

— KEYS TO —
CLIMATE
ACTION

How Developing Countries
Could Drive Global Success
and Local Prosperity



Amar Bhattacharya, Homi Kharas,
and John W. McArthur
Editors

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ONE

Introduction

The Role of Developing Countries in Driving Global Success and Local Prosperity

Amar Bhattacharya, Homi Kharas, and John W. McArthur

Introduction

From the dais in Sharm el-Sheikh, Egypt, Prime Minister Mia Mottley of Barbados posed a simple question to world leaders: “How many more countries must falter?” Drawing attention to the profound and intensifying interconnections between climate change and economic development for billions of people around the world, the eminent global voice called for urgent action, “What will you do? What will you choose to save?”

This scene unfolded on November 7, 2022, at the 27th gathering of the Conference of Parties (COP27) for the United Nations Framework Convention on Climate Change (UNFCCC). Dubbed the “implementation COP,” the Egyptian hosts sought to put human needs at the heart of the global climate conversation, with special emphasis on the views of people living in developing countries, especially in Africa. By the time the COP negotiations concluded nearly two weeks later, it had become ever clearer that future global climate talks will falter unless they elevate developing country perspectives. Issues of “loss and damage” dominated the COP27 summary headlines but represent only one of the many complexities developing countries are confronting in advancing their own climate and development priorities.

There are many compelling reasons to focus on developing countries when considering the global climate challenge. To begin, there is a moral imperative to address the needs of vulnerable people who have done the least to cause a problem but face the greatest consequences. While people everywhere are affected by

the droughts, floods, storms, sea level rise, fires, and heat waves associated with climate change, the effects are most acute among countries located in the tropics (World Meteorological Organization [WMO], 2022). Due to factors of history and geography, the tropics are also home to most developing countries, where billions of people with limited economic means are confronting the most severe daily consequences of the world's changing climate. An emphasis on justice needs to permeate climate action.

There is a strategic imperative too. Emerging markets and developing economies (henceforth “EMDEs” in this chapter), even when excluding China, will account for the majority of the world's annual greenhouse gas (GHG) emissions by 2040.¹ Simply put, without the full buy-in and contributory alignment of EMDEs, the world cannot achieve its foremost climate goals—as articulated in the seminal 2015 Paris Agreement and the 2021 Glasgow Climate Pact, and most recently updated in the 2022 Sharm el-Sheikh Implementation Plan.

There is also a conceptual imperative. The practicalities of economic policy and climate policy have become deeply interwoven within EMDEs, and hence for the entire world. The physical forces of climate change are having profound influence on the economic forces of growth and development, and vice versa. Channeling these dynamics toward successful climate and economic outcomes frames a linchpin of global sustainable development (Lankes et al., 2022).

The upshot is that EMDEs' economic and climate success is pivotal to the world's climate success. But EMDEs will only succeed if the world updates its approaches to supporting EMDE concerns. A critical factor, particularly from the perspective of developing countries, is the volume, cost, and structure of international finance. Absent much greater flows of climate-related development financing to EMDEs, the world will fall short on its climate goals.

Financing needs to be seen as part of the overall policy agenda. The immediate priority is to start with the further elevation of developing country perspectives on what they need to do to address development and climate challenges within their own economies. In this spirit, this volume brings together a cross section of distinguished academics and leading policy voices from a variety of developing country geographies and contexts. The authors of the 10 country and regional case studies are each engaged in the debates around climate change and development in their own countries, although they do not represent official views. They were invited to describe the challenges to and opportunities for “green transition” reforms. One of the first collective insights was the need to

1. Based on calculations by World Data Lab (2022).

avoid blanket terms like green transition, which is unhelpful in contexts where it connotes, due to past debates, environmental action at the expense of economic prosperity.

Despite the diversity across developing countries on basics of livelihoods, food, health, education, energy access, jobs, physical security, inequality across many dimensions, nature conservation, and climate vulnerability, there are commonalities: growing evidence of the devastating impact of climate change; the narrowing window of opportunity for global, national, and local course corrections; and the emergence of climate justice as a central principle guiding new policy action. The report of the Independent High-Level Expert Group on Climate Finance, launched at COP27, dubs the interconnected issues “the growth story of the 21st century: sustainable, resilient, and inclusive” (Songwe et al., 2022).

This introduction presents a new narrative for understanding the interwoven nature of the world’s climate and economic development challenges, anchored in the evolving and diverse perspectives of developing countries themselves. It is a story of climate change’s devastating consequences already hindering economic development around the world. It is a framing that underscores the need for urgent investments in adaptation, resilience, and nature (including ecosystems and biodiversity) to avoid development setbacks, while paying heed to the world’s narrow window for climate action. It requires empathy for many developing countries’ profound energy conundrum: a tension between the need to expand access for people who need it most while facing pressures to pursue low-carbon opportunities, often in the face of local political and financing headwinds. It implies practical urgency in tackling the broken threads of the international financing system for climate and development. It calls for elevating developing countries’ own views in framing and advancing a common global vision for action.

The Already Devastating Impacts of Climate Change and Nature Loss

The integration of climate action with economic development amounts to nothing less than a paradigm shift. Not long ago, economic concerns about human-induced climate change were typically discussed as a problem of the far-off future. A growing range of near-term impacts have helped change perceptions. The World Meteorological Organization reports that, in 2020 and 2021 alone, more than 30 developing countries experienced extreme climate events—including extreme heat and wildfires, floods, drought, and storms—that have caused significant numbers of deaths and major property damage

(WMO, 2022).² As a series of reports by Intergovernmental Panel on Climate Change (IPCC) have shown (e.g., IPCC, 2014, 2018, 2022), climate change is increasingly seen as a major “present cost” question, with the multidimensional costs ranging from depleted physical assets to slowed economic growth to major health, hunger, and livelihood consequences for millions of people at a time, including the growing risks of climate-induced migrants and refugees. Climate impacts are experienced unequally, often heightening inequalities for women and girls, particularly in developing countries where pre-existing responsibility for care and unpaid work has been compounded by climate-related health shocks and crop failures that jeopardize food security and livelihoods (Alam et al., 2015; U.N. Women, 2022). At a microeconomic level, fossil-fuel use has also been linked to problems like higher respiratory illnesses and education setbacks.³

One need not agonize over technical debates on discount rates for protecting one’s grandchildren if a more immediate priority is to confront economic development slowdowns and reversals already triggered. The least developed countries are carrying a particularly outsized burden (Sarr, 2022). Recent research by Callahan and Mankin (2022) on disaggregated within-country trends finds substantial estimated annual economic losses across income levels due to extreme heat episodes caused by humans. But the greatest consequences are estimated to occur in the regions with the lowest incomes, with the lowest decile losing an estimated 6.7 percent of gross domestic product (GDP) per capita per year.

Small island countries in the tropics are at the forefront of feeling the impacts of climate change and hence of the need to adapt and build greater resilience in the economy. For a significant number of these countries, climate change is already an existential threat, and a single extreme climate event can be devastating. For example, Hurricane Irma destroyed or severely damaged more than 80 percent of buildings on Barbuda in 2017; Hurricane Matthew wiped out around 20 percent of Haiti’s GDP in 2016. An IMF study suggests that, in the Caribbean, the annual damage from storms on the capital stock has amounted to an average of 5.7 percent of GDP (Mejia, 2016). By another estimate, 50 percent of the debt stock of Caribbean countries can be attributed to the

2. The WMO report includes extreme heat and wildfires in Algeria, Georgia, Lebanon, Libya, Morocco, Tunisia, and Turkey; floods in Afghanistan, Burundi, Malaysia, Mali, Niger, Pakistan, Sudan, and Turkey; drought in Afghanistan, Argentina, Brazil, Ethiopia, Iran, Kenya, Madagascar, Pakistan, Paraguay, Somalia, and Uruguay; and storms in Dominican Republic, Haiti, India, Jamaica, Mexico, Philippines, Timor-Leste, Venezuela, and Vietnam.

3. See for example, evidence discussed by Archibong and Osafo-Kwaako in Chapter 6 of this volume.

reconstruction needs after storms over the last two decades (and the compound interest paid thereon) (Living on Earth, 2022).

Concern about the present costs of climate change amplifies awareness of the scope for future costs, which are only likely to grow. For example, a report by S&P Global estimates that, as of 2020, more than 10 percent of South Asia's GDP was already at risk to climate hazards, and this could grow to as much as 15–18 percent by 2050, depending on global emissions trajectories (Munday et al., 2022). The same study finds that Central Asia, the Middle East and North Africa, and sub-Saharan Africa are especially susceptible to heat waves and drought, while East Asian and Pacific countries, along with the Caribbean and Central American countries, are particularly exposed to storms and floods. Low- and lower-middle-income countries are likely to experience more than threefold the losses as a share of GDP compared to upper-middle- and high-income countries. In other words, the burdens are likely to be greatest among the people who can least afford them. Other assessments by Chapagain et al. (2020) and Markandaya and Gonzalez-Eguino (2019) suggest that loss and damage in developing countries could add up to \$200–400 billion of required financing per year.

Developing countries are also home to many of the most important frontlines in protecting biodiversity and natural capital. From a global perspective, the loss of natural capital in developing countries is of outsized consequence, since these are the same regions where global biodiversity is most concentrated—most notably in the large tropical rainforests of the Amazon, the Congo River basin, and the Papua Indonesia rainforest. Some 1.6 billion people draw their income, food, shelter, and energy from these and other forests (United Nations, 2021). In the context of climate change, forests also provide many of the world's largest carbon sinks, absorbing GHGs from the atmosphere. The disappearance and degradation of forests being converted to agricultural land is a major problem, both for local communities who depend on sustainable forests and for the spillover effects on the rest of the world—including the alarming rate of species loss and risks of catastrophic loss to biodiversity (CBD Secretariat, 2020; IPBES, 2019; Swiss Re, 2022).

A similar story is embedded in declining sustainability of the oceans, marred by overfishing, warming ocean temperatures, threatened coral reefs, ocean acidification, and eutrophication of coastal environments. As of January 2023, only 2.4 percent of the ocean is fully or highly protected (Marine Conservation Institute, 2023). Threats to fisheries are already putting a strain on local economies. The risk of ocean biodiversity collapse raises much larger scale questions of economic cost. These are some of the reasons why the World Economic Forum (2023) lists biodiversity loss and ecosystem collapse as one of the top four

long-term risks to the global economy and why developing countries played an outsized role in the Global Ocean Commission.⁴

The Global Carbon Budget: A Narrowing Window of Opportunity

A vast scientific literature shows that the world needs to achieve zero net greenhouse gas emissions by no later than 2050 in order to avoid catastrophic risks of global warming.⁵ To do so, all countries must do their part to reduce carbon emission intensity per unit of economic output and, starting as soon as possible based on their circumstances, reduce absolute levels of carbon emissions. The Global Carbon Project (2022a) estimates that keeping the probability of meeting a 1.5 degree Celsius target at 50 percent means limiting future cumulative emissions to 380 GT CO₂, equivalent to nine years if emissions stay at 2022 levels. Reaching zero emissions by 2050 requires an annual reduction of 1.4 GT per year.

