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# Chapter 6

**Emerging consequences  
of COVID-19 on adaptation  
planning and finance**

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## Key messages

- ▶ COVID-19 and climate change have had a compounding effect, creating significant human suffering and stretching the economic and disaster response capacity of governments around the world. The compound nature of these risks continues to impact the adaptive capacity of governments, communities, societies and social groups, particularly those that are either already vulnerable (for example, women and indigenous groups) and those in developing countries.
- ▶ The pandemic has delayed existing adaptation planning in some countries and disrupted disaster risk finances. National Adaptation Plan processes have been hampered by health restrictions, as well as by the political and budgetary focus on immediate pandemic responses. Additionally, budgets for emergency disaster risk management have been depleted, raising concerns about a reduction in adaptive capacity for subsequent health emergencies and climate shocks.
- ▶ COVID-19 has exacerbated pre-existing financial barriers to investment in adaptation. However, there is an opportunity to redress these low levels of investment by directing recovery funding into green and resilient recoveries. In response to the pandemic, as at 15 August 2021, US\$ 16.7 trillion of fiscal stimulus had been announced by countries. Less than one-third of 66 studied countries had explicitly funded specific measures to address physical climate risks in their announced investment priorities up to January 2021. The costs of servicing the debt raised to respond to the pandemic, combined with decreased government revenues due to the economic impacts of COVID-19, may also hamper future government spending on adaptation, particularly in developing countries.
- ▶ COVID-19 provides lessons for improving climate adaptation planning and financing. COVID-19 highlights the importance of governments addressing compound risks through integrated risk management approaches. The pandemic also deepens the need for substantive debt relief for heavily indebted and climate-vulnerable countries and creates an opportunity to “build forward better”, through investment in activities that support green economic recovery and build adaptive capacity.

### 6.1 Introduction

The COVID-19 pandemic has reverberated throughout the world, placing strain on many of the systems that are essential to our lives. The crisis has revealed and reinforced many of the pre-existing vulnerabilities and fault lines running across our globalized world. It has also demonstrated that the notionally distinct domains of health, economics, society and environment are in fact complex, nested, interconnected systems, which require coordinated global responses (Organisation for Economic Co-operation and Development [OECD] 2020a).

Climate change adaptation practitioners are dealing with a similarly complex problem that also crosses physical, temporal and organizational boundaries. As with COVID-19, the climate crisis acts as a threat multiplier of pre-existing vulnerabilities, impacting people, livelihoods and

ecosystems. These threats are addressed by the Paris Agreement, which established the global goal on adaptation of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”.<sup>1</sup>

This chapter aims to synthesize the literature that describes how COVID-19 has impacted country-level “adaptive capacity” (see the glossary for a definition and discussion below) and identifies emerging opportunities for policymakers and decision makers to improve their responses to both the health and climate crises. For instance, the significant fiscal spending on the health emergency, welfare payments and economic recovery may make ongoing spending on measures to increase preparedness for climate hazards more challenging for some governments. However, it also presents an opportunity to invest in programmes and policies that enable governments to “build forward better”.

<sup>1</sup> In full, article 7.1 of the Paris Agreement reads “Parties hereby establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2.”

This chapter focuses on governmental – rather than societal, business or household – contributions to country-level adaptive capacity. Nonetheless, it is important to note that these dimensions are interlinked and cannot be neatly separated. The chapter also focuses primarily on the impacts of the pandemic on adaptation financing and planning, since the impacts on implementation are still emerging and are not well documented in existing studies.

To synthesize the literature, the authors conducted a rapid review of peer-reviewed literature and reports from multilateral organizations and policy institutions, published in or after 2020, on the link between COVID-19 and adaptation financing and planning.<sup>2</sup>

The chapter is organized as follows. [Section 6.2](#) explores the ways in which the pandemic and climate change interact and create “compound risks”, which increase the vulnerability and threaten the adaptive capacity of governments and societies. [Section 6.3](#) sets out how COVID-19 has delayed existing adaptation planning processes in some countries, creating potential compound risks in the future. [Section 6.4](#) analyses the emerging implications of COVID-19 for adaptation financing. As governments move from deploying “rescue” stimulus to “recovery” spending, the chapter synthesizes existing data to determine whether countries are investing in recoveries that are both economically effective and building countries’ adaptive capacity to climate change. Our analysis of these fiscal flows is constrained by pre-existing difficulties inherent in classifying and tracking adaptation spending.<sup>3</sup> [Section 6.5](#) outlines lessons for governments and multilateral institutions on how to address the adaptation financing and planning impacts of COVID-19, as identified above, to enable COVID-19 to act as a catalyst, rather than an impediment, to enhancing global climate adaptive capacity.

## 6.2 How COVID-19 has impacted adaptation planning and finance

Climate change and COVID-19 share many similarities. Like the COVID-19 crisis, the climate crisis is a systemic problem that requires coordinated global and domestic responses. Both crises are protracted, with effects that unfold over months and years, and are deeply entangled with other social, environmental and economic shocks and disruptions (Phillips et al. 2020). They both reveal the inequity in who experiences, and has the ability to respond to, the effects of crises (Dodds et al. 2020; Patel et al.

2020). Emerging evidence suggests that the pandemic has also impacted climate adaptation at multiple scales. This section highlights how COVID-19 has had a particularly significant impact on the “adaptive capacity” of countries (defined below), by creating or exacerbating compound risks at multiple levels.

### 6.2.1 COVID-19 and adaptive capacity

The emerging literature on COVID-19 and climate adaptation suggests that the pandemic impacts the Paris Agreement’s goals of “enhancing adaptive capacity”, “strengthening resilience” and “reducing vulnerability”. As highlighted by the 2018 edition of the Adaptation Gap Report (AGR), the distinction between these terms is not well established in the literature, with many of their key constructs overlapping one another. Instead, the report suggested that it may be more helpful to draw a distinction between “adaptive capacity” on the one hand, and country exposure and sensitivity to physical climate hazards, on the other.

Adaptive capacity is a broad concept with multiple definitions. The Intergovernmental Panel on Climate Change (IPCC) has defined the concept as referring to the ability of systems, institutions and humans to adjust to potential climate damage, to take advantage of opportunities, or to respond to consequences (IPCC 2014). Academic scholarship makes the point that multiple actors work together to enable adaptive capacity, including governments, businesses and communities, and highlights the importance of the interactions between these layers. To date, the literature on the impacts of COVID-19 on adaptation has primarily focused on the way the pandemic has impacted institutions and the economy. Reflecting this emphasis in the literature, this chapter focuses primarily on the issue of the “adaptive capacity” of governments.

The literature highlights that the impact of COVID-19 on physical climate risks is uncertain. Although the government-imposed restrictions on movement and economic activity that were enacted in response to the pandemic led to a reduction in emissions within some sectors, its long-term effects on climate hazards will be contingent on the length of the pandemic and government responses to it (Forster et al. 2020; le Quéré et al. 2020; Shan et al. 2020). At the time of writing, the emission reductions induced by government-imposed restrictions on movement and economic activity are unlikely to meaningfully reduce climate hazards. Despite temporarily slowing the usage of the global carbon budget, they do not appear to have reduced emissions permanently, with most countries having already returned

<sup>2</sup> This chapter is not intended to be a comprehensive catalogue of the literature. Instead, it aims to synthesize the information most relevant to government and civil-society decision-making at the point of intersection between COVID-19 and climate change adaptation. Key word searches were conducted across Google Scholar, ProQuest and Scopus. The first 100 results of each search, organised by citations and relevance, were reviewed. We selected sources which were most relevant to the key themes in the Adaptation Gap Report (AGR), namely adaptation planning, financing and implementation.

<sup>3</sup> As chapter 4 acknowledges, difficulties with tracking adaptation finance stem from, among other things, “...definitional challenges, accounting issues, confidentiality restrictions, and a lack of universally accepted impact metrics”.

**Box 6.1 What is a “compounding risk”?**

Compound risk is a term that is used in multiple domains, including climate science (IPCC 2012), disaster risk response and other sciences, with different meanings. The common denominator, however, is that compound risks build on each other and exacerbate hazards and other outcomes. Among others, the context-specific differences in the term’s definition centre on whether the causal basis of such risks should be related and on whether social and physical interaction should be considered the same or separate (Pescaroli and Alexander 2018). In this chapter, the term is used to refer to interactions not only between physical hazards but also involving other areas, such as social and economic systems.

The concept of compound risk is widely used in relation to climate adaptation. Zscheischler *et al.* (2020) reviewed historical instances of compound events related to weather extremes and concluded that many major catastrophes bear the hallmark of being caused by compound events. For example, they noted that in 1983, the largest synchronous wheat failure in modern history was driven by a strong El Niño event, which fuelled heatwaves and droughts in crop-producing regions across multiple continents.

Maladaptation is another example of compound risk, this time inherent in adaptation projects. Maladaptation refers to adaptation projects which inadvertently increase the vulnerability of communities or specific segments of communities (for example, women and indigenous groups). Some adaptation programmes explicitly try to avoid such risk compounding.

to their pre-pandemic emission levels (IPCC 2021). However, as highlighted in the remainder of this chapter, existing research shows with greater certainty that COVID-19 and its associated policy, economic and social responses are already impacting the adaptive capacity of governments.

