undertake climate risk screening of public investment programs and integrate into procurement standards for publicly financed projects (both purely publicly financed and PPPs). • Financial system governance bodies: Ensure the costs of climate risks are integrated into disaster risk management funding approaches, and develop approaches for fiscal risk management and contingency finance. • Central banks and financial supervisors: need to address climate-related risks in their monetary and prudential frameworks and operations. Disclosure of climate and other sustainability risks should become mandatory, and climate stress tests of financial institutions should be conducted regularly. Climate-related financial risks should be mainstreamed into macro and micro prudential supervision. Monetary and prudential measures should be aligned with climate goals. Importantly, supervisors should reconsider the prudential treatment of sovereign exposures in financial regulation
Fiscal and monetary policy (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Undertake economy-wide, sector-wide, and/or regional assessments of the impacts of physical climate risks—both acute and chronic—to overall economic growth and stability. • Financial system governance bodies: Promote safety nets and financial support mechanisms for communities most vulnerable to physical climate

(Volz et al., 2020)	risks, where the potential for capital flight may become an issue exacerbated by climate change. • Financial system governance bodies: Promote initiatives, programs, or financial policy approaches that can incentivize climate-resilience and/or adaptation investments particularly for key sectors such as infrastructure; Develop contingency funding plans to prepare for the increased frequency of climate-related shocks to the economy, and Actively remove regulations which incentivize maladaptation investments. • Governments and financial authorities: should implement financial sector policies to scale-up investment in climate adaptation and develop insurance solutions. Monetary and financial authorities can play an important role in supporting the development of local currency bond markets and fintech solutions for mobilizing domestic savings for financing climate-resilient, sustainable infrastructure and other adaptation measures. Developing insurance markets and broadening insurance coverage can help to enhance the financial resilience of households and businesses and take the burden off public finances.
Design blended finance in conjunction with efforts to improve the enabling environment. (OECD, 2021)	• Financial system governance bodies: Blended finance cannot compensate for an unfavourable enabling environment, but rather needs to be accompanied by efforts to promote a stable and conducive policy environment. A weak enabling environment characterised by poorly designed or absent regulation, policy settings (e.g. water prices and tariffs) or institutional arrangements, compounded by political interference in the management of (often public) utilities, constrains commercial investment.
Raising financial resources and dealing with debt (UNESCAP, 2022e)	Governments: • *Curbing non-developmental expenditures*: Governments can create more fiscal space by curbing non- developmental expenditures, notably funds allocated for defence. • *Improving pricing policies*: Governments can improve the efficiency and pricing policies of public enterprises by, for example, levying higher tolls and fees on public services, such as highways, information technology services, media and basic municipal services. They can also reduce the potential budgetary burden of the public sector by promoting PPPs. • *Taxation reforms*: Governments can also raise more funds through sales taxes, as long as the proceeds are used for progressive redistributive purposes and some countries should be able to introduce a comprehensive and nationwide value added tax on both goods and services. Overall, governments should be aiming to raise a higher proportion of funds from direct taxation on income, which is inherently "progressive" as it requires those with higher incomes to pay higher rates. • *Better public debt management*: The best way to effectively manage debt is through separate and accountable public debt management offices. Having independent debt management units not only helps avoid policy conflicts, but it also strengthens credibility, signalling the government's commitment to meeting its obligations • *Thematic bonds*: Use of thematic bonds is increasing in Asia-Pacific. To ensure the proceeds from these bonds are used effectively, and prevent "greenwashing", issuers should follow international standards and the environmental and social impacts should be verified by a third party • *Diaspora bonds*: Governments issuing such bonds need to have some understanding of the capacity and interests of their diasporas and the diasporas' trust in the government. The country should also have sufficiently developed domestic capital markets and the ability to offer a diverse range of

	bond structures in terms of maturity, currency denomination, fixed versus floating rates, frequency of interest payments, minimum purchase amounts and conditions on early redemption • *Offshore public bonds*: Smaller countries with less developed capital markets or weaker credit ratings, can issue public bonds in the economy of a more developed neighbour. • *Debt for development swaps*: Projects involving debt-for-climate swaps projects should be based on NDCs and national planning documents.31 The conditions can be encapsulated in a debt-for-climate swap "term sheet", similar to a term sheet for an investment deal. The monitoring, reporting and verification framework can be based on the targets and indictors in the ICMA Sustainability-Linked Bond Principles.
Shock-responsive Social Protection (UNICEF, 2023)	Governments: • Strengthen core social protection mechanisms. • Improve multi-hazard and risk-informed public finance mechanisms. • Design risk analytical requirements including triggers. • Expand the role of non-traditional stakeholders in risk pooling. • Reduce the size of the risks to be transferred.
Standards and Practices	
Standardized terminology and metrics (ADB, 2020)	• Governments: Innovative financing models require adjustments to national regulations to allow new partnerships and mechanisms. As such, governments should continue to collaborate with the finance industry and international finance institutions to develop and refine assessment, quantification, pricing, and monitoring approaches and methodologies to make resilience projects and vehicles into bankable investments with economic, environmental, and social co-benefits
Develop, Adopt, and Employ Climate Risk Management Practices (G UNEP Finance Initiative, 2019)	• Financial system governance bodies: Develop, adopt, and employ their own climate risk management practices including stress tests for physical climate risks • Financial system governance bodies: Engage insurance companies to integrated ex-ante resiliency measures and investments into product incentives. • Financial actors: accelerate the adoptions and employment of climate risk management practices including identifying hazards and assessing and quantifying vulnerabilities of assets.
Standard setting (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Adopt coherent and consistent climate risk guidelines for disclosure of physical and transitional risks and require disclosing entities to report on these metrics. • Financial system governance bodies: Require rating agencies to employ climate risk ratings aligned with best available assessments
Disclosure and reporting (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Make climate-related financial disclosures a mandatory requirement including those related to potential risks from physical impacts to assets. Establish TCFD frameworks as an initial basis for mandatory requirements and designate climate risk as material and requiring disclosures be presented in terms of financial value over several time horizons.
Increase transparency to make a valid business case for commercial investment	• Financial system governance bodies: Commercial investors are cautious about uncertainty regarding any of the risks related to an investment opportunity. With adequate contractual arrangements or blended instruments and mechanisms, it is possible to mitigate a variety of risks, share the remainder with the public sector or commercial co-investors, or take a certain level of risk on the financier's own book. However, in order to make such an