Developed countries account for approximately 30 percent of current emissions, and China accounts for nearly the same amount too, so these countries must lead in the absolute reduction of emissions (Global Carbon Project, 2022b). Other developing countries (excluding China) are responsible for more than 40 percent of annual emissions but only about 26 percent of the aggregate stock of anthropogenic carbon that has been emitted into the atmosphere since 1850 (Global Carbon Project, 2022b). Nevertheless, under current plans, developing countries will account for an increasing share of new annual emissions. These new emissions are on course to be driven by rapid economic growth and structural economic change, especially in Asia; by rapid population growth, especially in Africa; and by the need still to provide access to basic services for large shares of humanity, including nearly 760 million people who lack access to electricity and approximately 2.6 billion people who require access to clean fuels for cooking in 2020 (International Energy Agency [IEA], 2022a,b). Africa has a particularly pressing need to expand access to electricity. Amid these significant needs and low cumulative emissions to date, especially when measured on a per capita basis, it is appropriate for developing countries to have a slower path to net zero than developed countries that have already passed their peak levels of greenhouse gas emissions.

4. Notably, the top three risks in the World Economic Forum's 2023 Global Risks Report are (1) failure to mitigate climate change, (2) failure of climate-change adaptation, and (3) natural disasters and extreme weather events.

5. See, for example IPCC (2018) and Pörtner et al. (2022).

Amid the mounting costs of climate change and growing consensus on the narrowing window for climate action, there has been a significant shift in attitudes, both globally and among developing countries, on how to address the shrinking carbon budget. Vulnerable developing countries had always been in the forefront, pushing for more aggressive climate action. They were in the lead in calling to strengthen the target for average global warming from “well below 2 degrees” as set in the 2015 Paris Agreement to the “limit” of 1.5 degrees that formed the basis of the Glasgow Pact in 2021. They were among the first to join the Net Zero Coalition of the United Nations and to come forward with ambitious net-zero emissions targets (Table 1.1).⁶

A Golden Thread: Opportunities for Leapfrogging in Energy

For EMDEs, a foremost economic strategy imperative is to make the lowest-cost, highest-return investments in expanding energy infrastructure to meet their development needs. By one account, energy access is “the golden thread that weaves together economic growth, human development and environmental sustainability” (IEA, 2017). Figure 1.1 demonstrates the basic correlation between energy and economic development, through a cross-country plot of energy use per capita against income per capita in 2014. Figure 1.2 then shows time-series data for an individual country, Korea, during its successful period of economic development from 1971 to 2015. The data illustrate the basic point that developing countries will need more energy—the only question is how this can be attained in a way that is both most cost effective and least harmful to the environment.

Fortunately, new low-carbon technologies are increasingly offering the best options for high return energy investments, in a manner that helps shift climate action from a cost mindset to an investment opportunity mindset.⁷ At the same time, for countries that are highly dependent on fossil fuels, including coal, there is a need to consider how to accelerate the phase-out of fossil fuel reliance in a way that enables a just transition by fostering a sense of fairness among domestic winners and losers amid change.

6. Highly vulnerable countries like Barbados and the Maldives were early to assert net-zero commitments, although the World Bank classifies Barbados as a high-income country, since its gross national income (GNI) per capita of approximately \$17,000 is above the institution’s current high-income threshold (\$13, 205 as of mid-2022).

7. Other important investment pathways have been put forward in recent years too, including investing in girls’ education to support a voluntary reduction in fertility and thereby reduce population growth in a manner that results in lower future GHG emissions (Winthrop & Kharas, 2016).

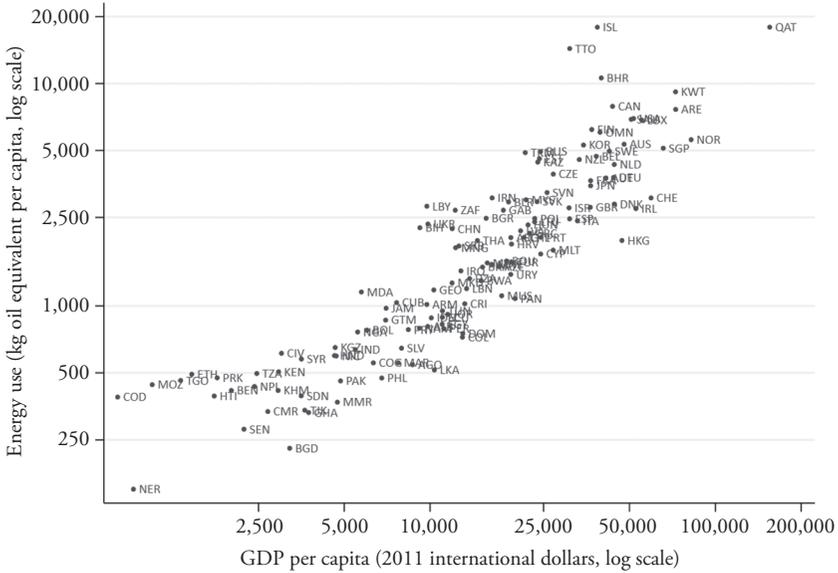
Table 1.1. “Net-zero” commitments by low- and middle-income countries as of January 2023

Status	Country	Target Year	
Achieved (self-declared)	Bhutan		
	Guyana		
	Suriname		
In Law	Fiji	2050	
	Russia	2060	
Included in Policy Documents	Maldives	2030	
	Nepal	2045	
	Armenia	2050	
	Belize	2050	
	Cambodia	2050	
	Cape Verde	2050	
	Colombia	2050	
	Comoros	2050	
	Costa Rica	2050	
	Gabon	2050	
	The Gambia	2050	
	Indonesia	2050	
	Laos	2050	
	Liberia	2050	
	Marshall Islands	2050	
	Papua New Guinea	2050	
	Peru	2050	
	Solomon Islands	2050	
	South Africa	2050	
	Turkey	2053	
	China	2060	
	Nigeria	2060	
	Sri Lanka	2060	
	Thailand	2065	
	Declaration or Pledge Made	Argentina	2050
		Brazil	2050
		Malawi	2050
Malaysia		2050	
Rwanda		2050	
Vietnam		2050	
Kazakhstan		2060	
Ukraine		2060	
Ghana		2070	
India		2070	

Note: Some countries’ “net-zero” pledges are for CO₂ emissions, some are for aggregate greenhouse gas emissions, and some are ambiguous.

Sources: Climate Watch (2022) and Net-Zero Tracker (2022).

Figure 1.1. Cross-country energy use per capita and GDP per capita, 2014

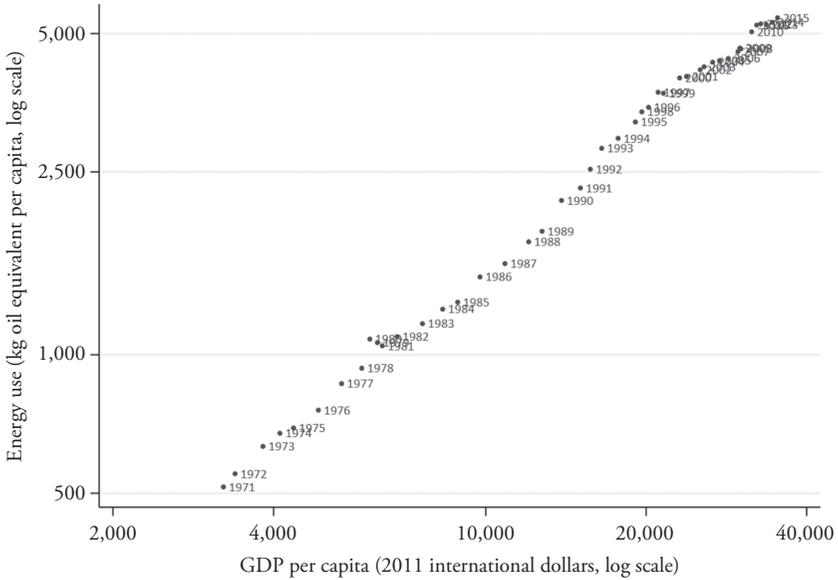


Sources: World Bank (2022b) and Bolt and van Zanden (2020).

In the most severe situations of inadequate energy infrastructure and large segments of the population without access to electricity, there are limited options for growing incomes and reducing poverty (IEA et al., 2022). In sub-Saharan Africa, less than half of the population was estimated to have access to electricity as of 2020, and overall population growth is still outpacing annual increases in access, even if countries like Kenya and Rwanda did record strong gains over the preceding decade (IEA, 2022a). The region's per capita electricity consumption was only a fifth of that of India (Ritchie et al., 2022; *The Economist*, 2022). By one estimate, more than half the world's people lacking access are concentrated in just nine countries, and roughly three-quarters are concentrated in 20 countries, with the largest unserved populations estimated to be in the Democratic Republic of Congo (more than 80 million people in 2020), Nigeria (66 million), and Ethiopia (more than 59 million) (IEA, 2022a).

The costs for the required energy infrastructure are substantial. EMDEs, excluding China, will need to invest around an average of \$1.5 trillion per

Figure 1.2. Korean energy use per capita and GDP per capita, 1971–2015



Sources: World Bank (2022b) and Bolt and van Zanden (2020).

year by 2030 in the clean energy transformation, roughly three times the volume of such spending today (Songwe et al., 2022). This is to invest in renewables, strengthen the transmission and distribution grids, provide storage and back-up capacity, and finance the early decommissioning of coal plants. The scale is large because EMDEs are on course to make the world's largest incremental investments in infrastructure over the coming decades to meet the needs of urbanization, population growth, and growing prosperity. A strategy to build an energy system largely based on renewables, and transform energy demand away from fossil fuels, entails larger upfront capital investments but with substantial longer-term avoided costs in terms of fossil fuel production and use.

The Growing Attractiveness of the Low-Carbon Transition

Fortunately for policymakers with an investment mindset, the economics of new energy technologies increasingly offer the option to leapfrog legacy systems and help shape new ones. To be sure, the opportunity set varies by geography and economic sector—whether power, industry, transportation, buildings, or

food systems, including land use. A recent United Nations Environment Programme (UNEP) (2022) report indicates that the power sector, including electricity supply, accounts for the largest share of energy-related emissions globally, at 42 percent, and offers many of the most advanced low-cost, low-emissions technologies. The same report describes how technology for low-emission buildings is widely available but requires accelerated deployment. Meanwhile, heavy industry requires ongoing technological progress to develop low-cost, low-emissions approaches, especially for cement and steel production. Transportation requires shifts in vehicle modes—including the shift from individual to mass transit and in transport modes—alongside ongoing advances in zero-emissions fuels for aviation and industrial transport in particular. For both industry and transport, green hydrogen technologies offer promise, as do other fuel forms, but ongoing scale-up and innovation are required (Castelvecchi, 2022). Meanwhile food systems need a mix of demand-side shifts, increased protection of ecosystems, improved farm-level practices, and reduced carbon use in supply chains (UNEP, 2022).