### **6.2.2 COVID-19 and climate change present “compounding risks” that impact adaptive capacity**

In the literature on the COVID-19 pandemic and climate adaptation, “compound risk” (box 6.1) has been used to describe the way in which the pandemic and climate change interact.<sup>4</sup> On the one hand, climate change may have contributed to conditions that exacerbate the pandemic (among other health impacts; see, for example, UNEP 2018).<sup>5</sup> Increased risk of COVID-19 infection has been associated with exposure to higher levels of certain air pollutants (Cole, Ozgen and Strobl 2020), and some scholars have linked geographic shifts in wildlife induced by climate change and ecosystem degradation with the spread of zoonotic diseases, such as COVID-19 (Carlson *et al.* 2020; Everard *et al.* 2020; Dasgupta 2021; UNEP and International Livestock Research Institute 2020). On the other hand, the pandemic and the social responses to it may also be impacting our ability to respond to climate change (Ranger, Mahul and Monasterolo 2021). This chapter focuses primarily on the latter.

In 2020, droughts, cyclones, and floods exacerbated by climate change damaged critical infrastructure or

impeded the public health responses needed to contain epidemics (Phillips *et al.* 2020). In Morocco, for example, droughts occurred in parallel to the pandemic, leading to major increases in unemployment in rural communities as farmers with lower incomes struggled to find work. Similarly, in developed economies, we have seen a compounding of the pandemic and climate risks. In the United States of America, the available evidence suggests that emergency response measures for COVID-19, coupled with responses to increased major hurricanes and wildfires, may have exacerbated staffing shortfalls at the United States Federal Emergency Management Agency in 2020 (United States Government Accountability Office 2020). Box 6.2 contains a case study of how the pandemic has reduced the resilience of Pacific states to cyclones.

While this chapter focuses on the government level, it is important to acknowledge that COVID-19 has also diminished adaptive capacity at other scales, making communities, organizations and households more vulnerable, which has a knock-on negative impact on country-level adaptive capacity. At the household level, the World Bank estimates that an additional 97 million people fell into poverty in 2020, driven by the economic shocks caused by the COVID-19 pandemic (World Bank 2021b). The links between poverty and climate vulnerability are well documented: poverty is both a driver and a result of vulnerability to climate change shocks and stressors (Hallegatte, Fay and Barbier 2018; Thomas *et al.* 2019). There have also been systematic reductions in adaptive capacity

<sup>4</sup> Other terminology has been used to describe types of complex risks, such as “cascading”, “interconnected” or “amplified” risks (Simpson *et al.*, 2021).

<sup>5</sup> Studies on this subject undertaken in different regions have shown that impacts are ambiguous and diverse, indicating the need for investment in country-specific research to build understanding of the required adaptation processes.

### **Box 6.2 How COVID-19 reduced the adaptive capacity of Pacific States to Cyclone Harold**

In April 2020, category 5 tropical cyclone Harold hit Small Island Developing States in the Pacific, including Fiji, the Solomon Islands and Vanuatu. The impact of the cyclone was catastrophic, with as many as 90 per cent of the population in Sanma, the most affected province of Vanuatu, losing their homes.

At first, response measures to the COVID-19 pandemic in the Pacific impeded the response of governments to the cyclone. In Fiji, the disaster response was constrained by COVID-19 restrictions, since the country's evacuation centres had to adhere to COVID-19 protocols, which included restrictions on capacity and social gatherings. In Vanuatu, officials banned foreign aid workers from entering the country to assist with disaster recovery, in line with strict measures to prevent the importation of COVID-19 into the country. Furthermore, aid supplies had to be quarantined for three days before disbursement to prevent the spread of the disease in a country with weak health infrastructure.

**Sources:** Gunia 2020; World Meteorological Organization 2020.

in business. Firms – particularly small to medium-sized enterprises in developing countries – have also experienced severe and widespread shocks, with declining sales and rising job losses (Adian *et al.* 2020; Christine *et al.* 2020). Furthermore, the COVID-19 pandemic could trigger extensive corporate debt distress, building on high pre-pandemic over-indebtedness (Liu, Garrido and Delong 2020).

Moreover, compound shocks caused by the COVID-19 pandemic have reverberated along existing lines of inequality, exacerbating existing socioeconomic inequities. The literature documents some of the many disproportionate health, economic and social impacts of COVID-19 experienced by groups already facing structural inequalities along socioeconomic, gender, class and ethnic lines (Dodds *et al.* 2020; Patel *et al.* 2020). Such inequalities, which leave many unable to take appropriate preventative measures, may also exacerbate the pandemic.

The compound nature of both climate change and the COVID-19 pandemic has significant policy implications, particularly for government adaptation planning and finance, which we discuss in the following sections.

## **6.3 The impact of COVID-19 on adaptation planning**

COVID-19 has impacted a range of adaptation planning processes. This section focuses on the impact on national adaptation planning and disaster risk planning. Chapter 3 of this report provides further details on progress made in national adaptation planning during 2020 and 2021.

### **6.3.1 COVID-19 has impacted the development of National Adaptation Plans**

National Adaptation Plans (NAPs) are a planning process through which countries can identify medium-term and long-term adaptation needs and bring adaptation into country-level policymaking processes. Between the creation of the process to formulate and implement NAPs in 2010 and 31 July 2021, only 24 of the 154 developing countries had so far completed and submitted their first NAPs. However, as at September 2021, at least 125 developing countries are in the process of formulating and implementing NAPs. Emerging evidence suggests that while COVID-19 has hampered some NAP processes, particularly among Least Developed Countries (LDCs), countries are working to progress their NAPs despite the constraints of the current environment (United Nations Framework Convention on Climate Change [UNFCCC] 2021). This view is supported by qualitative evidence ([box 6.3](#)). These constraints are also likely to have been experienced across adaptation planning and implementation processes beyond NAPs, particularly in LDCs (Caldwell and Alayza 2021).

Despite constraints, direct support has continued to be provided throughout the COVID-19 pandemic, including through the Open NAP initiative and through virtual administration of support programmes, where possible. Eighteen LDCs participating in the Open NAP initiative reported progress, despite COVID-19 (UNFCCC 2021). There is also anecdotal evidence that accelerating digitalization trends, driven by COVID-19, have created new opportunities for community engagement and consultation in planning processes by increasing accessibility and inclusivity of consultations for certain groups within communities (McKinley *et al.* 2021).

### **6.3.2 COVID-19 has impacted contingent disaster risk finances**

COVID-19 has created additional vulnerability to future climate-related shocks, since contingent funding retained for disaster relief has been redirected to address pandemic related shocks. This depletion has been partly amplified by requests from recipient countries to divert climate change adaptation and disaster risk reduction aid to COVID-19 responses (Quevedo, Peters and Cao 2020). For example, as at July 2020, India, Nepal and Pakistan had all made requests to the Global Facility for Disaster Reduction and Recovery. Many donors are accepting these requests and are providing additional flexibility to recipients in how they

### Box 6.3 The impact of COVID-19 on NAP processes

For some countries, such as Ghana, COVID-19 served as a “wake up call” to instigate the NAP process (UNEP 2020b). However, the available evidence suggests that for many other governments, COVID-19 has slowed the development of NAPs in 2020 and 2021.

The NAP Global Network, which supports countries in advancing their NAP processes, carried out research with partner countries on how the pandemic impacted country NAP processes. The research, which is backed by other similar studies, found that in some cases the pandemic had “completely stalled” or “delayed” NAP processes. It cited a number of factors:

- ▶ **Cancelled meetings and consultations:** Prohibition on travel in some countries and physical distancing requirements limited the ability to carry out NAP meetings. This was particularly problematic for communities with limited or no Internet access and also had the potential to restrict the extent to

which the perspectives of vulnerable groups like women and indigenous peoples are considered within NAPs.

▶ **Diverting political support for adaptation:**

Politicians were focused on responding to short-term issues, triggered by waves of the COVID-19 pandemic. For example, the NAP of South Africa was due to be approved by the cabinet of the country’s government in April 2020 but had to be put on hold because of the pandemic.

▶ **More competition for adaptation funding and resources:**

Some countries reported facing difficulties accessing the same levels of budget support because of COVID-19. In addition, several countries reported concerns that the debt they were taking on might create future problems for adaptation funding (see further discussion on this topic below in [section 6.4](#)).

**Sources:** NAP Global Network 2021.

use funds and including COVID-19 in new funding calls (Cornish 2021). While this demonstrates the responsiveness of pre-allocated financing frameworks to imminent crises, as emergency funds are depleted it also indicates potential vulnerability to future compounding COVID-19 shocks or natural disasters (Mahul and Signer 2020). The extent of this vulnerability will depend on the responses of donors in addressing short-term shortfalls and longer-term funding trends.

## 6.4 The impact of COVID-19 on adaptation financing

### 6.4.1 Record fiscal spending in response to COVID-19: a window of opportunity for green and resilient recoveries

In response to the immediate health crisis caused by the COVID-19 pandemic, governments have announced US\$ 16.7 trillion in fiscal support as at 15 August 2021. Of this figure, 75 per cent (US\$ 12.5 trillion) has been directed to immediate “rescue” initiatives designed to keep businesses and people afloat, 13 per cent (US\$ 2.3 trillion) to “recovery” initiatives designed to rejuvenate economies and the remainder elsewhere (Desvars-Larrive et al. 2020; International Monetary Fund [IMF] 2021b; O’Callaghan et al. 2021). Relative to Emerging Market and Developing Economies (EMDEs), Advanced Economies (AEs) have deployed more fiscal spending, for longer. Excluding loans,

equity and guarantees, between 2020 and 2022, advanced economies are expected to deploy over eight times more spending relative to Gross Domestic Product (GDP) than low-income developing countries ([figure 6.1](#)).