using blended solutions (OECD, 2021)	assessment, risks associated with an investment should be transparent and quantifiable.
Measurement, Assessment and Tagging	
Manage what you measure (ADB, 2020)	• Governments: Based on improved data collection and climate and disaster risk assessments, governments can benefit from a clearer understanding of their risk exposure and related funding needs into resilience infrastructure and non-structural measures. These can then inform their strategies and plans—including programming with international development organizations—and allow for clearer signaling to the private sector where accelerated investments will be made
Develop and adopt adaptation metrics and standards (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Develop and deploy resilience rating systems which can provide important market signals about climate risks • Financial system governance bodies and financial actors: Define and describe measures of climate resilience in investments, particularly based on evolving understanding of warming trends and resulting adaptation/resilience investment needs
Risk-sensitive budget reviews (UNDRR, 2020b)	Experts and Governments: • *Continuous tracking of DRR budgets, both direct and indirec*t, would allow for progress in DRR investments to be monitored and would allow risk-sensitive budget review reports to be used as a baseline for evaluation. • Budget data should be *disaggregated by subprogrammes, projects and activities*, by source of financing and by national- and regional-level spending; this would allow for an efficient and accurate budget marking of direct and indirect DRR investments. • *DRR investments should be explicitly stated as such and coded in budget lines*. This would mean that subjective categorization of components of DRR investments could be avoided. • *Data on actual spending*, as opposed to planned budget estimates, would allow for a better understanding of actual investments, as opposed to planned ones. • *Analysis of investments by type of hazard*, complemented by risk assessment analysis that considers damages and losses, would allow cost-benefit analyses to be carried out to determine value for money.
Climate expenditure reviews and budget tagging (Viet Nam Ministry of Planning and Investment and UNDP, 2022)	Governments and experts: • *Systematically track and report climate change budget and expenditure.* It would be most effective to move away from retrospective-CPEIR style studies and progress towards systematic climate expenditure tracking which is built into the planning and budgeting system. To do this requires development of a comprehensive monitoring and reporting system for climate investment and expenditure that can meet international reporting requirements and effective use on the domestic level, which should include the following components: (i) Investment expenditure and recurrent expenditure; (ii) Integration of public expenditure at the central and provincial levels; and possibly (iii) Private investment in climate change.
Vulnerability assessment (Centre for Sustainable Finance, 2020)	• Governments: need to conduct comprehensive sectoral and national vulnerability assessments over multiple timespans to identify climate-related sovereign risk and develop national adaptation plans. Systematic, scenario-based assessment of all sources of vulnerability for the macroeconomy, the financial system, and public finances is needed, addressing both physical and transition risks. Such an assessment could be conducted by a dedicated national climate risk board that should include the central bank and supervisor

	along with the key government departments responsible for finance, economy, planning, and agriculture, among others.
Awareness and Capacity Development	
Build Capacity Among All Financial Actors (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Build awareness and enhance internal technical and financial expertise and capacity to enable proper analysis of climate risks and opportunities • Financial actors: Employing relevant expertise across credit, risk management, portfolio, and investment staff • Financial actors: Build financial structuring capacity and expertise across asset classes to accelerate development of innovative financial instruments that can catalyze adaptation and resilient investment
Highlight and promote investment opportunities (UNEP Finance Initiative, 2019)	• Financial system governance bodies: Utilize information and analysis on climate risks to incentivise adaptation and resilience investment, such as creating linkages between highly vulnerable communities and locations with the establishment of innovative financial mechanisms and approaches (i.e., resilience banks, resilience bonds). • Financial actors: Utilizing climate risk management practices to develop and deploy new financial asset classes, instruments, and products, including such innovations as resilience bonds and expanded use of catastrophe bonds and contingency finance.
Collaboration and Demonstration	
Strengthening climate and disaster resilience is a cross-sector endeavor (ADB, 2020)	• Governments: Need to mainstream these topics across policies and departments, allocate dedicated budgets that are legally safeguarded from politically fluctuating support, require thorough resilience-proofing of any investments, and proactively engage and empower subnational entities through effective vertical coordination of disaster risk management
Collaborate with partners to devise localized technical solutions (ADB, 2020)	• Multilateral development banks and UN agencies: can provide grants and concessional loans—as well as their technical expertise and convening power—to assist in developing and financing location-specific resilience measures. If those are proven effective, they can be scaled-up with the support of global funds and blended finance facilities. • Governments: Developing countries should also realize the role of multilateral development banks as finance intermediaries for enhanced private sector activity in disaster risk reduction.
Establish policy-level co-ordination and co-operation processes for blended finance (OECD, 2021)	• Financial system governance bodies: An excessive reliance on concessional finance can inadvertently crowd out commercial finance, creating market distortions that impede greater accountability and financial sustainability of the sector. Co-ordination and co-operation among development finance actors on their blended finance engagements is a key for the market building aspect of blended finance, particularly when a concessional element is involved. Development financiers should co-ordinate more structurally beyond single transactions. While there is general agreement about the need for improved cooperation, actions on the ground may remain fragmented.
Financing from International Financial Institutions	
Reducing disaster risks from natural hazards through MDB support (World Bank IEG, 2022)	Multilateral Development Banks: • The World Bank has been highly effective on DRR when it has had *sustained engagement using multiple instruments and interventions* and when it has deliberately engaged to achieve replication by others.

	• Incorporate DRR activities in regions and sectors and for hazards that exhibit significant *coverage gaps*. • Identify and *measure the effects of DRR activities on exposure and vulnerability* to strengthen the development case to clients facing serious disaster risks. • Integrate the *needs of populations that are disproportionately vulnerable to disasters* caused by natural hazards into DRR project targeting and design, implementation, and results reporting. • In countries affected by serious natural hazards and fragility and conflict risks, identify and *assess the ways in which hazards and conflict interrelate*, and use this knowledge to inform country engagement and project design.
Climate change and sovereign risk (Centre for Sustainable Finance, 2020)	International financial institutions—including the International Monetary Fund, multilateral development banks, and regional financing arrangement • Have a special role in supporting vulnerable countries to better address climate-related sovereign risks and strengthen adaptive capacity and macro-financial resilience. • Building on their respective strengths, they can provide technical assistance and training, support surveillance and risk monitoring, provide finance for adaptation and resilience investment, help develop insurance solutions, and provide emergency lending and crisis support.
Private Sector and Mutual/Cooperative Sector Financing	
Enabling efficient private adaptation and mobilizing private finance (The Coalition of Finance Ministers for Climate Action, 2022)	Governments: • Reducing barriers such as reducing imperfections in credit \ markets, reducing tariffs on disaster management tools and goods, and removing inefficiencies in insurance markets and in risk pricing, including implicit and explicit subsidies, can foster private investment. • One critical step in enabling private adaptation responses is estimating adaptation financing needs, which, in turn, can inform the private sector—both investors and private financial instrument providers—of adaptation opportunities.
Enabling private investment in climate adaptation and resilience (World Bank GFDRR, 2021)	• Public sector led: *Long-term adaptation planning support* – Although individual projects can incorporate specific climate adaptation standards at the tender stage, private sector participation can be systematically scaled if adaptation and resilience goals and related investment needs are clearly identified at the national and subnational levels. • Public sector led: D*evelop a national adaptation investment plan* – A National Adaptation Investment Plan flows naturally from a well-developed National Adaptation Plan, to outline a national portfolio of investment-ready adaptation investments. • Public sector, with private participation*: Pipeline screening and market assessment* – Once the National Adaptation Investment Plan is in place, likely sources of financing need to be assigned to each item in the portfolio of "bankable" adaptation projects, including: Screening projects for potential for private financing; and Undertaking initial market sounding, assess return on investment, and conduct an enabling environment diagnostic, to understand what it would take to attract private investment. • Public sector, with private engagement*: Project preparation support* – including: (i) Leverage MDBs, project preparation facilities, and bilateral donors to provide technical assistance/ project structuring support, including potential for de-risking and co-financing; (ii) Identify potential private sector investors; and (iii) Identify an initial source of public sector funding to support project preparation.

