

Development and Climate Change

A Strategic Framework for the World Bank Group

1. THE CHALLENGE: DEVELOPMENT IN THE CONTEXT OF CLIMATE CHANGE

1. Climate change epitomizes the complexity of the development challenge in a globalizing but still highly unequal world. It magnifies growing concerns about food security, water scarcity, and energy security. Its recognition is owed to modern science, yet solutions involve deeply ethical considerations. It is a daunting environmental threat that raises the most difficult issues of economic disparity, political power, and social justice. Climate change makes people of every nation citizens of one planet dependent on the actions of others, and a way forward will require overcoming divisions among different groups. How nations and their people will come together to tackle this unprecedented challenge is likely to become a defining feature of our time, affecting the lives of the current and future generations.

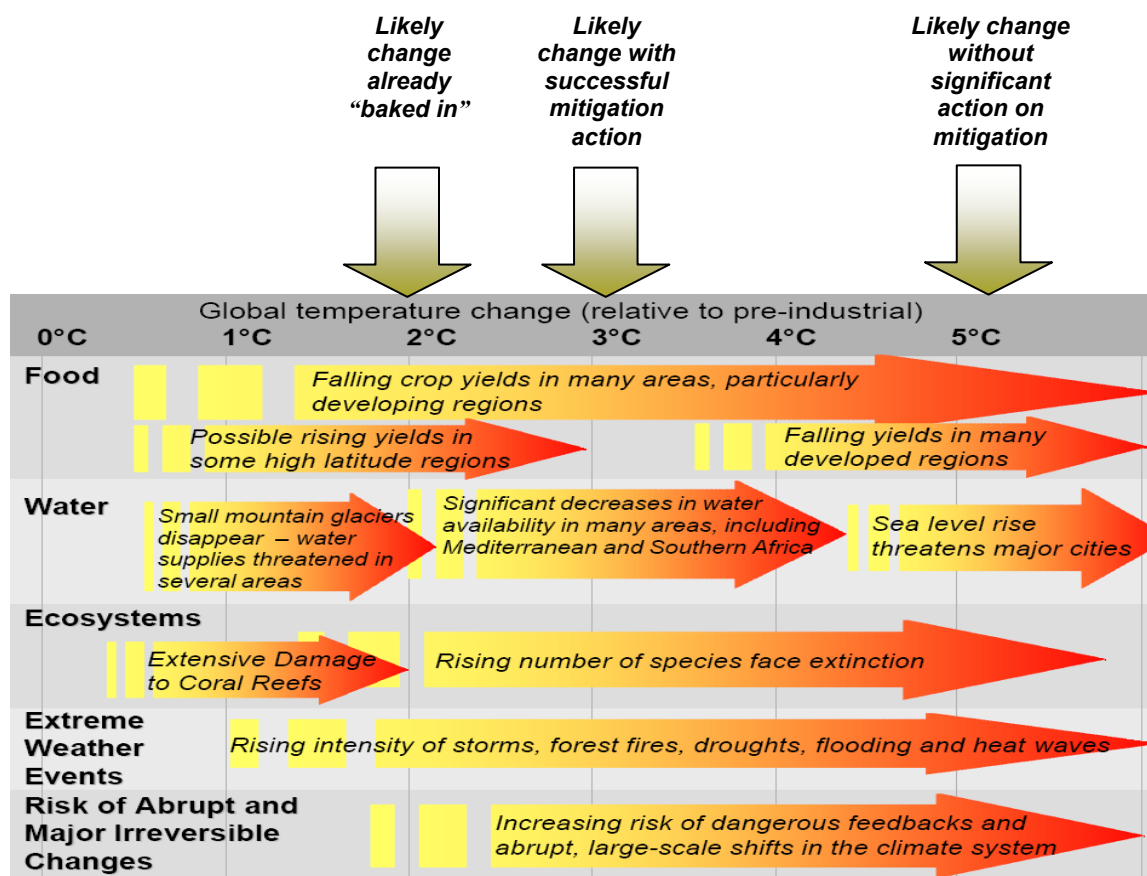
2. **Climate change is a development reality.** In its Fourth Assessment Report, the *Intergovernmental Panel on Climate Change* (IPCC 2007) made clear that the evidence of the warming of the climate system is unequivocal.¹ Over the last century, there are empirical records of widespread increases in observed air and sea temperatures, sea-level rise, melting sea-ice and glaciers, and reduction of snow cover. In addition, at continental, regional, and ocean basin scales, there are observed trends of extreme weather patterns including more intense and longer droughts, an increase in extreme precipitation events over many land areas, and more hot days and heat waves. The anticipated impacts of climate change, which could begin to occur within the next two to three decades, include: dangerous floods and storms; exacerbated water stress; decline in agricultural productivity and food security; and further spread of water-related diseases, particularly in tropical areas. This could lead to population displacement, migration, and potential conflicts. In the longer term, sea level rise and glacier melting threaten the existence of nations and the development foundation of sub-continents.