While countries continue to deploy rescue spending in response to outbreaks of COVID-19, the opportunities for increased adaptation support are greatest in recovery spending. As discussed in the Emissions Gap Report 2021 and the AGR2020, and as called for by world leaders and multilateral organizations, COVID-19 recovery spending presents a window of opportunity to invest in a green, resilient and inclusive economic recovery (for example, Asian Development Bank 2020; G7 2021b; O’Callaghan and Murdock 2021; OECD 2020b; UNEP 2020c). Investment in adaptation activities can generate durable economic benefits and reduce climate vulnerability. The Global Commission on Adaptation has estimated that investment in adaptation can deliver benefit–cost ratios of between 2:1 and 10:1, largely through avoiding future costs (Global Center on Adaptation 2019). Similarly, as discussed in the AGR2020, nature-based solutions are a source of investment with the potential to reduce climate risks and vulnerability, while providing economic, environmental, and social inclusion co-benefits (UNEP 2021). An IMF working paper estimated that for every dollar spent on ecosystem conservation (a form of nature-based solution), almost seven more were generated in the economy over five years (Batini et al. 2021).

**Figure 6.1** Revenue and spending measures as a percentage of 2020 GDP for different country income groups

**Note:** The data for this figure and section 6.4 has been collected and analysed using IMF World Economic Outlook classifications of countries (IMF 2021c). As such, the country composition groupings used by the IMF have been applied. However, it should be noted that the groupings of Advanced Economies (AEs), Emerging Market and Developing Economies (EMDEs) and Low-Income Developing Countries (LIDCs) may not directly overlap with the groupings of “developed”, “developing” and “least developed” countries discussed elsewhere in this report.

#### 6.4.2 Emerging evidence indicates a failure to capitalize on opportunities

Initial analysis of COVID-19 stimulus packages indicates limited investment in green and resilient recoveries, with some recovery packages likely deepening climate vulnerability. However, a conclusive assessment is constrained by the lack of comprehensive, global data and analysis on COVID-19 recovery spending allocated to adaptation investments.<sup>6</sup> An analysis by the World Resources Institute (Krishnan and Brandon 2021) of response and recovery packages announced up to 31 January 2021 by 66 economically and geographically diverse countries, including all G20 and V20 countries,<sup>7</sup> found that less than one-third (just 17 countries and the EU) of the countries studied explicitly flagged or incorporated physical climate risks, adaptation or resilience in their announced investment and priorities (as defined in Caldwell and Alayza 2021). Investment was categorized as adaptation or resilience if it explicitly mentioned addressing climate hazards or risks through one of the following approaches: climate risk considerations; local decision-making; shock-responsive social safety nets, including for vulnerable populations; projects in urban areas; water resources management; food security; nature-

based solutions; disaster prevention; and infrastructure (Krishnan and Brandon 2021). The study also looked at whether addressing physical climate risks was mentioned in the introductions or preambles of countries’ stimulus packages.<sup>8</sup> For example, if a country mentioned improving water management practices to address reduced water availability or if it invested in early warning systems, then it was considered to have selective climate risk management actions. The 13 countries (18 per cent) that cited adaptation and resilience as a core objective of their recovery, alongside jobs and growth, are classified as having “climate risk integrated plans” (figure 6.2). The study found that almost all the countries that cited the need to manage climate risks are on the front-line when it comes to experiencing climate change impacts, including several of the Small Island Developing States.

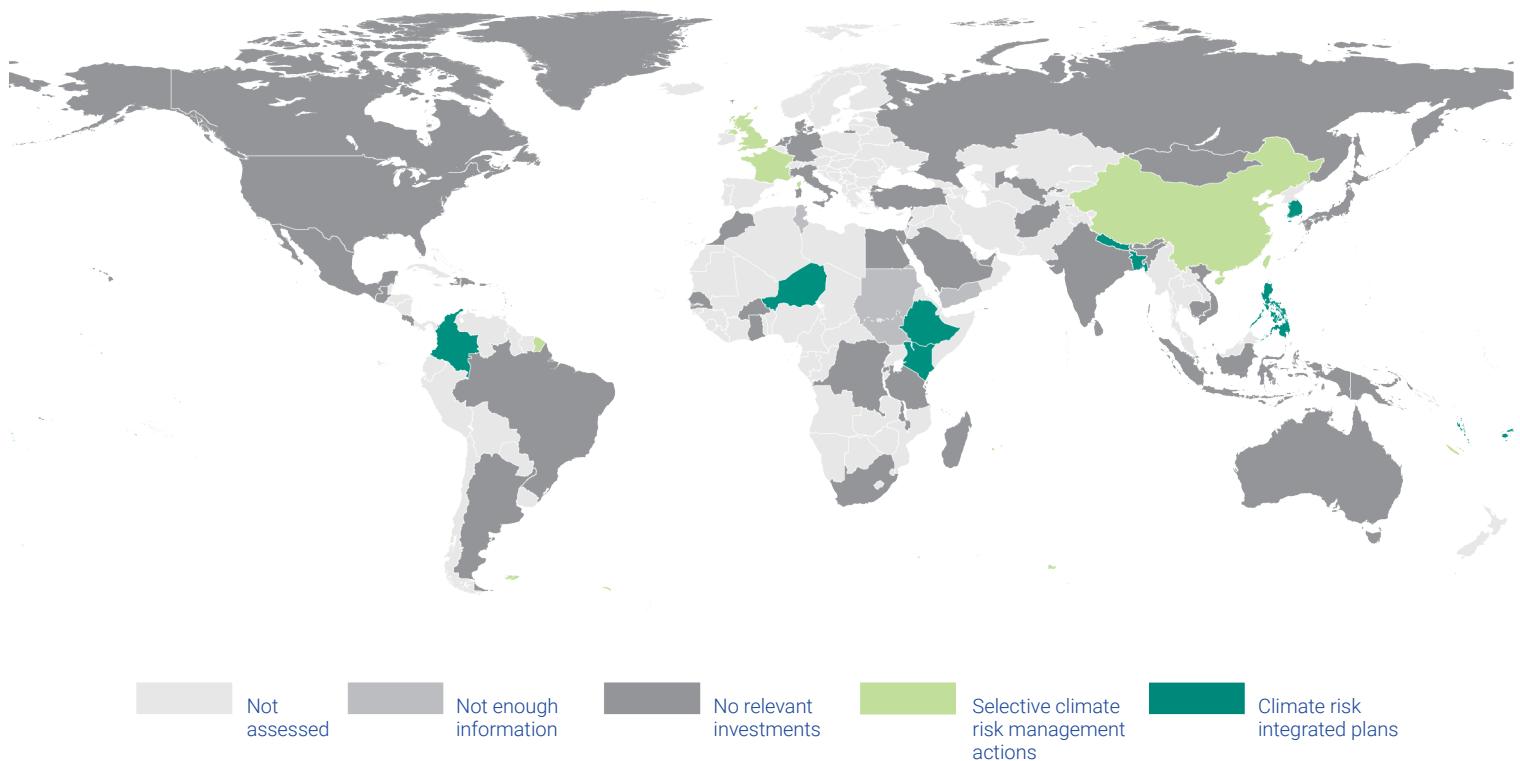
Sectoral analysis of COVID-19 pandemic stimulus packages indicates that some countries have invested more in activities that will increase climate change vulnerability than in those that will reduce it. The Vivid Economics Greenness of Stimulus Index found that, as at 1 February 2021, only US\$ 141 billion of US\$ 667 billion of tracked green stimulus had been directed towards “nature and biodiversity”,

<sup>6</sup> This is due to differing geographic and sectoral coverage of existing stimulus-related databases; the lack of standard definitions for adaptation; funding packages being released with varying levels of explanatory detail; difficulties distinguishing between funding that has been announced and funding that has been legally committed and deployed; and a lack of attention to adaptation-related issues within recovery packages. However, there are some high-level estimates of how adaptation has featured in recovery spending within regional and economic groupings and the impact of the pandemic on international public adaptation finance flows.

<sup>7</sup> This includes all countries from the G20, 48 countries from the V20, the six country champions for the Adaptation and Resilience track of the United Nations Climate Action Summit 2019 and the 20 convening countries of the Global Commission on Adaptation. Taking into account overlaps, this gives a total of 72 countries, six of which were dropped from the study due to lack of primary information.

<sup>8</sup> This study did not explicitly look for mitigation actions in stimulus packages, since others, such as those by Vivid Economics (2021a and 2021b), were comprehensively analyzing these actions.

**Figure 6.2** Countries including selected adaptation interventions in stimulus packages, as at 31 January 2021



**Note:** The figure is based on the same sample of 72 countries described above in [footnote 7](#). The figure only highlights measures at the national level and thus excludes measures at the European Union level. Territories recognized as disputed by the United Nations or whose status has not yet been agreed are included in the not assessed category.