In this context, the electricity sector has experienced the most rapid shift in EMDE investment opportunities over the past decade. The traditional strategy to expand access to electricity has been to connect households to a national grid, which often purchases its energy supply from fossil-fuel burning plants. Not only is this bad for emissions, but the unit costs of these connections can also be prohibitively expensive, especially for rural areas where many of the underserved population live. This has led to the pursuit of complementary “off grid” solutions that can provide alternative sources of energy. Ramping up a blend of low-cost on- and off-grid energy solutions frames a central development priority for many EMDEs.

This is happening with renewables—most notably with solar and on-shore wind technologies—for which the levelized cost of electricity (LCOE) is typically now lower than comparable ranges of fossil fuel costs. According to the International Renewable Energy Agency (IRENA, 2022a), the average global LCOE for solar plummeted 88 percent from 2010 to 2021, dropped by 68 percent for onshore wind, and fell more than 60 percent for offshore wind. In countries ranging from Brazil to India, Turkey, and Vietnam, the fuel-only generation costs for coal and fossil gas are multiples higher than the LCOE for new solar photovoltaics (PV), onshore wind, and offshore wind power projects (IRENA, 2022a).

These new investment economics also lead to cost savings. IRENA (2022a) estimates that, among non-Organization for Economic Co-operation and Development (OECD) countries, the annual savings from new renewable power generation capacity were already more than \$5 billion in each of 2020 and 2021, compared to the cheapest fossil fuel-fired option. Much of the savings were

generated through onshore wind and solar photovoltaic (PV) systems, alongside contributions from geothermal, hydropower, and biomass.

The lower costs embedded in these renewable technologies are enabling breakthrough opportunities for expanding affordable access to electricity grids concentrated in urban areas, in addition to off-grid and mini-grid systems that can serve rural areas.⁸ This contrasts with the current situation in many developing countries, where prices for household electricity do not yet cover the full cost of delivered supply, so expansion of electricity access depends on the availability of budget resources to subsidize utility companies. As the price of renewable energy continues to fall, and options for distributed generation continue to grow, developing countries will have even greater options to expand access and meet growing energy demands while decarbonizing their energy systems.

As of 2020, the share of renewables in existing electricity production is lower in developing countries than in developed countries, ranging from only 21 percent in Africa to about 40 percent in Europe (IRENA, 2022b). But this could change dramatically. For example, India has set a target to expand renewable energy by 500 GW over the coming decade, which is more than its existing installed capacity and would enable virtually all of its incremental demand to be met by renewables.

Investments in renewables are the foundation for a transition to clean energy and can be a key part of broad-based decarbonization strategies that enable developing countries to tap significant co-benefits. This includes major gains in pollution reduction and associated health benefits, which improve quality of life and boost productivity, contributing to improved competitiveness that could permeate throughout the economy. When combined with a push to enhance digitalization across sectors, there are great possibilities for more inclusive, resilient, and sustainable forms of economic growth.⁹ Intersections with active labor market policies are crucial in order to ensure climate friendly innovation, job creation, and successful transitions for young people entering the workforce and to promote opportunities to reduce occupational sex segregation as countries undergo structural transformation (Bhattacharya et al., 2021; Brixli et al., 2022; Lankes et al., 2022; Pearl-Martinez, 2014).

Positive Returns to Adaptation and Resilience

Investments in climate adaptation and resilience also offer significant opportunities for economic growth and development. The economics of these investment priorities merit much greater global attention moving forward. In 2019, a

8. See, for example, Modi, 2021.

9. See for example, Ingram et al., 2022; Stern and Romani, 2023.

Global Adaptation Commission of eminent experts outlined five initial action areas with positive investment returns: early warning systems, climate-resilient infrastructure, improved dryland agriculture, global mangrove protection, and making water resources more resilient (Global Commission on Adaptation, 2019). That study estimated that \$1.8 trillion in global investments over the course of a decade could yield more than \$7.1 trillion in net benefits, with the specific opportunities unique to each country. The commission identified early warning systems in developing countries to be a particularly high-return undertaking, with \$800 million in investments helping to avoid losses worth \$3–16 billion per year.

Opportunities for Decommissioning Coal and Fossil-Fueled Power Plants

Phasing out primary coal production and coal-based thermal power represents the lowest hanging fruit in cutting global carbon emissions and will bring important local health benefits. Advanced economies are committed to a sequenced phase-out of coal-fired and other fossil-fueled power plants, on a schedule dictated by the speed of introducing new forms of renewable energy supply. However, this schedule has slowed and even reversed in some European countries, due to the Ukraine/Russia war and ensuing import limits on Russian gas and petroleum. This highlights the short-term pressures in accelerating transitions out of coal and fossil fuels even in some advanced countries. Many large developing countries—notably China, India, Indonesia, South Africa, and Vietnam—are heavily coal dependent but also have large demands for new energy, and therefore face commonly difficult issues in the decarbonization transition.

The demands for incremental energy are so large that the first call on any new supply from renewables will be to boost overall supply rather than retiring existing coal and fossil fuel plants before their economic life ends. Changing this cost–benefit calculus is feasible but, for developing countries, will only take place if there is significant external support. An accelerated phase-out of coal could entail substantial financial and economic costs—including forgone revenues, costs of decommissioning plants, and transition costs for people and places. The required scale of expenditure could be considerable—estimated at \$50 billion a year by Songwe et al. (2022)—but there would be substantial local co-benefits, and the global benefits of the reduction in carbon emissions would be even higher, even by the (arguably low-price) benchmarks of today’s carbon markets.

Economic transitions, where there are winners and losers, are always complex from a political economy perspective, as this volume’s case studies on Nigeria, Indonesia, and South Africa indicate. When some of the benefits accrue to the rest of the world, the complexities are even greater. This is a first-order problem

for developing countries. Their energy transitions differ from those in advanced economies in two ways. First, they need as much energy as they can produce, regardless of source; second, their fiscal revenues may substantially depend on taxes and royalties from domestic fossil fuels. Neither issue can be ignored, and each provides a strong headwind against globally optimal transitions away from coal and other fossil fuels.

Climate Justice and the Just Transition

Climate action at global, national, and local scales needs to be approached from a perspective of climate justice—of a just transition that respects the needs of workers and communities everywhere, and of a just energy transition that pursues net-zero emissions while accounting for the impacts on people at all scales, with systematic attention to advancing gender equality. There are several facets to climate justice. It starts with the existing acknowledgment that countries responsible for the historical accumulation of GHG emissions should do their part to help vulnerable countries. Participants at the 1992 Earth Summit already agreed, in the Rio Declaration on Environment and Development, that “the developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command” (United Nations, 1992).

How does a focus on climate justice affect the pursuit of development? Four distinct issues need to be kept in mind and are highlighted to varying degrees in this volume’s case studies. One prominent concern focuses on loss and damage and the need for remediation. At COP27, with the announcement of a loss and damage facility and the Global Shield initiative launched by the G7 and the V-20 group of climate-vulnerable countries, developed countries have finally taken initial steps toward their responsibility to assist the most vulnerable countries for future climate impacts. However, there is a substantial risk that these will amount to only token commitments and that the new facilities will remain seriously underfunded. Innovative approaches will be required to ensure the necessary level of resources are generated.

A second strand is that developing countries must not be constrained in meeting their development goals because the carbon space is now more constrained. But this cannot be done by relying on fossil fuels as in the past. As former Ethiopian prime minister Meles Zenawi famously said in 2011 at COP17 in Durban: “It is not justice to foul the planet because others have fouled it in the past.” Fortunately, technological change and greater recognition of co-benefits and avoided costs means that decarbonization and development are not in conflict but are

mutually supportive. There will be a need for additional investments to achieve these synergies as well as to adapt to and build resilience to climate change.

A third strand of climate justice emphasizes that the process of transforming economic structures to support inclusive and resilient growth is likely to involve large transitional costs, including the gendered dimensions of workforce shifts. These can be associated with particular geographies, for example coal-producing regions, where livelihoods can be seriously affected if coal mines are suddenly closed down. It can also affect jobs. The skills required for green jobs and for green-related sectors may be quite different from those required for jobs in fossil-fuel and fossil-fuel-dependent sectors.

A final perspective is justice across generations. By one estimate, children born in 2020 will be subject to a two- to sevenfold higher exposure to extreme weather events, especially heat waves, compared to people born in 1960 (Thiery et al., 2021). One common presumption implicit in the use of discount rates is that future generations will be better off than current generations and therefore better able to bear the costs of climate change. However, growing uncertainty about future economic growth draws attention to the merits of lower discount rates; if catastrophic tipping points are exceeded, the negative impact on growth would require far smaller discounting (Weitzman, 2001).

A Broken Thread: International Financing Systems

While the evidence is mounting on the potential economic gains of investing in climate action, many developing country policymakers are still hesitant or unable to embrace rapid change, in part because of what is seen as large upfront costs and more distant gains. Although technology and investment opportunities are changing rapidly, global financing systems are not. If energy represents the golden thread of economic development, international financing represents the broken thread of sustainable development. It falls dramatically short in generating both the volumes and quality of finance required to achieve the relevant investment breakthroughs.

The Trillion-Dollar Gap

Any discussion of global climate finance needs to start by addressing the legacy of the pledge by developed countries in 2009, at COP15, to mobilize \$100 billion per year by 2020 for climate action in developing countries. In that Copenhagen Accord, developed countries, led by the United States, agreed as a principle that it was appropriate from a moral and economic perspective for rich countries to support developing countries to reduce their carbon emission intensity.

Even though the \$100 billion commitment was a somewhat arbitrary figure and never intended to match the scale of underlying needs, it remained unfulfilled as of 2022. Shortfalls on such a high-profile commitment for such a major global issue have generated widespread loss of trust among EMDEs toward further developed country commitments. In 2020, the most recent year with official data available, the total public and private climate finance mobilized by developed countries added up to only \$83 billion, according to OECD figures (2022a). Direct financing from bilateral donors, which was intended to be the mainstay of this finance, has remained stable at \$30 billion since 2016, with most of the increase coming from multilateral development banks (MDBs). The composition of climate financing is important too. On average, between 2016 and 2020, only around one-quarter of the financing was oriented toward adaptation, while two-thirds was for mitigation-related emissions efforts and the remainder for cross-cutting purposes. The share of grant financing has also been small and stagnant at around \$12 billion.

The loss of trust around the \$100 billion pledge is particularly problematic when confronting the practical investment needs across EMDEs, which are an order of magnitude greater. There have been several global-scale assessments of financing needs for the low-carbon transition.¹⁰ Bhattacharya et al. (2022) adds up country-level needs across EMDEs (excluding China) to estimate the required investments for sustainable infrastructure, adaptation, and resilience at approximately \$1.8 trillion per year by 2030, equivalent to nearly 5 percentage points of GDP.