	• Private sector-led: *Downstream transaction demonstration* – supporting coordination of project financing with relevant investors for adaptation projects ready for investment. Once a project is ready for investment, it will receive support to coordinate project financing with relevant investors
Insurance – seven mechanisms for supporting disaster risk reduction (ICMIF and UNDRR, 2020)	For cooperative and mutual providers (also relevant to private providers): • Apply *variable pricing* of insurance to provide incentives for risk reduction • Include *prerequisites and exemptions* to provide incentives for risk reduction • *Ensure investment reduces and prevents risk and builds resilience* • *Raise awareness of the systemic nature of risks* and provide transparent *information and advice* for reducing hazards, exposure, and vulnerability • *Build and share capacity and technology for risk modelling, analysis and monitoring* • Promote and *enhance local social capital* for responding to disasters and innovating to reduce risks • *Collaborate with the public sector* to signal unsustainable development and support decision making towards disaster risk reduction and risk-informed investment while closing protection gaps
Fintech and financial inclusion (ADB, 2021)	Policymakers and regulators: • Support the capacity of *microfinance providers* to adopt digital technology to drive financial inclusion and bring the benefits of the digital economy to their clients • Prioritize *investments in open digital ecosystems* that accelerate digitization of payments leading to inclusive recovery, resilience, and financial inclusion • Support innovation as part of *COVID-19 recovery* strategies • Reassess financial inclusion strategies to consider the growing use of *digital financial services* • Take steps to promote greater stakeholder cooperation to progress digital financial inclusion at the base of the economy by *reimagining regulatory technology risk management frameworks* and fast-tracking *regulatory licensing for microfinance* providers to go digital • Explore the potential of innovative fintech financing mechanisms for digital infrastructure development needs
Philanthropic giving (Give2Asia, 2020)	Grant advisors and philanthropic givers: • Continue *investing more in disaster risk reduction, preparedness, and resiliency*. The data shows that donor funding is inadequate, so communities are not being properly equipped for the next disaster. • Increase *attention to mental health and psychosocial support*, given that disasters are incredibly traumatic for individuals and communities – the effects of which can last for years. • Explore programming focused on *indigenous knowledge* — integrating local traditions and incorporating hyper-local actors. This currently represents less than 1% of overall disaster programming.
Islamic Finance	
Unlocking Islamic Finance Potential for Climate Mitigation, Adaptation and Resilience (ADB, 2022b)	Multi-lateral development banks and national governments: • *Greening capital markets*. Adopt harmonized standards and legal documentation for Green Sukuk issuances; Develop trading platforms, rating methodologies and unify pricing; Converge with ESG principles and streamline impact measurement; Introduce environmental impact sukuk and develop sustainable Sukuk • *Greening social finance*. Mobilize Zakat for green recovery, emergency response and climate resilience; Adopt shared governance standards and set-up global green Islamic philanthropy initiative; Develop innovative social finance structures (e.g. takaful, awqaf) for climate action.

	• *Project financing for green infrastructure*. Mobilize funds for project preparation; Create or scale-up de-risking facilities to improve bankability and reduce cost of capital; Set-up green infrastructure equity funds; Mobilize traditional and blended finance. • *Green banking services for the unbanked*. Develop distribution networks; Develop competitive and shari'ah compliant banking offers; Exploit the potential of fintech for efficient financial inclusion.

Section Eight: Observations and Recommendations for Accelerating DRR Financing in Asia and the Pacific

The business case for investing in disaster risk reduction is well established: it saves lives and future-proofs development gains, and, it just makes economic sense (UNDRR, n.d.). Financing resilient infrastructure in low- and middle-income countries produces $4 worth of benefits for every $1 spent (World Bank, 2019b). In India and China, every $1 million invested in climate adaptation infrastructure in the construction sector creates up to 650 and 200 jobs, respectively (ILO, 2018). And early warning systems that provide even 24hour warning of storms and heatwaves reduce damages by 30% (GCA, 2019).

This scoping study reviewed approaches and instruments for financing DRR in Asia and the Pacific since 2015. Many important observations can be gleaned from the information presented in the previous sections to help governments, the private sector, and international development organizations accelerate progress on disaster risk reduction through to 2030. These key insights are elaborated below.

Levels of DRR Financing

The cost of adaptation for climate-related and biological hazards in Asia and the Pacific is projected to be approximately $270 billion per year (refer to the tablet below). The current level of financing in the region that is directed specifically at climate change adaptation is estimated at $21 billion per year; however, the annual need is projected to be as much as $208 billion for East Asia and the Pacific and $177 billion for South Asia.

Financing for DRR, including for climate adaptation, comes from a range of sources including international development organizations, domestic governments, and the private sector. Islamic finance has also emerged as a potentially significant source of finance for DRR.

Overall Financing	
Projected cost of adaption to climate-related and biological hazards in Asia and the Pacific	$270 billion per year *(UNESCAP, 2021a)*
Current level of financing for climate adaptation in Asia and the Pacific	~ $21 billion per year *(Climate Policy Initiative, 2021), based on global financing of $46 billion in 2020-21 and 45% of global adaptation finance allocated in East Asia and the Pacific*
Projected climate adaptation finance need	$69 billion, ranging from $27 to $208 billion per year for East Asia and the Pacific *(UNEP, 2022)* $59 billion, ranging from $23 to $177 billion per year for South Asia *(UNEP, 2022)*

Building political leadership on DRR Financing is crucial. For this, **it is important to undertake risk-sensitive budget reviews and implement budget tagging and tracking systems to inform DRRFS so that DRRFS will show how the necessary future DRR investments should be financed**. As well, probabilistic cost-benefit analysis of DRR investments can be used to clarify and make

transparent the rationale for financing in DRRFS. Then, the development of methodologies on how to integrate the DRR Financing Strategies into the Integrated National Financial Framework (INFF) will help countries implement their financial plans to achieve their SDGs targets.