**Source:** Adapted from Krishnan and Brandon (2021).

compared to US\$ 262 billion of stimulus directly associated with pollution or activities expected to negatively impact biodiversity (Vivid Economics 2021a). Furthermore, it also found that, despite encouraging examples of green and resilient stimulus, the packages announced by 15 of the G20 nations will have a net negative environmental impact and even in the National Resilience and Recovery Plans in Europe, there is more spending that will damage nature than enhance it (Vivid Economics 2021b).

#### 6.4.3 COVID-19 may be encouraging greater international public finance flows in the short term but this is unlikely to apply to adaptation finance

Over the last 18 months, the demands on international public finance have increased significantly. Not only are international financial institutions facing simultaneous pressures to channel resources to address the ongoing health crisis, they must also respond strategically to the economic and climate crises. Similarly, developed

economies are also under domestic fiscal pressure and may be constrained in their abilities to channel additional finance to multilateral development banks (MDBs) and other countries in the medium to longer term (OECD 2020c).

Comprehensive reporting across MDBs and bilateral and other multilateral institutions on public finance (particularly climate finance), is limited. It also has a two-year time lag,<sup>9</sup> which makes it hard to project trends with a high degree of confidence. The analyses considered in this section all focus on 2020 flows to countries eligible to receive Official Development Assistance (ODA). Taken together, they provide some clarity on the short-term outlook.

Preliminary analysis from the OECD Development Assistance Committee (DAC) indicates that, as a whole, ODA flows from its 29 member countries and EU institutions reached their highest ever recorded level, rising by 3.5 per cent in 2020 over 2019 flows (OECD 2021). These figures demonstrated the willingness of DAC members to maintain or increase ODA budgets in 2020, likely in response to immediate needs

<sup>9</sup> The UNFCCC biennial assessments, which are considered the most authoritative source on climate finance flows from bilateral and multilateral actors, have a two-year lag (the 2020 report will report on flows for 2017 and 2018).

related to the pandemic. It remains to be seen whether these overall ODA levels will be sustained in the medium- to long-term or will experience a delayed tightening, consistent with previous financial crises (OECD 2020d).

Drilling down more specifically into climate finance, the 2020 Joint Report on Multilateral Development Banks' Climate Finance (European Bank for Reconstruction and Development 2021), an annual report jointly published by nine MDBs, shows that while the participating MDBs' overall climate finance for developing countries fell by almost 5 per cent in 2020 (as compared to 2019), the share of adaptation finance slightly increased from 34 per cent of 2019 to 35 per cent of 2020 flows, continuing the positive trend of the last five years, albeit with a decline in absolute terms (see chapter 4 for further details).<sup>10</sup> This indicates that there are likely opportunities not only for MDBs, but for countries to continue to invest in adaptive capacity while advancing their recovery from the pandemic. However, this study only examines MDBs' own climate-related investment and represents a small subset of international public climate finance.

Looking forward, the Climate Policy Institute and the Global Center on Adaptation (GCA) studied the potential impact on adaptation finance flows in the post-COVID-19 world: based on interviews with representatives from development finance institutions, they projected that – due to the competing pressures on financiers – there would be a single-digit percentage decline in adaptation finance in 2020, with the potential for a larger fall in following years. The estimated decline is based on several variables, including projected reductions in international development finance, increased debt distress and slow vaccine roll-out in climate-vulnerable countries (GCA 2021).

#### 6.4.4 COVID-19 induced debt distress and ongoing economic disruptions may constrain future climate adaptation spending

COVID-19 has exacerbated fiscal distress for many countries, particularly Emerging Market and Developing Economies. Many governments have had to increase borrowing to finance the fiscal rescue and recovery packages (among other measures). The median public debt among Low-Income Developing Economies rose from 38.7 per cent of GDP over 2010–2014 to 44.3 per cent pre-crisis, peaking at 49.5 per cent in 2020 (IMF 2019; IMF 2021b). Average public debt worldwide reached 97.3 per cent of GDP in 2020, 13 percentage points higher than the pre-pandemic projection (IMF 2021b).<sup>11</sup> Such additional borrowing, combined with a drop in GDP due to the economic impact of the pandemic, has led to much higher debt-to-GDP ratios worldwide. As a consequence, and in combination with falls in revenue from

lower economic activity, many countries have significantly reduced fiscal space (IMF 2021c).

Fiscal space is a necessary but not sufficient condition for adaptation spending. Political or policy barriers, such as a reluctance to take on debt to invest in adaptation, could prevent spending on adaptation (Mortimer, Whelan and Lee 2020). However, limited fiscal space could exacerbate these barriers, making it harder for governments to commit funds to adaptation. The pandemic could result in downgrades to countries' credit ratings, increasing the cost of public borrowing and further constraining access to financing and the ability to invest in adaptation (OECD 2020d). Furthermore, public and private debt may not have fully priced in climate risks, leading to the potential of future repricing of such debt and possible increased debt servicing costs for nations (Climate Policy Initiative 2020; Dibley, Wetzer and Hepburn 2021; Monasterolo and Volz 2020; Klusak *et al.* 2021). As a consequence, researchers estimate that critically indebted countries are more likely to constrain spending on adaptation (Kaiser *et al.* 2021). This is reflected in qualitative evidence (see box 6.3).

The compounding of COVID-19 debt and climate risk could be a problem for adaptation spending by governments. Countries with limited fiscal space – further reduced during the COVID-19 pandemic – may lack the financing needed to implement adaptation measures, in turn leaving them more exposed to climate risk through lower preparedness and therefore also more likely to experience further increases in borrowing costs (Dibley, Wetzer and Hepburn 2021). However, this risk could be mitigated by using COVID-19 recovery spending to advance adaptation goals (as discussed in sections 6.4.1 and 6.4.2).

### 6.5 Emerging lessons of the COVID-19 pandemic for adaptation planning and financing

As discussed in section 6.1, there are similarities in the systemic, compounding and unequal nature of COVID-19 and climate change. The following lessons, drawn from across the literature, are intended to address this systemic and institutional nature of the challenge.

#### 6.5.1 Lessons for adaptation planning

**Governments should develop an integrated approach to the governance of risk management that is based on wide consultation.** As discussed above in section 6.2, the COVID-19 pandemic compounds climate-related risks. This makes it important for governments to adopt an

<sup>10</sup> For reference, adaptation finance made up just 20 per cent of MDB climate finance flows in 2015.

<sup>11</sup> Advanced economies have taken on significantly more debt as a proportion of GDP during COVID-19 than LIDCs (16.3 per cent from 2019–20, compared to 5.2 per cent), reflecting the fact that they are better placed to access international capital markets and service debt in the long-term (IMF, 2021b).



Photo: © Shutterstock

integrated approach to risk management across hazards to acknowledge such risk compounding (Ranger, Mahul and Monasterolo 2021; Monasterolo and Volz 2020). The World Bank (2021a) outlines how this more comprehensive approach to risk management within public finance frameworks – incorporating climate, pandemics and other major risks – could form an important part of a wider shift towards a whole-of-government integrated approach to risk management.

Several years ago, the World Bank suggested that countries establish a national risk board to support government-wide coordination in their management of critical risks (World Bank 2013),<sup>12</sup> a suggestion made all the more timely by the COVID-19 pandemic. In many countries, this approach is already practised to some extent, typically with cabinet offices, ministries/departments and equivalent institutional bodies holding responsibilities for monitoring and managing national critical risks. A national risk board could bring together a set of cross-cutting risk management and adaptation objectives, a national risk assessment, a system of national financial protection planning and a much wider and integrated approach to fiscal risk management, thereby driving a whole-of-government approach.

Donors could also continue to support developing countries to better plan for compound risks, including through the establishment of flexible funding mechanisms and

improving governance and accountability for cross-sectoral decision-making (Hallegatte, Rentschler and Rozenberg 2020; Kruczakiewicz et al. 2021).

**Governments should leverage existing adaptation policy processes to manage compound risks.** While COVID-19 has impeded adaptation planning processes, it has also reinforced the relevance of planning for compounding risks. To do so, governments could better leverage existing adaptation planning processes, including the climate rationales of project proposals to the Green Climate Fund and adaptation-specific sections of Nationally Determined Contributions (NDCs) and NAPs (Hammill 2020). For example, governments that have developed a NAP may have undergone rigorous, country-specific risk assessments and identified medium-term and long-term priorities for building adaptive capacity to climate change. These assessments can offer a raft of benefits during the COVID-19 pandemic, including identifying vulnerable populations (for example, women and indigenous groups) and places that are likely to be disproportionately affected during the compounding crises. This would help provide mechanisms and institutional frameworks through which to deploy immediate support and offer investment options to inform resilient stimulus packages (Hammill 2020; World Bank 2020a). Box 6.4 provides an example of how integrated planning can help respond in a practical way to compounding disasters (World Health Organization 2021).

<sup>12</sup> National risk boards perform a similar, whole-of-government role to national platforms for disaster risk reduction, as advocated under the Sendai Framework for Disaster Risk Reduction.