Building on this analysis, the Songwe et al. (2022) report assesses the main investment and spending priorities encompassing the transformation of energy systems, responding to loss and damage, investing in adaptation and resilience, and restoring and protecting natural capital, including sustainable agriculture, forestry, and biodiversity. The report concluded that, altogether, EMDEs other than China will need to spend around \$1 trillion more per year by 2025 (4.1 percent of GDP compared with 2.2 percent in 2019) and around \$2.4 trillion more per year by 2030 (6.5 percent of GDP) on these priorities. A recent study by World Bank researchers based on the first cohort of Country Climate and Development Reports (CCDRs) came to similar findings (World Bank, 2022a). It assessed required climate investments as falling in a range from 1.1 percent of GDP in upper-middle-income countries (including China) to 5.1 percent in lower-middle-income countries and 8 percent in low-income countries.

10. See Buchner (2021), Energy Transitions Commission (2022), Gupta et al. (2014), IEA (2021), O'Callaghan et al. (2021), and Prasad et al. (2022).

How can these investments be financed? Much of the incremental investment will need to come from EMDEs' own domestic sources. To this end, Bhattacharya and colleagues propose a grand match that splits financing equally between domestic and external sources (Bhattacharya et al., 2022). The Songwe et al. (2022) report concludes that developing countries other than China will need additional external finance of around \$1 trillion per year by 2030 to meet the Paris Agreement goals and deliver on related development goals. This might be an eye-catching number politically, but it is modest relative to the scale of the global economy, which adds up to more than \$100 trillion annually.

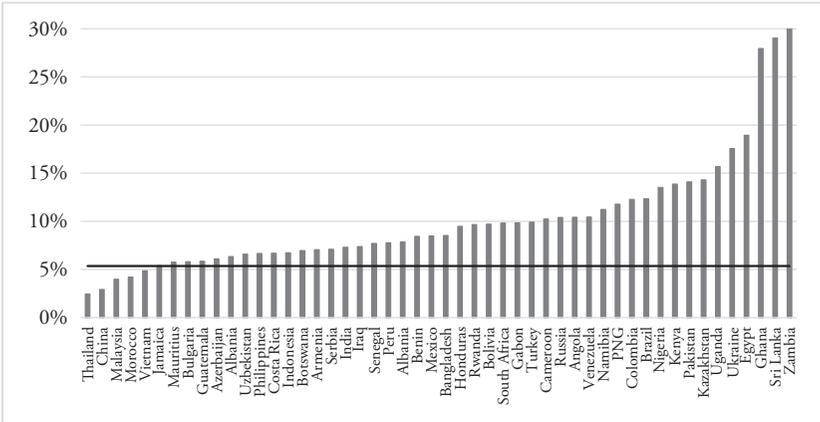
The Impediments to International Financial Flows to EMDEs

How will developing countries mobilize the requisite international finance? Almost all low-income countries, and many middle-income economies, have limited access to long-term finance at reasonable cost. A shortage in the supply of official international finance constrains countries' options. Global aid budgets, for example, add up to more than \$175 billion per year (OECD, 2022b), around 0.33 percent of donor country national income, but suffer from tenuous political support in many funder countries and are spread across many different economic, social, humanitarian, and environmental purposes, with volumes often unrelated to underlying scale of needs or larger development objectives. Financing for poverty reduction and human capital development suffers from systematic gaps, as does financing for climate mitigation, adaptation, resilience, and nature. Acute situations like refugees fleeing the war in Ukraine can also eat up a substantial share of existing aid budgets.

Some EMDEs, largely middle-income countries, have bypassed the public international development finance architecture by borrowing on private international bond markets. But to do so, they must pay relatively high interest rates. As of early 2023, sovereign borrowing costs, the generally lowest-priced borrowing benchmark within any economy, were 10 percent or more for many developing economies, compared to typically 4 percent or lower for advanced economies (Trading Economics, 2023). Actual project developers, like state-owned utilities, have to pay a premium over sovereign rates, making private finance even more expensive for specific investments.

High financing costs have an immediate impact on government balances and the fiscal space available for development spending. They also make the long-term payoff horizons of renewable energy less attractive. As one example: A typical solar developer in Germany needs to realize a return on investment of just 7 percent to make the project profitable. The same developer, with the same physical technology, would need a return of 17 percent in India and 28 percent

Figure 1.3. Developing country 10-year bond yields compared to IBRD borrowing rate (solid line), January 2023



Sources: Trading Economics, World Government Bonds, and Market Insider, extracted January 12, 2023.

in Egypt to make a similar profit after covering the higher financing costs (Songwe et al., 2022). It should therefore not be surprising that renewables are being introduced more quickly in countries where costs of finance are lower, as tends to be the case in developed countries, even though the intensity of the sun's radiation is typically higher in many developing countries.

An alternative solution is for countries to access loans on advantageous terms through the system of MDBs, like the International Bank for Reconstruction and Development (of the World Bank Group) and the regional development banks. As shown in Figure 1.3, such financing can come at a much cheaper cost. MDBs can also reduce the cost of private finance through risk mitigation instruments and blended finance. Revamping the role of MDBs has therefore become a central element in the discussions on making the international financial system fit-for-purpose to meet the pressing global and development challenges including climate (Ahmed & Summers, 2022).

The problems are not just on the supply side of finance. They are also on the demand side. Many EMDE finance ministers are reluctant to take on more debt in current market conditions, even for sound investment projects. Sometimes this is due to legal constraints. Most countries have fiscal rules designed to prevent elected government officials from overborrowing to fund short-term programs while leaving the debt servicing costs to their successors. Nearly three-quarters of a typical GHG mitigation project is debt financed, so these rules can present a major hurdle for project sponsors to overcome.

Adding to the problems, the present international financial architecture biases toward stove-piped project-by-project investments that limit the returns to individual activities, compared to the networked deployment of technologies that can produce investment complementarities through system-wide transformation. To give an example, building a network of electric vehicles and charging stations is only helpful if there is also financing available to transition the underlying power grid from coal to renewable fuel. System change requires a level of financial aggregation and mix of public and private investments and incentives that do not yet exist in international programs to support EMDEs.¹¹

Still other factors limit investments in adaptation, resilience, and nature. The protection of global biodiversity is a particular problem, as an area where costs are borne almost entirely by national governments but benefits are felt globally. Developing countries have subscribed to global agreements and declarations such as the 2010 Aichi biodiversity targets but cannot afford the funding necessary for expansion of protected areas, research, and effective regulation.¹² At the December 2022 meeting of the Convention on Biological Diversity in Montreal, Canada, developed countries committed to provide \$30 billion per year by 2030 to support biodiversity protection in developing countries. This could be a potential major step toward better investments in nature, but the onus is clearly on developed countries to show they can follow through on such a commitment.

For these and other reasons, developing countries have presented alternative scenarios in their nationally determined contributions (NDCs) to the UNFCCC process—one that presents ambitions conditional on being able to access more international finance and another that is unconditional on new support and hence less ambitious. The more ambitious scenarios are essential if the Paris Agreement's goals are to remain operative.

Case Study Insights

To help illuminate the practical dimensions of the global climate and development challenge, this volume presents a cross section of country and regional case studies that describe issues from the local perspective. An outstanding array of

11. This type of system change would encompass a full range of system players, ranging from consumer-level to institutional-level action. As one effort in this direction, in 2022 Indian Prime Minister Narendra Modi announced a “Lifestyle for the Environment” initiative to advance individual and collective action, which has also recently been taken up in the context of G20 deliberations.

12. In 2010, the 10th Conference of Parties for the U.N. Convention on Biological Diversity met in Nagoya, Aichi Prefecture, Japan, and adopted the Strategic Plan for Biodiversity 2011–2020 and a series of 20 targets for 2015 and 2020, known as the Aichi targets. See more at Convention on Biological Diversity (CBD, 2010).

distinguished authors detail not only the constraints that their economies face as they transition to lower-carbon systems but also pathways forward to achieve more climate-resilient development.

In Chapter 2, on Bangladesh, Mizan Khan and Saleemul Huq describe the country as the ground zero of vulnerability, due to its dense population and exposure to floods, cyclones, sea level rise, and salinity incursions. However, Bangladeshi politicians remain committed to economic growth, with environmental sustainability as the second priority. Growth is the priority for the political leadership to alleviate poverty in the country. The NDC advanced by the government has an unconditional reduction in “business as usual” emissions of only 6.7 percent by 2030, reaching 15 percent if international support is forthcoming.¹³ Partly, this limited ambition is attributable to the lack of business conviction that prosperity can be achieved alongside a low-carbon transition and worries over international competitiveness if energy prices rise or if carbon taxes are imposed. These worries carry through to Parliament, as many elected representatives come from the business community.

Some segments of business are, nevertheless, starting to commit to change. The garment sector—the number one foreign exchange earner in Bangladesh—has the highest number of internationally certified green garment factories in the world. Consequently, the key technical issues currently debated under Bangladesh’s just transition are around energy access, social equity, and building resilience, areas where international support has been less forthcoming compared to mitigation. These types of concerns have driven Bangladesh to include a significant pipeline of coal-fired power plants that could come on stream in the next few years as part of its energy access strategy, although it has scrapped plans to build additional new coal plants in the future.

With a low domestic tax regime, Bangladesh has limited economic capacity to significantly expand social programs, and its imminent graduation out of Least Developed Country status will further limit its access to concessional international assistance. It has produced a range of plans (the 10-year Mujib Climate Prosperity Plan and a second round of NDCs) which integrate climate into a new development strategy. Khan and Huq suggest using Bangladesh’s strong civil society organizations to play a more significant role, especially in encouraging green processes in private companies in the country’s critical garment sectors through promotion of renewable energy. They offer

13. The 2015 Paris Agreement calls for each country to put forward an NDC to outline its own climate actions. Parties to the agreement agreed to complete initial NDCs by 2020, with successive updates every five years thereafter.

important suggestions for nature-based solutions and a unique proposal for encouraging climate-resilient migrant-friendly towns as an adaptive response.

Abou-Ali, Elayouty, and Mohieldin review Egypt's challenges in Chapter 3. They argue that while Egypt has already taken a leadership role among developing countries, symbolized by its hosting of COP27, it could strengthen the linkage between climate action and the sustainable development goals, particularly SDG 1—No Poverty. A special feature of the politics of Egypt is the need to consider the differential impact of climate change and climate action on the agriculture intensive, poorer region of Upper Egypt, and on the more industrialized and service sector-oriented parts of the economy.