To increase the level of DRR Financing, financial incentives can be created through changes in financial regulations that reduce the effects of institutional investors' investments in DRR on their costs of capital.

Official development assistance in Asia and the Pacific has been steady since 2012, averaging approximately $1.4 billion per year but with only 16% directed at ex-ante disaster prevention and preparedness (see table below).

Data on **government spending** for multi-hazard disaster risk reduction is limited across the region, but in the context of climate change adaptation specifically, governments spend approximately $3 billion annually (see table below).

Financing of DRR from the **private sector** is growing but still represents only a fraction of its total potential. Globally, private sector financing directed at climate change adaptation totalled $1 billion in 2019-20, or about 2% of adaptation financing from all sources (Climate Policy Initiative, 2021).

Financing by Source	
Government domestic spending on climate adaptation	~$3 billion in East Asia and the Pacific *(Climate Policy Initiative, 2021), for 2020-21, based on $6.5 billion in government spending globally, and 45% of global adaptation finance allocated in East Asia and the Pacific*
Disaster-related Official Development Assistance (ODA) % of disaster-related ODA allocated to prevention and preparedness	$1.4 billion per year in Asia and the Pacific *(OECD Creditor Reporting System, average from 2012-20)* 16% in Asia and the Pacific, 4% globally *(OECD Creditor Reporting System, average from 2012-20)*
Private sector climate adaptation finance	$1 billion globally in 2020-21 *(Climate Policy Initiative, 2021)*

But the forward-looking potential is significant: foreign direct investment (FDI) flows in 2021 to SDG sectors across developing Asia totalled $17.8 billion, but were only 11% of total investment announcements (UNCTAD, 2022b). Furthermore, the region's sustainable bond market (all issuers) and private sustainable funds markets could potentially contribute up to $5.2 billion and $35 billion per year, respectively. And the yet untapped equity market in the region has a potential to deliver investment ranging from $23 to $230 billion annually (refer to the table below).

Islamic finance offers another source of potential DRR financing. For example, green sukuk issuances in Malaysia and Indonesia reached $1.3 billion and 750 million in 2020-21, respectively (IFSI, 2022). As well, cumulative climate financing to date by the Saudi Arabia-based Islamic Development Bank through 2018 was estimated at approximately $644 million, with 47% of this investment directed at adaptation-related efforts (ODI, 2019).

Governance Approaches for DRR Financing

Within **domestic governments** across the region, there is a trend toward creation of national disaster risk financing strategies, frameworks, and policies, including by countries such as Tonga, Samoa, Nepal, Indonesia, Philippines, and India. However, DRFS implemented in the region, supported by DRRFS and budgetary stress tests, facilitate policy makers' decision-making processes regarding the size of DRR investments, by making them transparent.

Further, there have been limited DRR-focused public spending reviews in Asia and the Pacific, and most climate focused public spending reviews in the region have been conducted in 2015 or earlier. On the upside, **nine countries in the region are now implementing climate budget tagging systems, including Bangladesh, Cambodia, India, Indonesia, Nepal, Pakistan, Philippines, Thailand, and Viet Nam** (UNDP, 2022). Financial inclusion strategies are also being developed to help guide fintech, much of which indirectly supports DRR-related efforts, such as in Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, and Viet Nam (UNESCAP, 2021). In this regard, information on DRR investments made is very limited.

In the **private sector**, disclosure of Environmental, Social, and Governance (ESG) criteria was a growing trend in the region from 2010 to 2020 (Bloomberg, 2021). ESG guidelines are also evolving in countries across the region, contributing to the need for global disclosure standards, such as issued by the International Sustainability Standards Board (IFRS, 2022). Firms in the region are also supporting recommendations of the global *Task Force on Climate-related Risk Disclosures* (TCFD): 47% of all firms supporting the TCFD are situated in the Asia and Pacific region, primarily in Japan (TCFD, 2022). There are also examples of companies using business continuity planning and enterprise risk management, although generally speaking, such practices around the world are typically not yet internally coherent and lack a multi-hazard approach (UNDRR, 2020a).

International financial institutions and multilateral development banks are starting to review their DRR-related spending and creating strategies to guide future financing; however, specifics are often lacking. Strategic partnerships are also emerging for DRR financing, such as through the *InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance,* and through various formal agreements between MDBs and national governments for delivering development results at the country level.

Financing Instruments for DR and DRR

A wide array of financing instruments has been deployed by **governments** across Asia and the Pacific to finance infrastructure, climate mitigation and adaptation investments, risk transfer, disaster risk reduction, and social assistance spending since 2015, including:

- **Domestic resource mobilization**: public taxes, tariffs, land-value capture (e.g., India, Philippines, Viet Nam), crowdfunding (e.g., Viet Nam).
- **Grants and transfers**: minimum conditions and performance grants (e.g., Nepal), payment for ecosystem services (e.g., Japan).

- **Debt financing**: sovereign bonds (e.g., Bhutan), sovereign green bonds (e.g., Fiji, Singapore, China), however, allocations to DRR or climate change adaptation via these instruments have been limited to date.
- **Equity financing**: blended financing (e.g., Bangladesh, China, Nepal), securitization (e.g., China),

A mix of **private financing instruments** are active in supporting disaster risk reduction and climate adaptation in the region, but the overall potential is still largely untapped.

- In the context of foreign direct investment (FDI), SDG sectors relating to water and sanitation, food and agriculture, health and education, and investment project announcements totalled $17.8 billion in 2021, representing only 11% of total investment announcements; UNCTAD, 2022b).
- **Relating to equity financing**, Asia-Pacific now commands an equity market worth $2.31 trillion (Bain & Company, 2022); however, this only provides a sense for the untapped potential — the majority of the capital is currently focused on technology for e-commerce, software, and online services (Bain & Company, 2022). If just 1% to 10% of the private equity market could be directed at disaster risk reduction, that could represent **$23 billion to $230 billion** in financing.
- For **debt financing**, several **private bonds** are contributing to climate adaptation and/or disaster risk reduction including for example, Hong Kong's Swire Properties, DSB Bank Asia, Singapore's City Development Ltd., Central Nippon Expressway Co. Ltd., Peoples Bank of China, India's and Yes Bank. For Asia and Oceania, the private and sovereign sustainable bond market totaled $172 billion in 2021 (UNCTAD, 2022c). If China's green bond market is any indication of potential, comprising 3% climate adaptation related projects (Climate Bonds Initiative, 2018a), then annual risk reduction related financing has an upper-end potential of as much as **$5.2 billion annually** in the region.
- For **sustainable funds** (i.e., equity or bond investments that are packaged together as mutual funds, pension funds, or exchange-traded funds), markets in Australia, New Zealand, Japan, China, and the rest of Asia totaled $128.8 billion in 2021. China's market comprises almost $50 billion in assets under management making it the third largest market globally (UNCTAD, 2022c). Globally, SDG-related equity funds represented 27% of total assets under management in 2021 (UNCTAD, 2021). Extrapolating to the Asia and Pacific region, this suggests a potential **$35 billion** market for risk reduction-related financing.