**Box 6.4 Leveraging existing climate disaster risk response tools to manage the COVID-19 pandemic in Pakistan**

The COVID-19 pandemic has highlighted how integrated risk management can offer multiple benefits. In Pakistan, as part of the country's response to the COVID-19 crisis, in 2020 it developed a Multidimensional Vulnerability Index to identify the communities most at risk from the pandemic. The Index was implemented through a map that integrated physical climate change risks as part of its assessment. It drew on tools developed for assessing flood and drought risk and created an integrated vulnerability tool, which was applied during the pandemic.

**Sources:** Quevedo, Peters and Cao (2020).

This suggestion is in line with the communiqué of G7 climate and environment ministers following their meeting in May 2021 (G7 2021a), which stressed the importance of increased action on adaptation (including by reaffirming their commitment to article 9.4 of the Paris Agreement, which calls for the provision of scaled-up financial resources contributing to adaptation action) and committed countries to working intensively to increase the quantity of finance for adaptation. Similar commitments have been made by the G7 world leaders, G20 energy and climate ministers and African ministers for the environment (G7 2021b; G20 2021; UNEP, African Ministerial Conference on the Environment and the African Union 2020).

When crafting stimulus packages, governments can apply emerging frameworks to identify and prioritize interventions that achieve both economic recovery and climate change resilience, such as the World Bank's Proposed Sustainability Checklist for Assessing Economic Recovery Interventions (World Bank 2020b), the World Bank Adaptation Principles (Hallegatte, Rentschler and Rozenberg, 2020) and the GCA Framework for Identifying Effective Interventions (GCA 2021). In addition, if available, countries can use existing country-specific adaptation plans and instruments as a starting point to identify stimulus measures suited to local contexts, as illustrated by the case study in [box 6.5](#).

Planned NAP processes can be used to help countries address specific risks exposed by COVID-19, such as through support for increased food security. For example, the Government of the Dominican Republic is planning to design the country's NAP process to incorporate adaptation strategies for the water, agriculture and food security sectors that will seek to create synergies with the government's programmes to finance farmers affected by COVID-19. The projects prioritized under the NAP will include climate-resilient investment in food production.

However, the usefulness of NAPs for managing compound risks is contingent on the rigour of the assessments. For instance, few NAPs currently integrate health risks, let alone other risks, as part of an integrated risk management process (World Health Organization 2021). UNEP has developed resources to encourage governments to integrate health considerations into NAPs (UNEP 2020a). Additionally, as at July 2021, UNEP is supporting 18 national governments to advance their NAP processes, including projects that simultaneously link to the COVID-19 response and recovery (UNEP 2020c). Governments should continue to be encouraged to ensure – with support where required – that NAPs are underpinned by rigorous, forward-looking climate change risk assessments to identify medium- to long-term adaptation priorities.

### 6.5.2 Lessons for adaptation financing

**Government and donors could increase investment to improve adaptive capacity.** The COVID-19 pandemic has spurred extensive fiscal spending. Governments should ensure that recovery spending is used to build forward better by actively targeting increases in climate adaptive capacity.

**Governments and donors could increase the resilience of fiscal frameworks to deal with compound risks.** COVID-19 has reinforced the need for governments and donors to ensure the rapid availability of finance after disasters to mitigate economic shocks and enable a swift and effective emergency and recovery response (Wahba *et al.* 2020). Such financing can reduce the financial shock of disasters on a government's balance sheet and ensure that predictable, timely and cost-effective finance is available to respond to the emergency (World Bank 2021a). In the context of the COVID-19 pandemic, countries that had pre-arranged disaster finance in place were able to respond to the pandemic swiftly. For instance, in Sierra Leone, having learned from its response to the Ebola outbreak in 2013–2014, the government was able to adjust its national social safety net programme to rapidly reach vulnerable households with donor support in its response to the pandemic (Sandford *et al.* 2020).

Despite its importance, prior to 2020 many governments' fiscal and macrofinancial frameworks did not anticipate or prepare for systemic shocks like the COVID-19 pandemic (OECD 2020a). However, some governments are now taking steps to manage systemic shocks beyond pandemics, including climate shocks (World Bank 2021a). To build resilience to compound risks, the World Bank Adaptation Principles include the recommendation that countries build flexibility, redundancy or both into budgets to account for ongoing costs that the country will face (OECD and World Bank 2019). For example, the Bhutan governmental budget process includes financial allocations for natural disasters and climate change impact risks as part of a "fiscal risk

### **Box 6.5 Identifying adaptation measures that meet short- and long-term goals in Fiji**

Countries can increase the adaptive capacity of their recoveries by identifying fiscal stimulus priorities from within existing government resilience plans. For example, the World Bank identified interventions with the potential to reconcile the short-term economic and job creation needs of Fiji with longer-term climate change adaptation goals, by drawing on the country's existing Climate Vulnerability Assessment (CVA).

The CVA was produced in 2017 and proposed a list of 125 interventions that would be most effective in reducing the country's vulnerability to the impacts of climate change. In 2020, the World Bank screened each proposal against its Proposed Sustainability Checklist for Assessing Economic Recovery Interventions to narrow the list to 63 core

interventions that could enable Fiji to "build forward better". However, the country's government will likely be operating in a fiscally constrained environment, with the economy contracting by 15.7 per cent in 2020 and the total outstanding debt of the country expected to increase from 62.3 per cent of GDP at the end of 2020 to 91.6 per cent of GDP at the end of the 2022 financial year. The analysis suggested that, if pre-existing planning instruments are sufficiently robust, governments can apply more rigorous constraints and still identify interventions that deliver co-benefits. For example, even assessing proposals against a budget cut-off of 3 per cent of GDP and solely prioritizing short-term stimulus effects resulted in a list of 10 initiatives that could contribute to resilience, long-term economic development and decarbonization.

**Sources:** World Bank 2020a; Asian Development Bank 2021.

allocation matrix" (Hallegatte, Rentschler and Rozenberg 2020). Taking such an approach to risk within public finance frameworks could enhance a country's adaptive capacity by enabling it to manage risks in an integrated way.

**Developed economies could significantly increase direct grants, concessional finance with adaptation requirements and support for local capacity-building to help countries counter the economic pains of the COVID-19 pandemic and meet adaptation requirements.** As discussed above, highly climate-vulnerable nations require better access to concessional finance, alongside substantive debt relief in order to create the fiscal space necessary to invest in adaptive capacity (Dibley, Wetzer and Hepburn 2021; Kaiser et al. 2021). Some governments and international financial institutions have already contributed to such causes (UNEP 2020a), while others have pledged to do more in the face of the pandemic (World Bank and IMF 2020). In this respect, the increase in Special Drawing Rights (SDRs) by the IMF in August 2021 (equivalent to US\$ 650 billion) is historically significant in size (IMF 2021a). However, to meet the needs of vulnerable countries, the amount of finance provided will need to be substantially higher than current commitments (O'Callaghan and Murdock 2021; United Nations 2020).

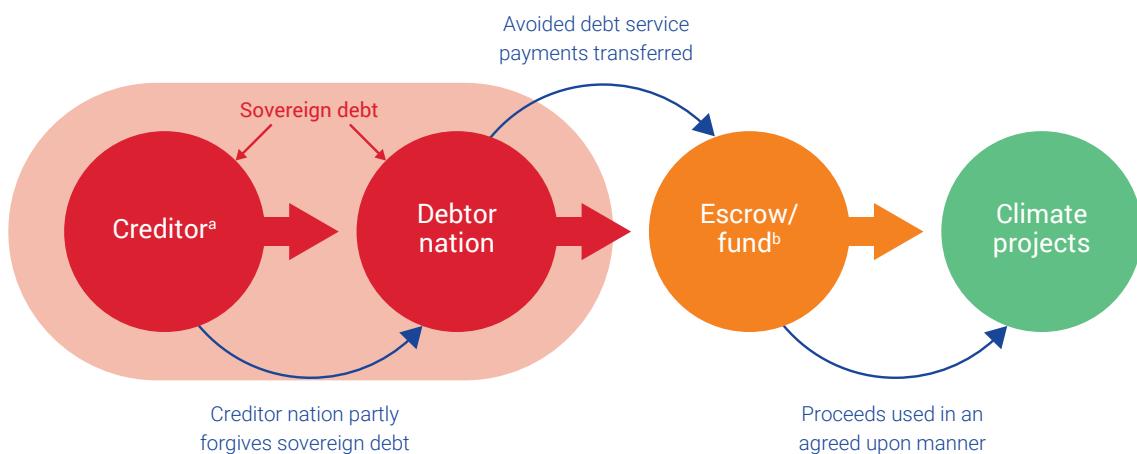
An ambitious and well-targeted package of support, with adaptation priorities, can support country-level adaptation capacity in a variety of ways, such as freeing up fiscal space for economically vulnerable countries, helping drive the recovery from the COVID-19 pandemic and ensuring the planned fiscal intervention promotes well-defined adaptation objectives (for example, UNEP 2021b). A strategy designed along these lines can take various forms, including debt relief, incentivizing greater private debt relief and private-sector investment in adaptation, or using promising debt relief mechanisms (see [box 6.6](#); chapter 4; Khan 2020; Singh and Widge 2021; Volz et al. 2021).

In addition to providing support in the form of finance, governments and donors should help fund and support capacity-building for compound risk management. This could include assisting government treasuries to better evaluate climate physical and transition risks, including considering how to manage such risks in the context of the pandemic and other compounding events. Such support could also help to develop local research capabilities in this area.