3. An effective response to climate change must combine both mitigation—to avoid the unmanageable—and adaptation, to manage the unavoidable. Most of the warming trend observed since the mid-20th Century is very likely due to an increase in anthropogenic greenhouse gas (GHG) concentrations, particularly of carbon dioxide (CO₂) caused by activities such as fossil fuel use and land use changes. While the Earth is likely to already be committed to the level of warming within 2 degrees Celsius, the challenge remains to curtail global greenhouse gas (GHG) emissions so that it will be feasible to “manage the unavoidable” without incurring costs and impacts of a catastrophic magnitude (see Figure 1). A delay in reducing GHG emissions significantly constrains opportunities to achieve lower GHG atmospheric concentration stabilization levels and is likely to increase the risk of severe (and possibly some irreversible) impacts and the cost of adapting to them.

¹ IPCC, 2007: *Climate Change 2007*. Contributions of Working Groups I, II, and III to the Fourth Assessment, Cambridge University Press, Cambridge, UK.

4. While mitigation is about reducing global GHG emissions, adaptation needs to happen at the regional, national, and local levels. One of the main features of climate change is a major asymmetry in the distribution of the causes and impacts across countries. Industrialized countries have contributed most to the existing stock of emissions in absolute terms and on a per capita basis, while many of the developing countries are likely to bear the brunt of the impacts (see Annex 1).

Figure 1: Adaptation Challenges Depend on Mitigation Progress



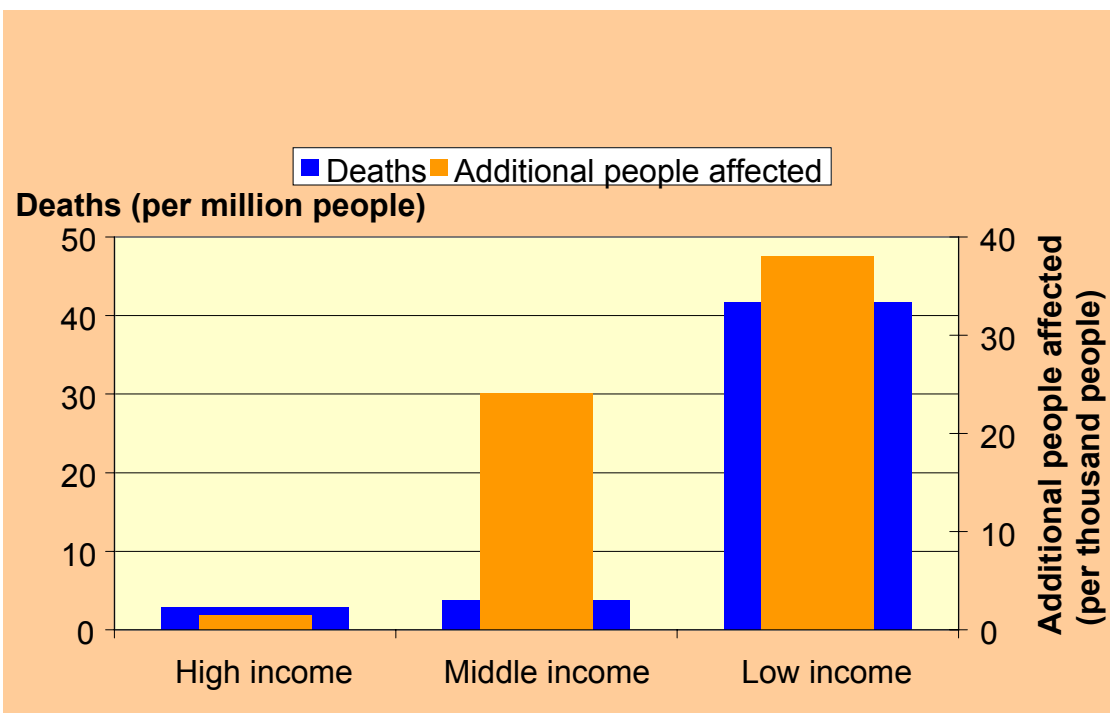
Source: Adapted from IPCC 2007.