Abou-Ali and coauthors identify three main challenges for Egypt. First, they comment on the inadequacy of good data, which makes it difficult to get a comprehensive overview of status and limits proper planning and monitoring. Next, they worry about implementation capacity. Under Egypt's regulatory system, for example, businesses find it easier to pay fines rather than reduce emissions. State capacity, especially at local levels, is weak, and while the National Climate Change Committee, chaired by the prime minister, provides an overarching strategy, implementation rests with a multitude of sectoral ministries. The third challenge for Egypt is finance. High debt levels and minimal fiscal space constrain Egypt's ability to fund projects from its budget, regardless of the long-run beneficial impact on aggregate growth. The authors identify three pathways for Egypt by building resilience and adaptation of the agriculture sector, decarbonizing the transport sector, and restructuring the power sector. Egypt is already poised to be an early mover in new opportunities in green hydrogen. Leveraging the private sector and involving local governments will be keys to success.

In Chapter 4, Ahluwalia and Patel describe how India is making rapid progress in introducing renewables, but full-scale transformation to clean energy will require progress on many fronts. India has committed, politically, to peaking its carbon emissions in the 2030s and achieving net zero by 2070. One major challenge it faces, however, is competitive populism, where state politicians offer lower electricity prices in attempts to garner more political support. This results in some subnational state-owned distribution companies (discoms) becoming financially strapped, a problem reinforced by weak management and large technical losses. In addition, coal decommissioning poses special problems for India, where coal accounts for 70 percent of power generation. The plants are newer than comparable ones in South Africa and thus more expensive to shut down. Financial support from the international community and an internationally fair agreement (around what will happen to coal plants in Europe and North America) must be part of the solution. All this is accentuated by India's desire to be a major green hydrogen producer, putting further pressure on electricity supplied

from renewables. It is through green hydrogen that India hopes to decarbonize much of its hard-to-abate industrial sector, like cement, steel, and fertilizer.

The overall picture presented by Ahluwalia and Patel is daunting but feasible. They show the need for a “whole-of-the-economy” approach, covering multiple sectors, multiple ministries, and multiple levels of government. They identify major investments that are needed in both public and private sectors, amounting to perhaps \$10 trillion over 50 years (1.5 percent of GDP each year) (General Electric and Ernst & Young, 2022). With such complexity and uncertainty over technologies of the future, they advocate for flexibility—breaking down the transition into a succession of 10-year plans, with the first 10 years oriented toward getting India to a point from which it can then start to reduce emissions systematically toward net zero.

In Chapter 5, Basri and Riefky discuss the transition in Indonesia. They argue that populous, low-income, coal-dependent economies, like Indonesia and India, face some of the toughest challenges. As such, despite the clear vulnerability of Indonesia’s archipelago to climate change, the political commitment to an ambitious target is limited, as decarbonization is seen as just one of many development priorities. In its NDC, Indonesia still imagines that coal will account for 38 percent of its energy mix by 2050, leading the Climate Action Tracker to classify it as “highly insufficient.”

Indonesia would require significant reform in its public finances to move toward a sustainable path. It currently spends 3.7 percent of its budget on climate-related issues, but 13 percent on subsidies for fossil fuels. There are options for increasing taxes (on carbon, fossil fuel excises, plastics excises, and reduced subsidies), but the revenues need to be clearly demarcated for the public benefit—either for climate action, using the newly introduced climate budget tagging system, or for development priorities such as health, social assistance, and small and medium enterprise support. Tying revenue measures more closely to development impacts is critical as Indonesia pursues a phased transition. Sustaining this program over time, however, will require strong public advocacy. The prevailing narrative in Indonesia is still that a green transition is a luxury good, that there may be lower potential output in a green transition because of stranded assets and negative energy supply shocks, and that fiscal policy should remain conservative despite the need for climate-related investments. For the world, decommissioning of coal and the preservation of forests in Indonesia have the highest priority. For Indonesia, the key issue is managing and phasing the transition in terms of policy change (carbon taxes, feed-in tariffs, grid regulation), investment projects, and financing social and economic development.

Nigeria stands in stark contrast to India, Indonesia, and many other large middle-income countries, as Archibong and Osafo-Kwaako show in Chapter 6.

Where those countries have an investment-grade credit rating, Nigeria does not. Hence, its financing challenge is more severe. Nigeria currently has the largest absolute number of poor people in the world, and lack of economic growth means those numbers are growing every year, so the challenge of development—of provision of basic needs to its population—remains paramount. Even though Nigeria is a large oil producer and exporter, almost half its own citizens lacked access to electricity in 2020, and this spills over into schools and clinics also lacking electric power, especially in the northern regions.

The subnational disparities in Nigeria raise the profile of just transition debates. The various transition plans and funds, such as the Climate Change Fund, provide an institutional framework for the implementation of climate policy, but the geographic redistribution that would be needed is quite untested from a political point of view. Nonetheless, Archibong and Osafo-Kwaako present three pathways to support Nigeria's green transition: improving project implementation, increasing public awareness, and mobilizing international finance. The price tag for Nigeria's energy transition plan is high—an estimated \$10 billion per year and rising for the next 40 years, equivalent to one-quarter of the total budget spending in 2022. Whether this can be efficiently spent by state governments is an open debate. Nigeria has some experience with peer competition in its universal basic education program that includes block grant disbursements based on the monitoring of program results, a design that rewards implementation success.

Implementation will also be one of the central challenges in South Africa, according to Richard Calland in Chapter 7. The joint economic characteristics of very high carbon intensity and poor levels of basic public services make South Africa the poster child for the need for an integrated climate-cum-economic development program. This is what the Just Energy Transition Partnership (JETP), launched in Glasgow, aims to provide. Calland praises the political victory of the partnership announcement and the institutional innovation of the Presidential Climate Commission to oversee it, which, in his view, provides a needed escape from traditional, weak bureaucratic processes. In South Africa, poor public administration has led to the country being categorized as susceptible to state capture. Calland emphasizes the difficulties in the execution of the JETP: technical, such as the degree to which gas should be a transition fuel; financial, because of the massive debt overhang of the utility Eskom and the realization that promised external support is a small drop in the overall integrated resource plan; and sociopolitical, to ensure that the social consequences of transition empower and help raise up people and communities.

At the end of the day, Calland puts his trust in good process as the only way forward. He advocates for openness and inclusion orchestrated by politically

savvy leaders and values a process that brings to bear the best technical and financial know-how. Calland identifies three priority opportunity areas in renewable energy, low-emissions transportation, and natural capital investments. But he stresses that talk of a green transition is unhelpful to the broader, underlying discourse of how to improve the human condition in South Africa and how to use the opportunities afforded by access to international climate finance to accelerate progress on human development. He argues that the focus should be on the just transition and the underlying economic drivers of the new, green economy.

Regional Case Studies

Countries can use regional and global platforms as a supplement to domestic programs. Regional approaches have value in offering strong common political support, amplifying voice in international discussions, providing a pre-commitment device making it harder for purely domestic politics to derail or fundamentally alter a reform trajectory, and creating opportunities for collective action among neighbors in the interest of all.

In Chapter 8, Ndung'u and Azomahou describe the situation in East Africa. They document the extensive costs of climate change already borne across the region, hurting economic growth, food security, and health and human capital. Since agriculture is the key source of livelihoods and employment for much of the region's population, the authors draw particular attention to the urgency of adaptation and resilience efforts in the farm sector. They also underscore the priority of tackling the region's low level of household access to clean cooking fuels and technologies.

East Africa has several fast-growing economies that will see a sustained increase in energy demand over time. They have an opportunity to increase the supply and demand efficiently by tapping their huge potential for renewable energy, creating regional grid integrations, with a modern regulator mixing the multiple renewable sources in the region—hydro and geothermal, as well as solar and wind—in an efficient way. Getting the coordination of policy regimes for this to be effective, however, will not be politically simple. Regional and domestic policy coordination will also require considerable cross-border sharing of technological expertise and increased foreign investment in clean energy deployment.

In the same vein, Adam and Songwe discuss regional approaches in Africa in Chapter 9. They propose nothing less than a complete transformation of the economic system in Africa, with Africa becoming more self-reliant. They view regional organizations, such as the U.N. Economic Commission for Africa, as a

bully pulpit from which to convene African policymakers to develop a new development strategy for the continent, stressing key adaptation issues such as climate-smart agriculture, as well as energy and transport solutions in a continent where the demand of power is growing most rapidly and where urbanization is proceeding fastest.

One original idea being proposed is the operationalization of regional mechanisms for supplying carbon credits from member countries of the Congo Basin Climate Commission to other countries outside the region. If a regional process of assessment of carbon sequestration, emissions counting, registration, and certification can be put in place, then the opportunities for scaling carbon credits could yield non-debt-creating revenues up to \$82 billion annually, a potential game changer for the region, far exceeding its current annual access to concessional finance.

Ultimately, regional approaches on environment-related taxation, greening supply chains in trade agreements, addressing weaknesses in the international financial architecture, and finding common positions on transition fuels, green hydrogen, and country platforms can help individual countries make the transition. However, cherry-picking components of a package is not an option. Each country must pick up the whole package and implement the program strongly. A regional organization can add credibility by monitoring and reporting on country progress against regionally agreed targets.

Daniel Titelman, Michael Hanni, Noel Pérez Benítez, and Jean-Baptiste Carpentier contextualize the challenges of climate events, natural disasters, and development gaps in Latin America and the Caribbean—the region with the lowest investment among major emerging and developing countries. In Chapter 10, Titelman and coauthors focus on the pathways that countries, national development banks, multilateral development banks, private sector actors, and the international community can take to bolster investment using the opportunity to accelerate low-carbon transitions and build resilience to climate change. High economic and social vulnerability to climate change, coupled with a limited ability to cope, motivate the climate and development investment imperative.

To close climate finance gaps, Titelman and coauthors detail opportunities for ramping up public and private resource mobilization efforts. These include expanding the fiscal space to promote public investment by bolstering the tax take at the national level, complemented by efforts at the international level to secure climate debt relief. There is ample space for public policies to incentivize private investment, through targeted tax incentives and green taxes, and to promote project-level investments by reducing political, sovereign, and policy risk. Financial markets offer another avenue for climate and development finance as

evidenced by the rapid growth in the issuance of thematic (i.e., green, social, and sustainable) bonds in Latin America and the Caribbean. These efforts to promote public and private investment can be amplified further by proactive financing from multilateral and regional lenders, global climate funds, and national development banks. The Interamerican Development Bank, the Development Bank of Latin America, the Caribbean Development Bank, and the Central American Bank for Economic Integration seek to mobilize \$50 billion in financing for climate action by 2025—up from around \$30 billion in climate-related finance from 2015 to 2019 in the region.

Sara Jane Ahmed picks up the notion of amplifying developing country voices through a regional grouping, in her case through the V-20, a group of 58 climate-vulnerable developing countries, home to 1.4 billion people. In Chapter 11, she documents the massive wealth cost from climate losses that have already been incurred in the last two decades—around \$525 billion or 20 percent of one year's output. She calls for a shift of mindset from climate vulnerability to climate prosperity: reducing loss and damage through access to immediate liquidity and concessional finance from international donors while using the funds to invest in renewable energy wealth and adaptation and resilience projects that can also bring about economic growth.