### Box 6.6 Debt-for-climate swaps: a promising debt relief mechanism

Debt-for-climate (DFC) swaps have been identified as a promising debt relief instrument to generate fiscal space for countries to allow green and resilient investment as part of the recovery from COVID-19. DFC swaps involve a debtor nation committing to greater climate ambition, funding or both for domestic climate activities, on terms agreed with the creditor instead of continuing to make external debt servicing payments. The types of climate actions suitable for a debtor nation depend on the specific circumstances of individual countries, including their level of vulnerability to climate change. The generic structure of a DFC swap agreement is shown in figure 6.3 below.

**Figure 6.3** Generic structure of a DFC swap at the country level



<sup>a</sup> Creditor is likely to be another nation State, but private sector creditors are also encouraged to participate in a DFC swap.

<sup>b</sup> An “escrow” is a legal vehicle in which funds are held in trust – usually by a third party – and can only be released once specific conditions are met. These funds should be sufficiently transparent so the public is able to determine to where funds have been dispersed. In this example, funds might be held in an escrow/fund until a government has taken preliminary steps to implement a climate project or once the project has achieved reductions in risk or vulnerability.

**Source:** Singh and Widge (2021).

DFCs have three primary benefits: increased climate spending, while avoiding debt servicing payments dedicated to climate-positive activities; boosting economic recovery, with direct investment that stimulates private investment and assists economic recovery; and reduced external country debt.

DFC swaps are particularly suited to countries with high levels of bilateral public external debt with other countries and are currently not captured by the G20 Debt Service Suspension Initiative. This primarily means middle-income and some low-income countries.

**Sources:** Singh and Widge (2021); Volz et al. (2021).

## References

### Chapter 6

- Adian, I., Doumbia, D., Gregory, N., Ragoussis, A., Reddy, A. and Timmis J. (2020). *Small and Medium Enterprises in the Pandemic Impact, Responses and the Role of Development Finance*. World Bank. <http://hdl.handle.net/10986/34552>.
- Asian Development Bank (2020). *Accelerating Climate and Disaster Resilience and Low-Carbon Development through the COVID-19 Recovery*. <https://doi.org/10.22617/TCS200295-2>.
- (2021). Asian Development Outlook 2021 Update: Transforming Agriculture in Asia. <https://dx.doi.org/10.22617/FLS210352-3>.
- Batini, N., di Serio, M., Fragetta, M., Melina, G. and Waldron, A. (2021). *Building Back Better: How Big Are Green Spending Multipliers?* International Monetary Fund. [www.imf.org/en/Publications/WP/Issues/2021/03/19/Building-Back-Better-How-Big-Are-Green-Spending-Multipliers-50264](http://www.imf.org/en/Publications/WP/Issues/2021/03/19/Building-Back-Better-How-Big-Are-Green-Spending-Multipliers-50264).
- Caldwell, M. and Alayza, N. (2021). *A Review of Climate Finance Needs and Availability in Developing Countries*. World Resources Institute.
- Carlson, C.J., Albery, G.F., Merow, C., Trisos, C.H., Zipfel, C.M., Eskew, E.A. et al. (2020). Climate change will drive novel cross-species viral transmission. Preprint paper uploaded to bioRxiv. [www.biorxiv.org/content/10.1101/2020.01.24.918755v1.full.pdf](http://www.biorxiv.org/content/10.1101/2020.01.24.918755v1.full.pdf).
- Christine, M., Besart, A.A., Cirera, A.X., Cruz, M., Davies, E., Grover, A. et al. (2020). *Unmasking the Impact of COVID-19 on Businesses Firm Level Evidence from Across the World*. World Bank. <http://hdl.handle.net/10986/34626>.
- Climate Policy Initiative (2020). *Updated View on the Global Landscape of Climate Finance 2019*. [www.climatepolicyinitiative.org/publication/updated-view-on-the-global-landscape-of-climate-finance-2019/](http://www.climatepolicyinitiative.org/publication/updated-view-on-the-global-landscape-of-climate-finance-2019/).
- Cole, M.A., Ozgen, C. and Strobl, E. (2020). *Air Pollution Exposure and COVID-19*. [www.iza.org/publications/dp/13367/air-pollution-exposure-and-covid-19](http://www.iza.org/publications/dp/13367/air-pollution-exposure-and-covid-19).
- Cornish, L. (2021). Who's funding the COVID-19 response and what are the priorities? Devex. [www.devex.com/news/interactive-who-s-funding-the-covid-19-response-and-what-are-the-priorities-96833](http://www.devex.com/news/interactive-who-s-funding-the-covid-19-response-and-what-are-the-priorities-96833).
- Dasgupta, P. (2021), *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury. [www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review](http://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review).
- Desvars-Larrive, A., Dervic, E., Haug, N., Niederkrotenthaler, T., Chen, J., di Natale, A. et al. (2020). A structured open dataset of government interventions in response to COVID-19. *Scientific Data* 7(1), 1–9. <https://doi.org/10.1038/s41597-020-00609-9>.
- Dibley, A., Wetzer, T., and Hepburn, C. (2021). National COVID debts: climate change imperils countries' ability to repay. *Nature*. <https://doi.org/10.1038/d41586-021-00871-w>.
- Dodds, K., Broto, V.C., Dettberbeck, K., Jones, M., Mamadou, V., Ramutsindela, M. et al. (2020). The COVID-19 pandemic: territorial, political and governance dimensions of the crisis. *Territory, Politics, Governance* 8(3), 289–298. <https://doi.org/10.1080/21622671.2020.1771022>.
- European Bank for Reconstruction and Development (coord.) (2021). *2020 Joint Report on Multilateral Development Banks' Climate Finance*. [www.ebrd.com/news/2021/MDBs-climate-finance-rose-to-us-66-billion-in-2020-joint-report-shows.html](http://www.ebrd.com/news/2021/MDBs-climate-finance-rose-to-us-66-billion-in-2020-joint-report-shows.html).
- Everard, M., Johnston, P., Santillo, D. and Staddon, C. (2020). The role of ecosystems in mitigation and management of Covid-19 and other zoonoses. *Environmental Science and Policy* 111, 7–17. <https://doi.org/10.1016/j.envsci.2020.05.017>.
- Forster, P.M., Forster, H.I., Evans, M.J., Gidden, M.J., Jones, C.D., Keller, C.A. et al. Current and future global climate impacts resulting from COVID-19. *Nature Climate Change*. <https://doi.org/10.1038/s41558-020-0883-0>.
- G7 (2021a). *G7 Climate and Environment Ministers' Communiqué*. [www.g7uk.org/g7-climate-and-environment-ministers-communique/](http://www.g7uk.org/g7-climate-and-environment-ministers-communique/).
- (2021b). *Our Shared Agenda for Global Action to Build Back Better*. [www.consilium.europa.eu/en/press/press-releases/2021/06/13/2021-g7-leaders-communiqué/](http://www.consilium.europa.eu/en/press/press-releases/2021/06/13/2021-g7-leaders-communiqué/).
- G20 (2021). *Joint G20 Energy-Climate Ministerial Communiqué*. [www.g20.org/wp-content/uploads/2021/07/2021\\_G20-Energy-Climate-Joint-Ministerial-Communiqué.pdf](http://www.g20.org/wp-content/uploads/2021/07/2021_G20-Energy-Climate-Joint-Ministerial-Communiqué.pdf).
- Global Center on Adaptation (2019). *Adapt Now: A Global Call for Leadership on Climate Resilience*. [https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/](http://www.gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/).
- (2021). *Adaptation Finance in the Context of Covid-19. The Role of Development Finance in Promoting a Resilient Recovery*. [https://gca.org/wp-content/uploads/2021/01/GCA-Adaption-in-Finance-Report.pdf](http://www.gca.org/wp-content/uploads/2021/01/GCA-Adaption-in-Finance-Report.pdf).
- Gunia, A. (2020). Tiny Vanuatu Keeps Borders Closed After Cyclone Harold to Stay Coronavirus-Free. *Time*, 17 April. [https://time.com/5820382/coronavirus-cyclone-harold-vanuatu/](http://time.com/5820382/coronavirus-cyclone-harold-vanuatu/).
- Hallegatte, S., Fay, M. and Barbier, E.B. (2018). Poverty and climate change: introduction. *Environment and Development Economics* 23(3), 217–233. <https://doi.org/10.1017/S1355770X18000141>.