5. **Developing countries and the poorest communities are likely to suffer earliest and the most.** This is due to their geographical location, low incomes, and limited institutional capacity, as well as their greater reliance on climate-sensitive sectors such as agriculture. Developing countries are burdened more by climate-related natural disasters than industrialized countries (Figure 2). The IPCC 4th Assessment Report and the United Nations Development Program (UNDP) Human Development Report 2007² document chronic water stress, food security at risk, a growing frequency of climate-related disasters, and an increased burden of diarrhea and malaria as among the most notable examples of the threats to livelihoods and development aspirations (see Annex 1).

² UNDP, 2007: Human Development Report 2007/2008: Fighting Climate Change: Human Solidarity in a Divided World. accessible at <http://hdr.undp.org/en/reports/global/hdr2007-2008/>

6. Climate change has the potential to reverse the hard-earned development gains of the past decades, and impede the progress toward achieving the Millennium Development Goals (MDGs), such as eradicating poverty, combating communicable diseases, and ensuring environmental sustainability. Incremental climate changes within the near future will largely occur in arid, semi-arid and dry sub-humid regions of the developing world that are home to half of the world's currently malnourished populations. Women, indigenous communities, and marginalized societal groups are among the most vulnerable. Some of the effects are already emerging at a regional scale although it is difficult to discern due to adaptation and non-climatic drivers.

Figure 2: The Toll of Climate-Related Natural Disasters (1960 – 2006)



Source: Centre for the Research on the Epidemiology of Disasters, Université Catholique de Louvain. www.emdat.eb Disasters include floods, droughts, landslides, extreme temperature events, wind storms, wave/storm surges, and wildfires. Low income economies are those with a gross national income (GNI) per capita of US\$ 905 or less in 2006, middle income economies are those with a GNI per capita of more than US\$ 905 but less than US\$ 11,116.

7. **Climate change increases the costs of development.** There are at least three dimensions to these added development costs: (1) the required economic adjustments to the impacts of global climate policies, including actions that may lead to price increases for various commodities, such as energy and food, or changes in trade balances; (2) the need for more resilient infrastructure, disaster relief and preparedness measures, and new agricultural technologies and practices to counter increased risks of climate change impacts; and (3) the accelerated adoption of less GHG intensive technologies, including those with higher costs and risks, as may become necessary in the context of the global climate change regime.

8. Fundamentally, the challenge is to help poorer countries grow their economies and improve living standards despite the higher costs of development inflicted by climate change.

Subsequently, there is a need to improve global and country-based knowledge of all these cost components and ways to minimize the total burden. This also means that successful global mitigation policies should be balanced with the consideration of national burdens of adaptation, and the equity and social concerns across and within the countries.

9. The increasing complexity of the development challenge, including multiple linkages to climate change, food security, and energy security, has been highlighted by the ongoing food price crisis. Indirect and unintended consequences of policies motivated by concerns about energy security and climate change have contributed to a competition between crops for food and crops for fuel. Rising fuel prices have been another factor contributing to the current food price increases. Looking ahead, the impact of likely changes in energy prices from anticipated global mitigation efforts along with the corresponding changes in other commodity prices on the price of food, is an area that requires further analysis. In addition, climate variability and early signs of changing weather patterns will likely contribute to further uncertainty in crop yields and volatility in food prices. Implications of a combination of all these and other factors for the poorer population groups need to be better understood and addressed on a country-by-country basis.