  In addition, seven of the top 30 pension funds globally are in Asian countries, representing almost $4 trillion in total assets (six out of seven being sovereign funds, with Japan comprising half of total value; Thinking Ahead Institute, 2022).

  Regarding Exchange Traded Funds (EFTs), it was reported that "as many as 92 ESG-labelled ETFs" were launched in Asia-Pacific in 2021, more than the combined new ETFs over the four years prior (Finews.asia, 2022).
- There is a growing commitment from **mutual and cooperative insurance** companies around the world using their products and services to support disaster risk reduction

through risk transfer, policy incentives, and impact investment (ICMIF and UNDRR, 2020), including in Asia and the Pacific. **Private insurance** companies are also supporting DRR through products and services, including signalling unsustainable development and creating platforms for climate and catastrophic risk assessment in the region. However, of the $50 billion in natural catastrophe loss in 2021 in Asia and the Pacific, only $9 billion was insured, representing an 83% protection gap (Gallin 2022; in ADB, 2022).

- In the area of **philanthropic giving**, of the $55 million in grants tracked by Give2Asia from 2005 to 2019, approximately 7% or $3.92 million was tagged as supporting "resiliency", including risk reduction, preparedness, and sustainable infrastructure (Give2Asia, 2020).

A mix of financing instruments are also being deployed by **international development organizations**. For instance:

- **Debt financing instruments** include, for example, the ADB's Contingent Disaster Financing (CDF) to provide 'quick and flexible' support to member countries and the World Bank's Deferred Drawdown Option for Catastrophic Risk (Cat DDO) and Development Policy Financing (DPF).
- **Thematic bonds** have also been used, such as the International Finance Corporations support to the Philippine Green Bond delivering investment to resilience-related measures of the Philippines Energy Development Corporation.
- **Grants** are also being used, such as the ADB's Asian Development Fund 13's thematic pool on disaster risk reduction and climate adaptation. **Insurance and re-insurance** instruments are also used in the region for DRR, such as the Pacific Disaster Risk Financing and Insurance Programme created through a joint initiative among international development organizations.
- **Programmatic technical-to-loan support** building on and coordinating the results of disaster risk assessments through multi-year partnerships with governments that packages technical advice and assistance with funding.

Furthermore, **Islamic finance,** described as one of the fastest growing elements of global finance with total assets now worth USD 3.06 trillion (IFSI, 2022), offers a range of potential instruments for supporting DRR, including via Islamic Banking assets, Sukuk issuances (i.e., similar to a bond), Islamic funds assets, Takafuk (insurance), as well as giving instruments such as zakat and waqf.

Recommendations to Accelerate DRR Financing in Asia and the Pacific

Based on the experience gained since the Sendai Framework came into force in 2015, more than 90 recommendations proposed by relevant international organizations have been identified to accelerate DRR financing. Section 7 of this report features over 90 such actions across eight areas covering: (i) policies and regulations; (ii) standards and practices; (iii) measurement, assessment and tagging; (iv) awareness and capacity development; (v) collaboration and demonstration; (vi) financing from international development organizations; (vii) financing from the private and mutual/cooperative sectors; and (viii) Islamic finance.

Based on a review of these actions, as well as the high-level financing trends observed across the region, 11 key recommendations are offered here to help accelerate investment in DRR across Asia and the Pacific in the second half of the Sendai Framework implementation.

For governments:

1. Develop analytical methodologies such as DRR financing strategies and budget stress testing to assess potential fiscal losses due to disasters and identify and select efficient and effective DRR investments and compare the financing cost of these investments with the cost of disaster risk financing instruments, and select the most appropriate and least costly financial instruments and mechanisms within the scope of comprehensive disaster risk assessment.
2. Undertake annual budget expenditure reviews for disaster risk reduction, including climate adaptation. Such reviews can be greatly facilitated by implementing an expenditure/budget tagging system using a clear taxonomy that organizes DRR expenditures into groups based on a hierarchy by classifying, marking, and reporting budget items.
3. Integrate the DRR Financing Strategies and budget stress testing into the Integrated National Financing Framework.
4. Provide financial regulation incentives that will reduce the rising regulatory capital cost of institutional investors due to disaster risk reduction investments in order to mobilize the resources of institutional investors into long-term DRR investments.
5. Use a mix of financing instruments within a risk-layering and ex-ante approach to finance for response, damage, and build back better and disaster risk reduction investments by considering both direct and indirect cost of disaster scenarios.

For the private sector:

6. With use of the private sector bond market for risk reduction expanding, along with the sustainable funds market to a lesser extent, companies, including commercial banks, should continue to fuel growth in the bond market. Elaborating further on the principles already created for thematic bonds to include reference to the Sendai Framework and concept of resilience, or creation of distinct principles for DRR bonds, would help mobilize the bond market in support of risk reduction.
7. With Asia's equity market and sovereign pension funds comprising over $6 trillion in total assets, engagement with these sectors represents a leverage point for financing disaster risk reduction, including hazards exacerbated by climate change.
8. Private and cooperative and mutual insurance sectors are encouraged to continue their efforts to close protection gaps and importantly, to use their insurance and investment products and services to incentivise disaster risk reduction by clients and community stakeholders.

For international development organizations:

9. International financial institutions are encouraged to undertake finance reviews and increase official development assistance in Asia and the Pacific targeting ex-ante disaster risk reduction and climate adaptation and ex-post recovery and reconstruction that build resilience.
10. International development organizations are encouraged to continue exploring the potential of Islamic Finance instruments to support disaster risk reduction, including climate change adaptation.
11. International development organizations are encouraged to use taxonomies that distinguish between pre-disaster and post-disaster expenditure and define resilience-related expenditure between post-disaster recovery and reconstruction efforts to urgently address the limited information currently available on the cost and level of financing for disaster risk reduction in Asia and the Pacific.

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Annex

Annex A: Select DRR finance governance approaches based on country submittals to the Sendai Framework Midterm Review and country status reports from 2020-22.