The V-20 case highlights major gaps in the international financial architecture and the interest by the V-20 to build forward solutions together. There are no compensatory mechanisms for losses associated with climate change, and it is important to evolve the toolkit of support to focus on prearranged and trigger-based financing for predictability, grounded in data and science. Special mechanisms are needed to maximize renewable energy wealth and resilience. Another challenge is that the risk and uncertainty of climate events have brought with them a high cost of capital and spiraling debt levels in many V-20 countries. Many renewable energy and adaptation and resilience projects only become bankable if the cost of capital is reasonable. Mechanisms to bring down this cost are vital for securing the way to climate prosperity.

In Chapter 12, Montek Ahluwalia and Utkarsh Patel tackle the international financing challenge. In the context of the flawed 2009 Copenhagen pledge for \$100 billion per year by 2020, and the 2021 Glasgow commitment to revisit the climate finance support level by 2024, the authors describe the need for developing countries to take a position on what new support should entail. Identifying investment needs in a more granular manner is not straightforward. The core investments in mitigation and adaptation can be identified, such as renewable energy, green hydrogen, carbon capture and storage, electric vehicles, mass transit, resilient infrastructure, agricultural research, irrigation systems, reducing methane from animal husbandry and land use, and forest protection. But these

must be adjusted by subtracting out the savings from not having to invest in fossil-fuel related projects. The investments must be phased over time, disaggregated between public and private projects, and extended to the transformation of sectors that are indirectly affected by the changes. All this must also happen in the context of rapidly changing technology and the shifting cost of capital.

Nonetheless, calculations to date suggest that a major step up in climate finance from all sources will be needed—concessional grants and credits, multilateral and bilateral official nonconcessional loans, private flows, philanthropy, and innovative finance. The mix of required sources implies that a single aggregate commitment confounds accountability and confuses dialogue by mixing apples and oranges. Developing countries should instead organize themselves for more granular financial commitments, including more aid for low-income and vulnerable countries, compensation for loss and damage from climate change, a new mandate and larger ambition for multilateral development banks, and a serious effort to mobilize private financing and drive down its cost by smart use of official guarantees and other de-risking instruments.

Key Implications and Recommendations: Some Developing Country “Asks” and Responsibilities

Taken together, these chapters give deep texture to the practical issues that EMDEs are confronting as keys to global climate action, with priorities varying and evolving according to country context. Each country has significant global climate responsibilities alongside its own national interest to provide opportunity for its population. A common theme is the need for more and better international support.

Developing country views on climate action have changed significantly over the past decade and still remain in flux, as evidenced by the case studies and the engagement of developing countries in global discussions, including recent COP processes. Several factors are responsible for this evolution. A principal reason is the recognition of the growing urgency of the challenge, with a shrinking window to limit global warming and mounting costs that are falling disproportionately on the developing world. Political leaders like Prime Minister Mottley have become the most strident voices calling for stronger and more urgent climate action. Many, although not all, leaders in the developing world are also beginning to see the opportunity to use climate action to shift to a better form of growth and development because of falling costs of green technologies and the co-benefits associated with climate action.

Despite this changing understanding, the scale and pace of action is being held back by several factors. Many developing countries remain concerned that a

focus on climate action could detract from development goals. They are particularly concerned about the diversion of financial resources away from development priorities and a shift in focus within institutions like the World Bank. Several developing countries are concerned about the costs of transition to new energy systems. This is especially the case when entire economies are highly dependent on fossil fuels, as in Nigeria, or where there are possibilities for sizeable fossil fuel-based economic opportunities, as in many other parts of Africa and in Latin America. The early phase-out of fossil fuels in coal-dependent economies also poses major challenges. A lack of domestic fiscal resources and of adequate external financing further limits the inclination and ability of many developing countries to embark on ambitious climate action.

Amid these complexities, several guiding principles can help inform priorities both for country-level action and for scaling up international support:

- EMDEs are pivotal to the global climate agenda: They are the most impacted by climate change, and their growth and development trajectories will be key drivers toward reaching a global net-zero target by midcentury.
- Climate action is not separate from development action; it must be fully integrated with and anchored in development efforts—both to avoid development setbacks and to promote new opportunities for growth and well-being.
- The climate and development challenge that EMDEs are facing is multi-decadal, but the coming decade is critical given the urgency of shrinking carbon budgets, heightened risks to nature, and the need to avoid lock-in of dangerous development pathways.
- EMDEs have to confront the here-and-now impacts of climate change that require much better national and international mechanisms for insurance and loss and damage. Adequate international support is essential, based on the principle of historic responsibility.
- The world lags far behind in confronting the realities of climate adaptation and resilience, which are major priorities for EMDEs. Institutional capacity and financing for these areas need urgent strengthening.
- The loss of natural capital in EMDEs poses risks of irreversible damage to them and to the world; EMDEs can provide cost-effective eco-services for the entire planet if better burden sharing mechanisms can be created.

- The transformation of energy systems provides a historic opportunity to deliver on both climate mitigation and development goals by leapfrogging to new technologies for low-cost renewable power and shifting energy demand. Countries have unprecedented options for updating a dirty, wasteful, and volatile model of economic growth to one that is more robustly sustainable, resilient, and inclusive.
- Making progress at the pace necessary to deliver on global climate and development goals will require a major investment push across all EMDEs—in clean energy transformation, adaptation and resilience, and natural capital.
- Strong country leadership with robust policy and institutional foundations will be crucial for transforming climate investment needs into viable investment programs and projects and to manage structural dislocations from rapid change.
- The availability of the right kinds of finance at affordable cost will be essential. In addition to buttressing domestic resource mobilization, EMDEs other than China will need additional external finance of around \$1 trillion per year by 2030, comprising a mix of private finance, official development finance, and concessional finance.

In line with these principles, we see four key components for successful climate action and outcomes in EMDEs.

Setting the International Agenda

First, developing countries have to engage effectively in setting the global climate action agenda. Decision-making needs more coherence at the national and international levels, both in terms of consensus on actions that need to be taken and in addressing the fragmented nature of the international financing system. In this respect, although the UNFCCC and COP negotiating processes have often been difficult and divisive, developing countries have generally been well unified in making their case, especially for poor and vulnerable countries. In particular, the “G77+China” political axis has been remarkably effective in forming and presenting common views and securing important concessions over the years. The breakthrough on establishing a loss and damage facility at COP27 would not have happened without such a strong collective voice on the part of developing countries.

Nonetheless, even while this developing country coalition has been extremely strong on adaptation, loss and damage, and finance, it has been more ambivalent on climate mitigation because of differences in interests between large emitters, fossil fuel producers, and vulnerable countries. As a collective, EMDEs must push for more ambitious and accelerated decarbonization by advanced economies and China to slow down the process of climate change. For the world to achieve net-zero emissions by 2050, advanced economies need to achieve net zero well before then. Everyone must play their part in moving toward net zero, but the major responsibility lies with those who have already accounted for the bulk of accumulated emissions.

Given the scope and urgency of climate action, climate discussions have extended to many other fora including the G20, the international financial institutions, informal intergovernmental groupings such as the Coalition of Finance Ministers and the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), and a wide range of public–private initiatives. Ensuring that developing country perspectives are included effectively in these discussions remains a challenge, one that could be buttressed by more analytical work in the underlying spirit of this volume—with a focus on sharing views and pursuing the development of common positions. The succession of G20s led by emerging markets (Indonesia in 2022, India in 2023, Brazil in 2024, and South Africa in 2025) presents a good opportunity to pursue a global climate agenda that fully accounts for development and developing country interests.

The fragmented nature of global climate discussions has led the G7 to propose a “climate club” that would bring together committed countries at the highest level to raise collective ambition, strengthen implementation, and ensure a level playing field. As a recent report led by Lord Stern has argued, such a grouping would only be effective if it were to be inclusive of developing countries, including the large emitters (Stern & Lankes, 2022). Meanwhile, former Indian Finance Minister Jayant Sinha has proposed the formation of a Global Climate Alliance, with a central focus on helping developing countries access the finance and technology required to accelerate climate action. Such an alliance that brings the developing country perspective to bear could be the basis for an equal partnership between developed and developing countries.

Domestic Planning and Consensus Building

Second, developing countries have to build the necessary foundations for effective climate action within their own countries. This is a huge and multipronged challenge. It requires a clear vision, strategy, and ability to implement well-specified policies and investment programs. Several chapters in this volume

stress the importance of coherence across public sector institutions. The long-term nature of climate action and investment is often at odds with short-term political cycles. One way to build consensus and bind commitments is through the development of long-term strategies and their articulation in NDCs presented to the international community. A good example of such a long-term vision and strategy is India's decarbonization strategy that was presented at COP27. The whole-of-government approach that pulled together the strategy and set out the implementation plan can now help guide sustained action.

Similarly, as the South Africa case study discusses, the investment plan that South Africa presented at COP26 can help sustain domestic political commitment and in turn can secure the necessary external support. In the lead-up to COP27, host country Egypt launched its Nexus of Water, Food and Energy Program, which could lay the basis for accelerated and sustained domestic action and attract the necessary support from donors and the private sector. These types of national, sector-focused platforms to set a strategic vision and action plan bringing together all key stakeholders can be adopted more widely for urgent climate and related development goals and, as argued in the Africa regional case study, extended to the regional and subregional levels.

The country-level transformations envisaged in this volume are complex enough in implementation to make the task of forging international agreements look comparatively straightforward. Practical implementation tensions abound. Much of this is driven by the complicated political economy of accelerating and managing change. As the case studies make clear, within each EMDE, the need to invest in adaptation, resilience, and nature while building infrastructure and transitioning out of fossil-based energy systems represents a whole-of-society challenge. It typically confronts deep vested interests and incentive systems spanning industry, policy, and political constituencies. National just energy transition platforms are emerging but untested mechanisms to convene stakeholders and mobilize coordinated investments toward common benchmarks of success. In some cases, efficient implementation would lead to investments across contiguous nation states, or in adjacent subnational jurisdictions, each of which requires different coordinating mechanisms. Local actors are often most focused on pragmatic issues of identifying viable—and not excessively disruptive—transitional societal paths to success. This contrasts with the technically minded urgency of global climate discussions, which are frequently pushing for rapid transformation at almost any cost.

A credible investment program also needs to be articulated across the range of required climate investments, with well-developed pipelines of projects. Our case studies suggest urgent gaps in the realm of adaptation and building resilience. Few countries start with adequate technical plans for climate action.

A shortage of bankable projects is a common complaint, but most countries can get started by identifying a few straightforward projects and using the experience to develop more scalable strategies.

State capacity for planning, implementation, public engagement, and results accountability is essential to advancing these practicalities, another common theme across the case studies. Too often, public systems remain weak and data are scarce, limiting evidence-based policymaking. Citizens and the business community might not be adequately involved in plans. Women are too often underrepresented in decision-making forums (Brixi et al., 2022). Trust in existing institutions is often low. Transparency of projects, budgets, and the tracking of results are all important, as is prioritization of gender equality and an ethos of public integrity, public engagement, and public service in government, or at least in the relevant implementing agencies. Polls suggest that most citizens believe their governments should do more to confront climate change, even if they are less confident in the likelihood of success. People are frequently asking for greater voice, participation, dialogue, and communication with public sector actors. Equitable leadership and participation of women is essential in designing climate action strategies at all scales (Bhattacharya & Podesta, 2021).