- Hallegatte, S., Rentschler, J. and Rozenberg, J. (2020). *The Adaptation Principles: A Guide for Designing Strategies for Climate Change Adaptation and Resilience*. World Bank. <http://hdl.handle.net/10986/34780>.
- Hammill, A. (2020). Resilient Recovery: Using climate adaptation plans to build back better. International Institute for Sustainable Development, 5 May. [www.iisd.org/articles/climate-adaptation-stimulus](http://www.iisd.org/articles/climate-adaptation-stimulus).
- Intergovernmental Panel on Climate Change (2012). *Special Report of the Intergovernmental Panel on Climate Change: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Field, C.B. et al. (eds.). Cambridge University Press. [www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/](http://www.ipcc.ch/report/managing-the-risks-of-extreme-events-and-disasters-to-advance-climate-change-adaptation/).
- (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC. [www.ipcc.ch/report/ar5/syr/](http://www.ipcc.ch/report/ar5/syr/).
- (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Masson-Delmotte, V. et al. (eds.). Cambridge University Press. In Press. [www.ipcc.ch/report/sixth-assessment-report-working-group-i/](http://www.ipcc.ch/report/sixth-assessment-report-working-group-i/).
- International Monetary Fund (2019). *Macroeconomic Developments and Prospects in Low-Income Developing Countries 2019*. Policy Paper No. 19/039. [www.imf.org/en/Publications/Policy-Papers/Issues/2019/12/11/Macroeconomic-Developments-and-Prospects-in-Low-Income-Developing-Countries-2019-48872](http://www.imf.org/en/Publications/Policy-Papers/Issues/2019/12/11/Macroeconomic-Developments-and-Prospects-in-Low-Income-Developing-Countries-2019-48872).
- (2021a). *IMF Governors Approve a Historic US\$650 Billion SDR Allocation of Special Drawing Rights*. Press Release No. 21/235, 2 August. [www.imf.org/en/News/Articles/2021/07/30/pr21235-imf-governors-approve-a-historic-us-650-billion-sdr-allocation-of-special-drawing-rights](http://www.imf.org/en/News/Articles/2021/07/30/pr21235-imf-governors-approve-a-historic-us-650-billion-sdr-allocation-of-special-drawing-rights).
- (2021b). *Fiscal Monitor April 2021*. [www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021](http://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021).
- (2021c). *World Economic Outlook: Managing Divergent Recoveries*. [www.imf.org/en/Publications/WEO/Issues/2021/03/23/world-economic-outlook-april-2021](http://www.imf.org/en/Publications/WEO/Issues/2021/03/23/world-economic-outlook-april-2021).
- Kaiser, J., Hampel, V., Vesprémi, M., Pfliegner, K., Smith, J., Sims, H. et al. (2021). *Climate change, Debt and COVID-19: Analysing the Triple Crisis with a New Climate Disaster and Debt Risk Indicator and Building Forward for a Resilient Recovery, Based on Climate Justice*. Berlin: Brot für die Welt. [www.brot-fuer-die-welt.de/fileadmin/mediapool/downloads/fachpublikationen/analyse/Analyse\\_102\\_English.pdf](http://www.brot-fuer-die-welt.de/fileadmin/mediapool/downloads/fachpublikationen/analyse/Analyse_102_English.pdf).
- Khan, M. (2020). *Debt-for-Adaptation Swap – Investment in Adaptation and Resilience*. Heinrich Böll Foundation, Center for Sustainable Finance (SOAS, University of London) and Global Development Policy Center (Boston University) as Background Paper #3 to the Debt Relief for Green and Inclusive Recovery Project. <https://drgr.org/background-paper-3/>.
- Klusak, P., Agarwala, M., Burke, M., Kraemer, M. and Mohaddes, K. (2021). *Rising Temperatures, Falling Ratings: The Effect of Climate Change on Sovereign Creditworthiness*. Cambridge Working Papers in Economics, 2127. <https://ideas.repec.org/p/cam/camdae/2127.html>.
- Krishnan, N. and Brandon, C. (2021). *Are COVID Stimulus Packages Building Resilience? An Analysis of 66 Countries*. Washington, D.C.: World Resources Institute.
- Kruczkiewicz, A., Klopp, J., Fisher, J., Mason, S., McClain F.S., Sheekh, N.M. et al. (2021). Compound risks and complex emergencies require new approaches to preparedness. *Proceedings of the National Academy of Sciences* 118(19), e2106795118. <https://doi.org/10.1073/pnas.2106795118>.
- Liu, Y., Garrido, J. and Delong, C. (2020). *Private Debt Resolution Measures in the Wake of the Pandemic, IMF COVID-19 Special Series*. International Monetary Fund. [www.imf.org/-/media/Files/Publications/covid19-special-notes/en-special-series-on-covid-19-private-debt-resolution-measures-in-the-wake-of-the-pandemic.ashx](http://www.imf.org/-/media/Files/Publications/covid19-special-notes/en-special-series-on-covid-19-private-debt-resolution-measures-in-the-wake-of-the-pandemic.ashx).
- Mahul, O. and Signer, B. (2020). The Perfect Storm: How to Prepare against Climate Risk and Disaster Shocks in the Time of COVID-19. *One Earth* 2(6), 500–502. <https://doi.org/10.1016/j.oneear.2020.05.023>.
- McKinley, E., Crowe, P.R., Stori, F., Ballinger, R., Brew, T.C., Blacklaw-Jones, L. et al. (2021). ‘Going digital’ - Lessons for future coastal community engagement and climate change adaptation. *Ocean and Coastal Management* 208, 105629. <https://doi.org/10.1016/j.ocecoaman.2021.105629>.
- Monasterolo, I. and Volz, U. (2020). Addressing Climate-Related Financial Risks and Overcoming Barriers to Scaling-up Sustainable Investment. G20 Insights. [www.g20-insights.org/policy\\_briefs/addressing-climate-related-financial-risks-and-overcoming-barriers-to-scaling-up-sustainable-investment/](http://www.g20-insights.org/policy_briefs/addressing-climate-related-financial-risks-and-overcoming-barriers-to-scaling-up-sustainable-investment/).
- Mortimer, G., Whelan, B. and Lee, C. (2020). *Emerging approaches to solve the climate adaptation finance gap*. Climate-KIC Australia. [https://climate-kic.org.au/wp-content/uploads/2020/11/Adaptation-Finance\\_300ppi.pdf](https://climate-kic.org.au/wp-content/uploads/2020/11/Adaptation-Finance_300ppi.pdf).
- National Adaptation Plan Global Network (2021). *How COVID-19 Is Reinforcing the Need for Climate Adaptation in Vulnerable Countries*. [www.napglobalnetwork.org/stories/how-covid-19-is-reinforcing-the-need-for-climate-adaptation-in-vulnerable-countries/](http://www.napglobalnetwork.org/stories/how-covid-19-is-reinforcing-the-need-for-climate-adaptation-in-vulnerable-countries/).
- O’Callaghan, B.J. and Murdock, E. (2021). *Are We Building Back Better? Evidence from 2020 and Pathways for Inclusive Green Recovery Spending*. United Nations Environment Programme. [www.unep.org/resources/publication/are-we-building-back-better-evidence-2020-and-pathways-inclusive-green](http://www.unep.org/resources/publication/are-we-building-back-better-evidence-2020-and-pathways-inclusive-green).
- O’Callaghan, B., Yau, N., Murdock, E., Tritsch, D., Janz, A., Blackwood, A. et al. (2021). Global Recovery Observatory. Oxford University Economic Recovery Project. <https://recovery.smithsschool.ox.ac.uk/tracking/>.