Annex B: Select DRR finance instruments based on country submittals to the Sendai Framework Midterm Review and country status reports from 2020-22.

Annex C: Select challenges and opportunities in financing DRR based on country submittals to the Sendai Framework Midterm Review and country status reports from 2020-22.

Annex A: Select DRR finance governance approaches based on country submittals to the Sendai Framework Mid-term Review and country status reports from 2020-22.

Country	Governance Approaches for DRR Finance
Australia (2022 MTR Report)	• **Disaster Risk Reduction Package and the National Partnership Agreement**: Designed to reduce the risk and impact of disasters in Australia and support the implementation of the National DRR Framework. • **National Resilience Task Force Guidance Document series:** Guidance for Strategic Decisions on Climate and Disaster Risk; Guidance on Governance emphasises the need to promote local solutions to manage the physical impacts of natural hazards; Systemic Disaster Risk Handbook; Guidance on Vulnerability focuses on ways to understand vulnerabilities to climate impacts, natural hazards and disaster; Guidance on Scenarios moves on to explain how to develop and use scenarios to think about the potential implications of high-stakes strategic and operational decisions when highly uncertain drivers of climate and disaster risk are present; Guidance document on Prioritisation, encourages users to re-visit investment, program and project objectives by shifting the focus from 'assets' to 'services and communities. • **Queensland Disaster Resilience and Mitigation Investment Framework**: provides guidance on effective investment decision-making and prioritisation to support disaster resilience and mitigation across Queensland, looking at both infrastructure and community resilience measures. • **Resilience Valuation Initiative (RVI):** Coalition of stakeholders from public, private and community organisations which aims to advance an accepted process with enabling methodologies for valuing the benefits and costs of a resilience-building asset, feature or activity. • **Enabling Resilience Investment (ERI)** approach: Used to generate place-based risk mitigation options for communities in cities, suburbs and rural and regional Australia
New Zealand (2022 MTR Report)	• **Financial Sector (Climate-related Disclosures and Other Matters) Amendment Act 2021:** The new law will require around 200 large financial institutions, including banks, insurers, investment schemes and Crown financial institutions to start making climate risk-related disclosures. • **National Adaptation Plan:** Includes ensuring that planning for new assets incorporates the full cost of adaptation over the life of an asset and the set up durable investment management systems to respond to, fund and finance climate action
Philippines (2022 MTR Report)	• The **National DRR Law** enabled substantial investments for DRRM through the creation of a National DRRM Fund in the annual national budget or the General Appropriations Act (GAA) and its local counterpart, the Local Disaster Risk Reduction and Management Fund whereby not less than 5% of an LGU's annual budget should be allocated for DRRM activities, putting premium or a larger share (70% of the 5% allocation) for prevention, mitigation, and preparedness activities.

	• **National Disaster Risk Financing and Insurance (DRFI) Strategy**: Formulated in 2015, however, modalities are mostly ex-post in nature and its implementation is a work in progress with some of its aspects still in its nascent stage.
Republic of Korea (2022 MTR Report)	• **Prior Consultation System for Disaster and Safety Budgets (PCSDSB):** Under this system, MOIS requests and reviews the disaster and safety related work/budget plans from each central ministry, sets yearly investment directions based on them, reviews investment priorities and suitability, and notifies the budget appropriation authority of their decisions. The goal of this system is to manage the nation's disaster and safety budget in an integrative and efficient manner. The disaster and safety budget of 2022 was up by 6.3% from the 2021 at 21.9 trillion won. This amounted to 3.6% of the ROK government's total budget. The 2023 Provisional Plan for the PCSDSB consists of 377 programs amounting to 24.3 trillion won, up by 13.5% from 2022. • **PCSDSB for local governments**: Tentatively introduced in 2021 with the goal of accounting for the local contexts of disaster in the nation's disaster policy and investment, and boosting overall efficiency in the nation's disaster budget.
Thailand (2022 MTR Report)	• **13th National Economic and Social Development Plan - Transforming Thailand into a Progressive Society Sustainable Value Creation Economy (2023-2027):** The Plan provides adequate attention to disaster and climate risk, for instance, Development Milestone 11 focuses on reducing risks and impacts from natural disasters and climate change. • Royal Decree on Promotion of Catastrophic Insurance Fund • Royal Decree on Provision of Financial Assistance to Flood – Affected People
Myanmar (2020 Status Report)	• **National Risk Financing Strategy**: Being drafted by the Ministry of Planning, Finance and Industry in collaboration with the Ministry of Social Welfare, Relief and Resettlement, ADB and World Bank. The Strategy will explore the existing financial instruments including government contributions, insurance and microfinance tools that can strengthen government and people's financial capacities to respond to and recover from disasters. • **Natural Disaster Management Law**: Details the establishment of the National Disaster Management Fund to support in managing and spending of which is further detailed in the 2015 Financial Regulations. As per DM law, disaster management funds at the subnational levels are also set up for effective relief, response and recovery interventions.

Annex B: Select DRR finance instruments based on country submittals to the Sendai Framework Mid-term Review and country status reports from 2020-22.

Country	Summary of DRR Financing Instruments
Australia (2022 MTR Report)	Grants and Transfers • **Disaster Risk Reduction Package (DRRP)**: The Australian, state and territory governments jointly committed $261 million over five years from 2019-20 towards the DRR Package, designed to reduce the risk and impact of disasters in Australia. • **Disaster Ready Fund (DRF)**: committed to investing up to $200 million per year (from 2023-24) on disaster prevention and resilience initiatives • **Preparing Australian Communities Program Local**: $150 million program aims to help increase the ability of communities to mitigate, avoid, withstand and/or recover from the increasing effects of tropical cyclones, bushfires or floods as a result of climate change • **Emergency Response Fund** (ERF): Provides $150 million in funding for resilience building measures ahead of a disaster (to be replaced by the DRF) • **Strengthening Telecommunications Against Natural Disasters package**: $37.1 million to improve the resilience of Australia's communications network in bushfire and disaster-prone areas. • **Northern Rivers Resilience Initiative:** $150 million has been committed to priority flood resilience projects in the Northern Rivers region of New South Wales following the large- scale floods in 2022. • **Resilient Homes Fund program**: $741 million in funding seeks to help make Queensland homes more flood resilient. • **Betterment Funding**: Since the first betterment fund was established in 2013, more than 480 projects across Queensland – valued at more than $240 million – have been approved, helping to create strong, more resilient communities. Of those betterment projects that were re-impacted, an investment of $110 million generated approximately $250 million in savings or avoided costs. Equity and Public-Private Partnerships • **Resilience Investment Vehicle (RIV)**: Pilot first commenced in 2018. The pilot aims to explore how public and private capital could be directed to finance new and/or adapt existing infrastructure which builds resilience, reduces disaster risk and can derive a financial return for investors. The RIV pilot is a cross-sector effort between IAG, National Australia Bank (NAB), CSIRO, the NEMA, Queensland Reconstruction Authority and Resilience New South Wales.
Bangladesh (2022 MTR Report)	Grants and Transfers • **DRR and adaptation Fund**: Total 8.8 % of National Budget was allocated to DRR Sector for last 5 years. In the 8th Five Year Plan from 2021 to 2025, around 9 to 11% of National Budget has been allocated to DRR which are closely link with climate adaptation. • **Disaster Management (Fund Operation) Rules**: Provision of adaptation and climate resilience fund mobilization to recover losses and damages.