Finance

Third, progress on climate action requires better international collaboration and support for developing countries, especially on finance. As discussed earlier, developed countries have yet to deliver on their high-profile commitment to mobilize \$100 billion per annum by 2020 for climate action in developing countries, while developing countries will need \$1 trillion per annum in additional external finance by 2030 to meet the commitments of the Paris Agreement and deliver on related goals. This will require the right kinds of financing at the right scale and at affordable cost to meet the different types of investment needs (Songwe et al., 2022).

The large unmet needs for loss and damage, adaptation and resilience, natural capital protection including natural forests, and just energy transitions all call for a massive scale-up of highly concessional finance. Rich countries must therefore be pressed to double their direct climate finance commitments by 2025 and improve their effectiveness (Songwe et al., 2022). While donors must step up, the international community also needs to pursue all options to expand the envelope of low-cost finance. Innovative ways could include through expanded use of the IMF's Special Drawing Rights, voluntary and compliance ("cap-and-trade") carbon markets, debt for climate and nature swaps, expanding and leveraging private philanthropy, and deploying innovative financing mechanisms like the International Financing Facility for Education.

Efforts to address loss and damage could expand the “polluter pays” principle to the international domain, as a parallel to how it is often applied domestically. For example, the United States levies an 9-cent-per-barrel tax on oil to finance an Oil Spill Liability Trust Fund, which pays for clean-up from accidents. An international levy on fossil-fuel production or exports could finance a global fund that would be available to countries when they suffer a catastrophic disaster, say one that imposes a cost in excess of 5 percent of GDP. This would fill a gap in the marketplace. Countries can use insurance, or sovereign debt, to smooth small expected losses over time, but these become prohibitively expensive if they have to cover large losses that happen frequently. These are the circumstances when a loss-and-damage fund could be most valuable and is most needed from an economic and a climate justice perspective.

The expansion and reform of the MDB system is also critical given the role that these institutions play in helping countries ramp up climate action and in mobilizing finance. MDBs are well placed to help in the reduction, management, and sharing of risk, and therefore in catalyzing private finance at scale including the largely untapped pool of institutional investors. They are also ideally placed to finance public infrastructure both for energy transformation and for adaptation and resilience. The Songwe–Stern Commission recommends that MDB financing for climate action should be tripled over the next five years. To take on such an expanded role, MDBs will need to update their mandates to incorporate the linkages between development and climate change, adjust their operating models to focus on systemic change, and pursue all means to expand the scale of financing support from greater mobilization of private capital, to better utilization of their existing capital (as proposed in the 2022 G20 Capital Adequacy Framework Review), to adequate augmentation of capital—all with concerted and more coherent support from their shareholders. A common and strong ask from EMDEs will be critically important in these debates.

The bulk of the incremental finance that will be necessary for energy transformation, the largest component of required climate investments, can now come from the private sector. In addition to tackling impediments to the investment climate—including offtake risk of not getting paid for power produced—the cost of capital is a key constraint for the expansion of private finance for renewable energy in EMDEs. This will require specific measures to tackle exchange rate risk, policy-induced risks, and credit risks that are now much higher because of the diffuse nature of the investments.

The types of finance needed will vary by project and countries: more concessional funds for projects without clear revenue streams and for poor and vulnerable countries; more official finance for public investments; more risk-mitigated private finance for energy transformation, especially in middle-income

countries. The provision of climate finance should not be seen as a zero-sum competition between countries. The needs of poor and vulnerable countries are the greatest in relative terms and will require the most concessional terms. While middle income countries and large emitters can draw more on private finance, they will also require scaled up support from the MDBs and even some concessional finance for priorities like just transitions and loss and damage.

Building Trust

Fourth, developing countries should ask developed countries for measures to help rebuild trust and confidence in international cooperation. Considerable damage has been done to the faith of people living in developing countries that they are treated fairly in global economic decision-making. A short list of recent causes includes inequities in access to vaccines, the disappointments on implementation of the \$100 billion climate finance pledge, the willingness of some advanced economies to backtrack on commitments to move away from fossil fuels when their own energy security was affected by the Russia–Ukraine war, and the prioritization of mitigation over adaptation in financial assistance to EMDEs. Moreover, financial regulations, trade policies, migration policies, the management of international financial institutions, disputes over the role of transition fuels such as natural gas, and general neglect of support for economic development have created an atmosphere where competition between countries rules the world rather than cooperation among them.

Making things worse, developing country policymakers chafe at the restrictions imposed by international financial institutions on financing of new fossil fuel energy plants while the dominant advanced economy shareholders of the same institutions permit new plants to open in their own countries. They worry about ideological inflexibilities being imposed on them for the use of transition fuels like natural gas. They resent the injustice of the loss and damage they suffer with no legal recourse to compensation. They complain about having to pay to access the best technologies, even when the basic science has been developed with public money. In short, they consider the rules of the game tilted in favor of rich countries who have paid little heed to developing country concerns and priorities.

To be sure, developing countries' outward-oriented concerns and asks cannot be an excuse for their own inaction. One hope that emerges from this volume's case studies is that there is a growing alignment between the national self-interest of developing countries and the global responsibilities to mitigate climate emissions and protect nature that they are being asked to deliver. Simply put, EMDEs have new leverage in ensuring their voice is heard. Advanced economies will benefit from paying heightened attention to EMDE needs, and they

have moral, financial, and strategic reasons to put in place a more supportive international structure. Broad contours for a potential structure are beginning to emerge. Still needed is an integrated program of details—country-by-country, sector-by-sector—crafted with an urgency to match the shrinking window of opportunity that still exists.

Conclusion

Over the coming several decades, no part of the world will play a greater role in both experiencing and affecting global climate change outcomes than EMDEs themselves. They share many of the greatest interests in limiting the damage of climate change, and they face many of the most urgent needs for low-cost investments to address the needs of their people. But challenging financing conditions impede progress—in adapting to climate change, in developing resilience, in protecting natural capital, and in deploying new technologies to underpin prosperity. EMDEs need greater international support to tackle growth-enhancing sustainable development strategies.

To set a more robust global path to net zero by 2050, the world needs to pay greater attention to the needs of developing countries. With their growing leverage, these countries have new opportunities to lean forward with a unified “ask” in global climate and development negotiations. The broader prize and aspiration amount to a full-fledged reconception of models for sustainable development and international cooperation. Falling short by losing sight of the big picture or wrangling excessively over details will dim the prospects for prosperity around the world. Rising to the occasion, however, can help usher in a new era of prosperity for all.

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References

- Ahmed, M., & Summers, L. (2022). "IMF-World Bank meetings are the last stop before a coming economic storm," *The Washington Post*. <https://www.washingtonpost.com/opinions/2022/10/05/imf-world-bank-meetings-prepare-economic-downturn/>
- Alam, M., Bhatia, R., & Mawby, B. (2015). *Women and climate change: Impact and agency in human rights, security, and economic development*. Georgetown Institute for Women, Peace, and Security.
- Bhattacharya, A., Ivanyina, M., Oman, W., & Stern, N. (2021). Climate action to unlock the inclusive growth story of the 21st century. IMF Working Paper 21/147.
- Bhattacharya, A., & Podesta, J. (2021). Room 13: A 'breakthrough' agenda on climate finance. Room document, 17 Rooms 2021 flagship. Center for Sustainable Development at The Brookings Institution and The Rockefeller Foundation. https://www.brookings.edu/wpcontent/uploads/2021/11/2021-Room-documents_Room13.pdf
- Bhattacharya, A., et al. (2022). Financing a big investment push in emerging markets and developing economies for sustainable, resilient and inclusive recovery and growth. Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, and Brookings Institution.
- Bolt, J., & van Zanden, J. L. (2020). Maddison style estimates of the evolution of the world economy. A new 2020 update. Maddison Project Database.
- Brix, H., Sara, S. J., & Peschka, M. P. (2022). People and planet together: Why women and girls are at the heart of climate action. <https://blogs.worldbank.org/climatechange/people-and-planet-together-why-women-and-girls-are-heart-climate-action>
- Buchner, B., et al. (2021). Global landscape of climate finance 2021. *Climate Policy Initiative (CPI)*.
- Callahan, C., & Mankin, J. S. (2022). Globally unequal effect of extreme heat on economic growth. *Science Advances*, 8(43). <https://doi.org/10.1126/sciadv.add3726A>
- Castelvecchi, D. (2022). How the hydrogen revolution can help save the planet—and how it can't. *Nature*, 611(7936), 440–443. <https://doi.org/10.1038/d41586-022-03699-0>
- Chapagain, D., Baarsch, F., Schaeffer, M., & D'haen, S. (2020). Climate change adaptation costs in developing countries: Insights from existing estimates. *Climate and Development*, 12(10), 934–942. <https://doi.org/10.1080/17565529.2020.1711698>
- Climate Watch. (2022). Overview of Commitments. World Resources Institute. www.climatewatchdata.org
- Convention on Biological Diversity. (CBD). (2010). X/2. Strategic Plan for Biodiversity 2011–2022. <https://www.cbd.int/decision/cop/?id=12268>
- CBD Secretariat. (2020). Global biodiversity outlook 5—Summary for policy makers. Montréal.
- The Economist*. (2022, November 3). Africa will remain poor unless it uses more energy. <https://www.economist.com/middle-east-and-africa/2022/11/03/africa-will-remain-poor-unless-it-uses-more-energy>
- Energy Transitions Commission. (2022). Degree of urgency: Accelerating action to keep 1.5°C on the table. <https://www.energy-transitions.org/wp-content/uploads/2022/11/ETC-Degree-of-Urgency-Accelerating-Action-to-Keep-1.5C-on-the-Table.pdf>