- Organisation for Economic Co-operation and Development (2020a). *A systemic resilience approach to dealing with Covid-19 and future shocks*. Paris. [www.oecd.org/coronavirus/policy-responses/a-systemic-resilience-approach-to-dealing-with-covid-19-and-future-shocks-36a5bdfb/](http://www.oecd.org/coronavirus/policy-responses/a-systemic-resilience-approach-to-dealing-with-covid-19-and-future-shocks-36a5bdfb/).
- (2020b). *Building Back Better: A Sustainable, Resilient Recovery after COVID-19*. Paris. [www.oecd.org/coronavirus/policy-responses/building-back-better-a-sustainable-resilient-recovery-after-covid-19-52b869f5/](http://www.oecd.org/coronavirus/policy-responses/building-back-better-a-sustainable-resilient-recovery-after-covid-19-52b869f5/).
- (2020c). *Global Outlook on Financing for Sustainable Development 2021*. Paris. <https://doi.org/10.1787/e3c30a9a-en>.
- (2020d). *The impact of the coronavirus (COVID-19) crisis on development finance*. Paris. [www.oecd.org/coronavirus/policy-responses/the-impact-of-the-coronavirus-covid-19-crisis-on-development-finance-9de00b3b/](http://www.oecd.org/coronavirus/policy-responses/the-impact-of-the-coronavirus-covid-19-crisis-on-development-finance-9de00b3b/).
- (2021). COVID-19 spending helped to lift foreign aid to an all-time high in 2020. Paris. <https://www.oecd.org/dac-financing-sustainable-development/development-finance-data/ODA-2020-detailed-summary.pdf>.
- Organisation for Economic Co-operation and Development and World Bank (2019). *Fiscal Resilience to Natural Disasters: Lessons from Country Experiences*. Paris. <https://doi.org/10.1787/27a4198a-en>.
- Patel, J.A., Nielsen, F.B.H., Badiani, A.A., Assi, S., Unadkat, V.A., Patel, B. et al. (2020). Poverty, inequality and COVID-19: the forgotten vulnerable. *Public Health* 183, 110. <https://doi.org/10.1016/J.PUHE.2020.05.006>.
- Pescaroli, G. and Alexander, D. (2018). Understanding Compound, Interconnected, Interacting, and Cascading Risks: A Holistic Framework. *Risk Analysis*, 38(11), 2245–2257. <https://doi.org/10.1111/RISA.13128>.
- Phillips, C.A., Caldas, A., Cleetus, R., Dahl, K.A., Declet-Barreto, J., Licker, R. et al. (2020). Compound climate risks in the COVID-19 pandemic. *Nature Climate Change* 10, 586–588. <https://doi.org/10.1038/s41558-020-0804-2>.
- Quevedo, A., Peters, K. and Cao, Y. (2020). *The impact of Covid-19 on climate change and disaster resilience funding Trends and signals*. ODI and Flood Resilience Alliance Briefing Note. <https://odi.org/en/publications/the-impact-of-covid-19-on-climate-change-and-disaster-resilience-funding-trends-and-signals/>.
- le Quéré, C., Jackson, R.B., Jones, M.W., Smith, A.J.P., Abernethy, S., Andrew, R.M. et al. (2020). Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19 forced confinement. *Nature Climate Change* 10, 647–653. <https://doi.org/10.1038/s41558-020-0797-x>.
- Ranger, N., Mahul, O., and Monasterolo, I. (2021). *Managing the financial risks of climate change and pandemics: What we know (and don't know)*. *One Earth*, 4(10), 1375–1385. <https://doi.org/10.1016/j.oneear.2021.09.017>.
- Sandford, J., Rajput, S., Coll-Black, S. and Kargbo, A. (2020). *Safety nets, health crises and natural disasters: Lessons from Sierra Leone*. Discussion Paper No. 2010. Washington, D.C.: International Bank for Reconstruction and Development and World Bank. <http://hdl.handle.net/10986/34952>.
- Shan, Y., Ou, J., Wang, D., Zeng, Z., Zhang, S., Guan, D. et al. (2020). Impacts of COVID-19 and fiscal stimuli on global emissions and the Paris Agreement. *Nature Climate Change* 11, 200–206. <https://doi.org/10.1038/s41558-020-00977-5>.
- Simpson, N.P., Mach, K.J., Constable, A., Hess, J., Hogarth, R., Howden, M. et al. (2021). A framework for complex climate change risk assessment. *One Earth* 4(4), 489–501. <https://doi.org/10.1016/j.oneear.2021.03.005>.
- Singh, D. and Widge, V. (2021). *Debt for Climate Swaps Supporting a sustainable recovery*. Climate Policy Initiative. [www.climatepolicyinitiative.org/publication/debt-for-climate-swaps/](http://www.climatepolicyinitiative.org/publication/debt-for-climate-swaps/).
- Thomas, K., Hardy, R.D., Lazarus, H., Mendez, M., Orlove, B., Rivera-Collazo, I. et al. (2019). Explaining differential vulnerability to climate change: A social science review. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), e565. <https://doi.org/10.1002/WCC.565>.
- United Nations (2020). *Pandemic Recovery Assistance, Debt Relief Vital to Keeping Developing Countries' Economies Afloat, Speakers Stress as General Assembly Continues Annual Debate*. Meetings Coverage and Press Releases, 23 September. [www.un.org/press/en/2020/ga12269.doc.htm](http://www.un.org/press/en/2020/ga12269.doc.htm).
- United Nations Environment Programme (2018). *Adaptation Gap Report 2018*. Nairobi. [www.unenvironment.org/resources/adaptation-gap-report](http://www.unenvironment.org/resources/adaptation-gap-report).
- (2020a). *The Post-COVID-19 Recovery: How to Articulate Integrated Responses to the Health, Economic and Climate Crises in Latin America & the Caribbean*. Policy Brief. [https://wedocs.unep.org/bitstream/handle/20.500.11822/32673/COVID19\\_CLIMATE\\_EN.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/32673/COVID19_CLIMATE_EN.pdf?sequence=1&isAllowed=y).
- (2020b). 'COVID-19 is a wake-up call': Ghana to develop national plan for climate adaptation. 2 July. [www.unep.org/news-and-stories/press-release/covid-19-wake-call-ghana-develop-national-plan-climate-adaptation](http://www.unep.org/news-and-stories/press-release/covid-19-wake-call-ghana-develop-national-plan-climate-adaptation).
- (2020c). *National Adaptation Planning (NAP) process offer to support national post-COVID19 recovery efforts*. Nairobi. [https://unfccc.int/sites/default/files/resource/UNEPUpdateUNFCCCNAPTechnicalWorkingGroup.pdf](http://unfccc.int/sites/default/files/resource/UNEPUpdateUNFCCCNAPTechnicalWorkingGroup.pdf).
- (2020d). *The Emissions Gap Report 2020*. Nairobi. [www.unep.org/emissions-gap-report-2020](http://www.unep.org/emissions-gap-report-2020).
- (2021). *Adaptation Gap Report 2020*. Nairobi. [www.unep.org/resources/adaptation-gap-report-2020](http://www.unep.org/resources/adaptation-gap-report-2020).
- United Nations Environment Programme, African Ministerial Conference on the Environment and the African Union (2020). *Report of the ministerial meeting: Eighth special session of the African Ministerial Conference on the Environment*. 9 December. AMCEN/SS.VIII/6. [www.unep.org/events/conference/eighth-special-session-african-ministerial-conference-environment](http://www.unep.org/events/conference/eighth-special-session-african-ministerial-conference-environment).
- United Nations Environment Programme and International Livestock Research Institute (2020). *Preventing the Next Pandemic: Zoonotic diseases and how to break the chain of transmission*. Nairobi. [www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and](http://www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and).

- United Nations Framework Convention on Climate Change (2021). *National Adaptation Plans 2020: Progress in the Formation and Implementation of NAPs*. Bonn. <https://unfccc.int/sites/default/files/resource/NAP-progress-publication-2020.pdf>.
- United States Government Accountability Office (2020). *COVID 19: FEMA's Role in the Response and Related Challenges*. [www.gao.gov/products/gao-20-685](http://www.gao.gov/products/gao-20-685).
- Vivid Economics (2021a). *Greenness of Stimulus Index*. Fifth edition.
- (2021b). *Greenness of Stimulus Index*. Sixth edition.
- Volz, U., Akhtar, S., Gallagher, K.P., Griffith-Jones, S., Haas, J. and Kraemer, M. (2021). *Debt Relief for a Green and Inclusive Recovery: Securing Private-Sector Participation and Creating Policy Space for Sustainable Development*. Berlin: Heinrich-Böll-Stiftung; London: Center for Sustainable Finance; and Boston, M.A.: Global Development Policy Center. [www.boell.de/sites/default/files/2021-06/DRGR%20Report%202021%20Endf.pdf](http://www.boell.de/sites/default/files/2021-06/DRGR%20Report%202021%20Endf.pdf).
- Wahba, S., Simpson, A., Garcia, A.C., and Toro, J. (2020). Preparedness can pay off quickly: Disaster financing and COVID-19. *World Bank*, 7 April. <https://blogs.worldbank.org/sustainablecities/preparedness-can-pay-quickly-disaster-financing-and-covid-19>.
- World Bank (2013). World Development Report 2014. <https://doi.org/10.1596/978-0-8213-9903-3>.
- (2020a). *How to Build Back Better After the COVID-19 Crisis? A Practical Approach Applied to Fiji*. [www.worldbank.org/en/news/immersive-story/2020/09/17/how-to-build-back-better-after-the-covid-19-crisis-a-practical-approach-applied-to-fiji](http://www.worldbank.org/en/news/immersive-story/2020/09/17/how-to-build-back-better-after-the-covid-19-crisis-a-practical-approach-applied-to-fiji).
- (2020b). *Proposed Sustainability Checklist for Assessing Economic Recovery Interventions*. <https://thedocs.worldbank.org/en/doc/223671586803837686-0020022020/original/SustainabilityChecklistforAssessingEconomicRecoveryInvestmentsApril2020.pdf>.
- (2021a). *Strengthening Indonesia's Fiscal Resilience to Natural Disasters and Health-Related Shocks*. 21 January. [www.worldbank.org/en/news/press-release/2021/01/21/strengthening-indonesias-fiscal-resilience-to-natural-disasters-and-health-related-shocks](http://www.worldbank.org/en/news/press-release/2021/01/21/strengthening-indonesias-fiscal-resilience-to-natural-disasters-and-health-related-shocks).
- (2021b). *Updated estimates of the impact of COVID-19 on global poverty: Turning the corner on the pandemic in 2021?* 24 June. <https://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty-turning-corner-pandemic-2021>.
- World Bank and International Monetary Fund (2020). *World Bank/IMF Annual Meetings 2020: Development Committee Communiqué*. 16 October. [www.worldbank.org/en/news/press-release/2020/10/16/world-bankimf-annual-meetings-2020-development-committee-communique](http://www.worldbank.org/en/news/press-release/2020/10/16/world-bankimf-annual-meetings-2020-development-committee-communique).
- World Health Organization (2021). *Review of Health in National Adaptation Plans*. [www.who.int/publications/i/item/review-of-health-in-national-adaptation-plans](http://www.who.int/publications/i/item/review-of-health-in-national-adaptation-plans).
- World Meteorological Organization (2020). *Tropical Cyclone Harold challenges disaster and public health management*. 14 April. <https://public.wmo.int/en/media/news/tropical-cyclone-harold-challenges-disaster-and-public-health-management>.
- Zscheischler, J., Martius, O., Westra, S., Bevacqua, E., Raymond, C., Horton, R.M. et al. (2020). A typology of compound weather and climate events. *Nature Reviews Earth and Environment* 1, 333–347. <https://doi.org/10.1038/s43017-020-0060-z>.