	Insurance • Establishing **subsidized insurance-based risk recovery mechanism** to mitigate risk of climate induced disasters and geo-hazards.
Philippines (2022 MTR Report)	Grants and Transfers • **National DRRM Fund**: intended to be used for (a) prevention and preparedness; (b) preparedness; (c) response; and (d) rehabilitation and recovery and can be accessed by both National and Local Governments. Ranged from Php 8.75 billion to 37.8 bllion annually from 2016-2021 • **Local DRM Fund**: Per the National DRRM Law, local governments are mandated to allocate not less than five percent (5%) of their estimated revenues from regular sources, 70% of which was to be used for prevention, mitigation, and preparedness activities while the remaining 30% shall be reserved for Quick Response Funds (QRF) for response and relief activities. Ranged from Php 39.4 billion to 81.6 billion annually from 2017-2021. • **Special Purpose Funds**: A number of Special Purpose Funds include DRRM in its Menu of Projects along with other developmental programs and projects which can be requested by the agencies and local governments. Official Development Assistance • For technical Assistance, tools and technology development, Policy development/formulation, and Infrastructure support. Debt financing • **Contingent credit financing (CAT-DDO 4)**: Disaster Risk Management Development Policy Loan with a Catastrophe-Deferred Drawdown Option (DPL with CAT-DDO) wherein a form of contingency financing offering immediate liquidity of up to USD$ 500 million or 0.25 percent of a country's Gross Domestic Product (GDP) whichever is less can be tapped. Insurance • **Sovereign Risk transfer instruments /mechanisms**: Examples are catastrophe risk insurance, insurance of public assets, catastrophe bonds (Cat bonds). The Department of Finance secured catastrophe bonds used for Typhoon Odette with a payout of USD 52.5 million.
Republic of Korea (2022 MTR Report)	Subsidies and Funds • For unforeseeable large-scale disasters like the COVID-19 pandemic or when special needs for public funding arise to manage catastrophes, the ROK has **subsidies and funds** in place that serve as stabilizing funding sources. **A part of certain taxes as specified by law is regularly accrued for such subsidies and funds, to be disbursed in emergency situations.** These subsidies and funds were promptly disbursed during the COVID-19 pandemic for supporting small businesses and vulnerable groups, as well as for disease control activities. • The local subsidies of the ROK government are sums granted to "local governments faced with financial deficiencies," and can be classified into general subsidies, special subsidies, real estate subsidies, and fire-fighting safety subsidies. (Local Subsidy Act (LSA), Articles 2 and 3) • In particular, special subsidies and fire-fighting safety subsidies can be disbursed for the disaster- and safety-related activities of local

	governments. The financial resources of subsidies are partial amounts of taxes as specified in Article 4 of the LSA. • The fire-fighting safety subsidies were introduced in 2015 to support local governments in operating fire-fighting human resources, expanding fire-fighting and safety facilities, and reinforcing safety management. The financial resources for these subsidies are a part of consumption tax on tobacco, as specified in Article 9 of the LSA. Domestic Resource Mobilization • **Prior Consultation System for Disaster and Safety Budgets (PCSDSB):** Under this system, MOIS requests and reviews the disaster and safety related work/budget plans from each central ministry, sets yearly investment directions based on them, reviews investment priorities and suitability, and notifies the budget appropriation authority of their decisions. The goal of this system is to manage the nation's disaster and safety budget in an integrative and efficient manner. The disaster and safety budget of 2022 was up by 6.3% from 2021 at 21.9 trillion won. This amounted to 3.6% of the ROK government's total budget. The 2023 Provisional Plan for the PCSDSB consists of 377 programs amounting to 24.3 trillion won, up by 13.5% from 2022. • **PCSDSB for local governments**: Tentatively introduced in 2021 with the goal of accounting for the local contexts of disaster in the nation's disaster policy and investment, and boosting overall efficiency in the nation's disaster budget.
Afghanistan (2020 Status Report)	International Assistance • **Afghanistan Reconstruction Trust Fund (ARTF)**: Established as a World Bank administrated financing mechanism to support the budgeting and national investment programs. It brought together 34 international donors and stakeholders in various programs and projects with the intention to improve education, resilient communities, core infrastructure, sustainable governance among other key development issues.
Tonga (2022 Status Report)	International Assistance • Tonga has established a **revolving funding** of USD 5 million with the support of ADB to finance joint climate change adaptation and disaster risk reduction activities directly to communities on a competitive basis. Before creating this fund, communities were dependent on two separate funds for disaster risk reduction (i.e., national emergency fund) and climate change adaptation (i.e., national climate change fund).

Annex C: Select challenges and opportunities in financing DRR based on country submittals to the Sendai Framework Mid-term Review and country status reports from 2020-22.

Country	Challenges and Opportunities in DRR Finance

Australia (2022 MTR Report)	• Often, funding packages released following hazard events only support building back to what was, rather than building back better
	  ○ Systemic thinking shifts the focus from the resilience of a built asset to, instead, the contribution that asset makes to the resilience of the broader network, provision of critical services, supply chains and cross-sectoral systems.
	• Competitive grants are often not achieving the intended outcome of ensuring that funding goes to the communities most at need.
	  ○ experiment with new funding models which directly invest in community priorities.
	  ○ in order for the private sector to invest, projects need to be at scale – either large enough or smaller projects bundled.
	  ○ trial participatory granting, whereby giving the communities most at need the authority to determine who and what to fund.
	  ○ There is increased recognition of the role NbS can play in helping to address systemic challenges, such as climate change, biodiversity loss, disaster risk, ecosystem degradation, water and food security and human health
	• Limited access to discretionary funds at the immediate outset of an event impacted them from rapidly delivering services.