- G20. (2022). Boosting MDBs' investing capacity: An independent review of multilateral development banks' capital adequacy frameworks. https://www.dt.mef.gov.it/export/sites/sitodt/modules/documenti_it/rapporti_finanziari_internazionali/rapporti_finanziari_internazionali/CAF-Review-Report.pdf
- General Electric and Ernst & Young (EY). (2022). Decarbonization of India's energy sector: Policy roadmap to achieve clean energy targets. Whitepaper. https://www.ey.com/en_in/energy-resources/policy-roadmap-to-realizing-india-s-green-energy-potential
- Global Carbon Project. (2022a). Global carbon budget: Summary highlights. <https://www.globalcarbonproject.org/carbonbudget/22/highlights.htm>
- . (2022b). Supplemental data of Global Carbon Project 2022. <https://doi.org/10.18160/GCP-2022>
- Global Commission on Adaptation. (2019). Adapt now: A global call for leadership on climate resilience. Report of the Global Commission on Adaptation, co-managed by World Resources Institute and the Global Center on Adaptation.
- Gupta, S. J., et al. (2014). Cross-cutting investment and finance issues. In O. Edenhofer et al. (Eds.), *Climate change 2014: Mitigation of climate change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1207–1246). Cambridge University Press.
- Ingram, G., McArthur, J. W., & Vora, P. (2022). How can digital public technologies accelerate progress on the Sustainable Development Goals? Brookings Global Working Paper 174.
- Intergovernmental Panel on Climate Change (IPCC). (2014). AR5 synthesis report: Climate change 2014. <https://www.ipcc.ch/report/ar5/syr/>
- . (2018). Summary for policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipccspecial-report-on-global-warming-of-1-5c-approved-by-governments/>
- . (2022). Climate change 2022: Impacts, adaptation and vulnerability. <https://www.ipcc.ch/report/ar6/wg2/>
- International Energy Agency (IEA). (2017). Energy access outlook 2017: From poverty to prosperity. <https://doi.org/10.1787/9789264285569-en>
- . (2021). Financing clean energy transitions in emerging and developing economies. World Energy Investment 2021 Special Report. Prepared in collaboration with the World Bank and the World Economic Forum.
- . (2022a). World energy outlook 2021 dataset on access to electricity. <https://www.iea.org/product/download/010751-000317-010470>
- . (2022b). World energy outlook 2021 dataset on access to clean cooking. <https://www.iea.org/product/download/010557-000317-010501>
- IEA, IRENA, UN Statistics Division, World Bank, World Health Organization. (2022). Tracking SDG 7: The Energy Progress Report 2022. World Bank. © World Bank. License: Creative Commons Attribution—NonCommercial 3.0 IGO (CC BY-NC 3.0 IGO).
- IPBES. (2019). Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

- E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (Eds.). IPBES secretariat. <https://doi.org/10.5281/zenodo.3831673>
- International Renewable Energy Agency (IRENA). (2022a). Renewable power generation costs in 2021. International Renewable Energy Agency, Abu Dhabi.
- . (2022b). Renewable energy statistics 2022. International Renewable Energy Agency.
- Lankes, H. P., Soubeyran, E., & Stern, N. (2022). Acting on climate and poverty: If we fail on one, we fail on the other. Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science.
- Living on Earth. (2022, October 8). Climate disasters and debt. <https://www.loe.org/shows/segments.html?programID=22-P13-00043andsegmentID=3>
- Marine Conservation Institute. (2023). *The marine protection atlas*. <https://mpatlas.org/>
- Markandya, A., & González-Eguino, M. (2019) Integrated assessment for identifying climate finance needs for loss and damage: A critical review. In R. Mechler, L. Bouwer, T. Schinko, S. Surminski, and J. Linnerooth-Bayer (Eds.), *Loss and damage from climate change: Climate risk management, policy and governance*. Springer. https://doi.org/10.1007/978-3-319-72026-5_14
- Markets Insider*. (2022). Bonds. <https://markets.businessinsider.com/bonds/finder?borrower=andmaturity=andyield=andbondtype=2%2C%203%2C4%2C16andcoupon=andcurrency=andrating=andcountry=>
- Mejia, S. A. (2016). Gone with the wind: Estimating hurricane and climate change costs in the Caribbean. International Monetary Fund Working Papers.
- Modi, V. (2021). Too cheap to meter: The promise of unstored solar power. In H. Kharas, J. W. McArthur, and I. Ohno (Eds.), *Breakthrough: Harnessing Technology for a Better Future* (pp. 63–76). Brookings Institution Press.
- Munday, P., et al. (2022). Weather warning: assessing countries' vulnerability to economic losses from physical climate risks. *S&P Global Ratings*. https://www.spglobal.com/_assets/documents/ratings/research/101529900.pdf
- Net-Zero Tracker. (2022). Climate watch. <https://www.climatewatchdata.org/net-zero-tracker>
- O'Callaghan, B., et al. (2021). Roadmap to Green Recovery. *Oxford University Economic Recovery Project*. <https://recovery.smithschool.ox.ac.uk/roadmap-to-green-recovery/>
- Organization for Economic Co-operation and Development (OECD). (2022a). Climate finance provided and mobilised by developed countries in 2016–2020: Insight from disaggregated analysis. <https://doi.org/10.1787/286dae5d-en>
- . (2022b). ODA levels in 2021—preliminary data. <https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/ODA-2021-summary.pdf>
- Pearl-Martinez, R. (2014). Women at the forefront of the clean energy future. International Union for Conservation of Nature (IUCN) for USAID Bureau for Economic Growth, Education, and Environment.
- Pörtner, H. O., et al. (2022). Summary for policymakers. In H. O. Pörtner et al. (Eds.), *Climate change 2022: Impacts, adaptation and vulnerability* (pp. 3–33). Cambridge University Press. <https://doi.org/10.1017/9781009325844.001>

- Prasad, A., et al. (2022). Mobilizing private climate financing in emerging markets and developing economies. IMF Staff Climate Note 2022/007, International Monetary Fund.
- Ritchie, H., et al. (2022). Access to electricity vs. GDP per capita, 2020. *Our World in Data*. <https://ourworldindata.org/grapher/access-to-electricity-vs-gdp-per-capita>
- Sarr, M. D. (2022). At COP27, support poorest for climate loss and damage. *Nature*, 611(9), 9. <https://doi.org/10.1038/d41586-022-03474-1>
- Songwe, V., et al. (2022). Finance for climate action: Scaling up investment for climate and development. Report of the Independent High-Level Expert Group on Climate Finance. Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.
- Stern, N., & Lankes, H. P. (2022). Collaborating and delivering on climate action through a climate club. Independent Report to the G7.
- Stern, N., & Romani, M. (2023). <https://www.weforum.org/agenda/2023/01/globalgrowth-story-of-the-21st-century-lse-grantham-systemiq-davos2023/>
- Swiss Re. (2022). Biodiversity and ecosystems services index: Measuring the value of nature. <https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-biodiversity-and-ecosystems-services.html>
- Thiery, W., Lange, S., Rogelj, J., Schlessner, C.-F., Gudmundsson, L., Seneviratne, S. I., Andrijevic, M., Frieler, K., Emanuel, K., Geiger, T., Bresch, D. N., Zhao, F., Willner, S. N., Büchner, M., Volkholz, J., Bauer, N., Chang, J., Ciais, P., Dury, M., ... Wada, Y. (2021). Intergenerational inequities in exposure to climate extremes. *Science*, 374(6564), 158–160. <https://doi.org/10.1126/science.abi7339>
- Trading Economics. (2023). Bonds. <https://tradingeconomics.com/bonds>
- United Nations (U.N.). (1992). Report of the United Nations Conference on Environment and Development. A/CONF.151/26/Rev.1 (Vol. I).
- . (2021). The Sustainable Development Goals report. <https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf>
- UNEP. (2022). Emissions gap report 2022: The closing window—climate crisis calls for rapid transformation of societies. Nairobi. <https://www.unep.org/emissions-gap-report-2022>
- U.N. Women. (2022). Explainer: How gender inequality and climate change are interconnected. <https://www.unwomen.org/en/news-stories/explainer/2022/02/explainer-how-gender-inequalityand-climate-change-are-interconnected>
- Weitzman, M. L. (2001). Gamma discounting. *American Economic Review*, 91(1), 260–271. <https://doi.org/10.1257/aer.91.1.260>
- Winthrop, R., & Kharas, H. (2016). Want to save the planet? Invest in girls' education. <https://www.brookings.edu/opinions/want-to-save-the-planet-invest-in-girls-education/>
- World Bank. (2022a). Climate and development: An agenda for action—emerging insights from World Bank Group 2021–22 country climate and development reports. World Bank. <https://openknowledge.worldbank.org/handle/10986/38220> License: CC BY-NC-ND
- . (2022b). World development indicators. <https://databank.worldbank.org/source/world-development-indicators>

- World Data Lab. (2022). World emissions clock. Retrieved from <https://worldemissions.io/>
- World Economic Forum. (2023). *The global risks report 2023* (18th Ed.). World Economic Forum.
- World Government Bonds. (2022). World government bonds—current spreads. <http://www.worldgovernmentbonds.com/spread-historical-data/>
- World Meteorological Organization (WMO). (2022). State of the global climate, 2021. WMO-No. 1290. World Meteorological Organization.

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About the Center for Sustainable Development at Brookings

The Center for Sustainable Development generates leading research, insights, and convening to advance the economic, social, and environmental challenges of global sustainable development and help implement the Sustainable Development Goals (SDGs) within and across all countries.

To set a more robust global path to net-zero emissions by 2050, the world needs to pay greater attention to the needs of emerging markets and developing economies (EMDEs), even when holding aside the special case of China. Over the coming several decades, no part of the world will play a greater role in both experiencing and affecting global climate change outcomes than EMDEs themselves. They need greater international support to tackle growth-enhancing sustainable development strategies.

In *Keys to Climate Action*, twenty-five authors describe new economic narratives and global actions that can help catalyze progress toward inclusive, sustainable, and resilient growth in EMDEs. The volume begins with the stark reality of climate change's devastating consequences already hindering economic development around the world. It underscores the need for urgent investments in adaptation, resilience, and nature to avoid development setbacks while paying heed to the world's narrow window for climate action. It requires empathy for many developing countries' profound energy conundrum: a tension between the need to expand access for people who need it most while facing pressures to pursue low-carbon opportunities, often in the face of local political and financing headwinds. It implies practical urgency in tackling the broken threads of the international financing system for climate and development.

The volume brings together a cross-section of distinguished academics and leading policy voices from a variety of developing country geographies and contexts. It presents perspectives on the country-specific climate and development challenges and opportunities in Bangladesh by **SALEEMUL HUQ** and **MIZAN KHAN**, Egypt by **HALA ABOU-ALI**, **AMIRA ELAYOUTY**, and **MAHMOUD MOHIELDIN**, India by **MONTEK SINGH AHLUWALIA** and **UTKARSH PATEL**, Indonesia by **MUHAMAD CHATIB BASRI** and **TEUKU RIEFKY**, Nigeria by **BELINDA ARCHIBONG** and **PHILIP OSAFO-KWAAKO**, and South Africa by **RICHARD CALLAND**. Then, broader case studies focus on regional issues in East Africa by **NJUGUNA NDUNG'U** and **THÉOPHILE AZOMAHOU**, across the African continent as a whole by **VERA SONGWE** and **JEAN-PAUL ADAM**, in Latin America and the Caribbean by **DANIEL TITELMAN**, **MICHAEL HANNI**, **NOEL PEREZ BENITEZ**, and **JEAN-BAPTISTE CARPENTIER**, and among the Vulnerable Twenty Group of Ministers of Finance of the Climate Vulnerable Forum by **SARA JANE AHMED**. A final chapter by **MONTEK SINGH AHLUWALIA** and **UTKARSH PATEL** focuses on systemic issues in financing development and climate-driven prosperity.

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