Bangladesh (2022 MTR Report)	• Regional and international cooperation and funding mechanism with flexibility for dedicated DRR funding are required for reducing the exposure and vulnerability of hazards and impact of disaster and climate change. ○ Obtain accreditation for the existing National Funding Entities (NFE) to become National Implementing Entities (NIE) in order to access support from the international funding mechanisms – both within and outside the Implementation of SFDRR United Nations Framework Convention on Climate Change (UNFCCC)

Cambodia (2022 MTR Report)	• Necessity of additional, but also of shifted, i.e., risk-mainstreamed investments
	  ○ Costs of all required risk mitigation solutions and investments should be calculated.
	  ○ Private as well as the public sector should be encouraged to increase investments for risk reduction and resilience
	  ○ Explore alternative climate change adaptation funding mechanisms. This includes in particular the funding of Cambodia's Nationally Determined Contributions (NDC),

Philippines (2022 MTR Report)	Challenges • Investments in Disaster Risk Reduction is substantial but is constrained by adequacy, unpredictable level of funds and is still predisposed to post-disaster spending • Uneven levels and non-utilization of Local DRRM Funds

	• While there are dedicated budgets for DRRM at the National and Local Government level, mobilizing and maximizing resources hamper the implementation of risk reduction Programs • Disaster Risk Financing and Insurance modalities are mostly ex-post in nature and its implementation is a work in progress with some of its aspects still in its nascent stage Opportunities • Full implementation of the Revised Guidelines on the Management and Administration of the National DRRM Fund • Consider policy/budget reforms for the National DRRM Fund • Updating of Local DRRM Fund Expenditures and Reporting Guidelines • Procurement reforms for speedy implementation and minimize the fears of spending. • Expand application of DRFI instruments such as risk transfer by improving insurance of public assets, identification of products to cover insurance of homeowners and small businesses, and establishment of a catastrophe risk insurance pool for LGUs and private sector. Proposals to establish an insurance pool for disaster risks in a number of cities is currently being formulated towards its full implementation through the assistance of the Asian Development Bank. • Increase access of funds for energy resiliency plans, programs projects
Republic of Korea (2022 MTR Report)	• The current DRM system of the ROK has limited policy incentives for inducing the participation of the private sector. ○ Policies that induce the participation of non-governmental actors such as companies, civil society, local communities, and individuals in the decision-making for DRR-related investment must be expanded. As disasters become more varied in form and multi-hazards increase, the government alone cannot assume full responsibility for managing all disasters, and needs to be accompanied by other actors in their DRR efforts. • Proactive campaigns are needed to change perceptions of risk and hazard mitigation to induce voluntary investment in DRR by private actors ○ Efforts must be made to **raise awareness on preventative investment for DR**R across all stakeholders by expanding the Safety Culture Campaigns. • The mandate for a BCP (Business Continuity Plan) only applies to a small set of private organizations whose goods and services are deemed essential. ○ Incentives will be needed in order to encourage private actors who are not required by law to **develop a BCP to enhance their disaster resilience** ○ Incentives for DRR activities and investment in the private sector must be provided to induce greater participation of private actors.
Thailand (2022 MTR Report)	• Develop more DRR financing strategy and financial tools. ○ Risk finance complements DRR by securing adequate financial resources to protect assets and livelihoods from disaster risk. ○ Relevant ministries/departments need to first identify risk financing and transfer tools current available to different stakeholders in the country. This will be followed by identifying main financing gaps in funding DRR. ○ Finally, the country needs to develop a financial strategy for financial protection within broader fiscal risk management.

Malaysia (2020 Status Report)	• **Little detail is available about the exact financing of DRR and CCA** in Malaysia • The current, response-oriented system seems to leave only **marginal attention to risk reduction** concerns at all fronts, and while it is true that Malaysia has been relatively sheltered from the impacts of catastrophic disasters, the looming impacts of climate change should facilitate rapid transformation towards having a proactive perspective in disaster governance. ○ Among the most important issues to be addressed by the government would be to **expand the financing of disaster and climate risk reduction into budgeting at all levels**.
Myanmar (2020 Status Report)	• **Significant funding gaps** contribute to challenges in managing disasters in Myanmar. Even the current emergency response costs of flooding far outweigh the available resources, which indicates a severe short-term funding gap for relief and response (World Bank, 2017). • Financial provisions to conduct assessment on reconstruction gaps are not currently available, but as previous disasters have indicated (such as the Cyclone Nargis in 2008), **sustaining long-term financing for recovery is also an immense challenge** now and for the upcoming decades (World Bank, 2017). • Financial assistance is also required for further **integration of DRR and CCA into critical infrastructure** (especially hospitals and schools) (Relief and Resettlement Department, 2013). • While the exact costs associated with climate-resilient and low-carbon investments have not been calculated, it is estimated that the achieving these development targets requires a five to ten percent increase in GDP and **annual capital investment increase of up to 28 percent over the two upcoming decades** (Ministry of Natural Resources and Environmental Conservation, 2019). Thus, achieving resilient and sustainable development is also interlinked with green growth that can support the needs of the population, and can increase the reach of social safety nets, infrastructure and employment opportunities.
Federated States of Micronesia (2022 Status Report)	• Revitalise the National Strategic Development Plan to reflect a new context post Compact funding in 2023 and uses this opportunity to integrate biological hazard risk management into longer-term development planning. The government needs to work with donors to **develop a medium-term fiscal strategy** to secure global climate funding while ensuring consistency with the 2023 Action Plan and the Infrastructure Development Plan 2025.
Republic of Marshal Islands (2022 Status Report)	• The RMI will need to **identify innovative sources of climate change adaptation and disaster risk management finance**, which could include budget support, national financing vehicles, and private-sector led initiatives. • The **high dependence on external partners** results in vulnerabilities, including potential delays in mobilizing humanitarian support and coordinating disaster response assistance.
Republic of Nauru (2022 Status Report)	• **Access climate finance**: In the Pacific region, climate finance is mostly accessed through multilateral and bilateral donor organisations. Nearly 86% of the climate finance in the Pacific region is delivered through project type interventions, while only 1% is channelled as direct budget support and 1% for sector budget support. Nauru needs significant financial resources to adapt

	to the adverse effects and reduce the impacts of climate change. Nauru can access finance from national, regional, and international public and private financiers/donors.
Samoa (2022 Status Report)	• Samoa National Action Plan for Disaster Risk Management (2017-2021), Samoa Climate Change Policy (2020-2030), Enhanced Nationally Determined Contribution (2021) **does not include a detailed financial cost for implementing each strategy/objectives.**
Tonga (2022 Status Report)	• Tonga has established a revolving funding of USD 5 million with the support of ADB to finance joint climate change adaptation and disaster risk reduction activities directly to communities on a competitive basis. Before creating this fund, communities were dependent on two separate funds for disaster risk reduction (i.e., national emergency fund) and climate change adaptation (i.e., national climate change fund).