10. **The importance of growth and energy access.** Accelerating or sustaining high economic growth remains critical for developing countries—and is more urgent because of climate change. Poor countries have a myriad of pressing priorities, low capacities, and a very high opportunity cost of investment. Vulnerability of the poor to changing climate is underpinned by socio-economic limitations, notably a lack of investments in agriculture and rural infrastructure, extensive degradation of arable lands, settlement in risk-prone areas, poor access to credit and markets, and inadequate social safety nets. There is scope for adaptation actions that can both achieve lower carbon growth and be supportive of national development priorities and local business opportunities—such as energy efficiency, renewable energy, sustainable livelihoods and environmental protection (see Box 1).

Box 1: Examples of Climate Action as a Development Opportunity

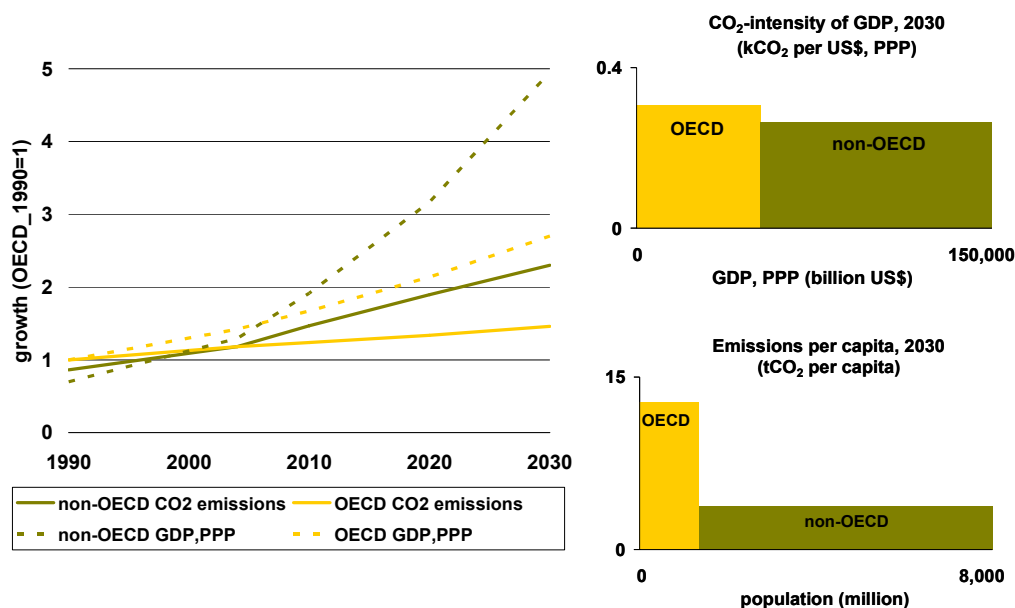
- New business enterprises in response to new markets and economic diversification
- Increased sustainability of rural livelihoods due to better management of climate change risks
- Greater energy efficiency and diversification of energy base
- Technological innovation that increases competitiveness, improves lifestyles, and protects the environment
- Higher-quality infrastructure resilient to climate-related disasters
- Improved urban air quality and reduced congestion
- Better forest and land management practices that also benefit local communities
- Improved spatial planning and accountable local governance with multiple benefits for local communities

Source: The WBG.

11. As developing countries strive to expand their economies and reduce poverty, they need energy to meet the MDGs and fuel requirements. About 1.6 billion people worldwide still have no access to electricity networks, most of them living in sub-Saharan Africa and South Asia. Many more people throughout the developing world do not have *dependable* access to electricity. Without that access to modern, clean, reliable, and efficient energy services, the poor miss out on the most basic opportunities for economic development and improved living standards. **Gross domestic product (GDP)** per capita and energy per capita, two MDG indicators, will remain lower in most of the developing countries than in industrialized countries

over the next decades, although these indicators will vary significantly across developing countries and between low income and middle income groups. Energy-related carbon-dioxide (CO₂) emissions per capita will also remain significantly lower in most developing countries for the decades to come (see Figure 3).

Figure 3: The case for cooperative global action: Projected growth in CO₂ emissions and GDP, CO₂ emissions per capita, and per GDP in the Organization for Economic Co-operation and Development (OECD) and non-OECD countries



Source: EIA – USDOE 2007.

12. **Tackling climate change takes a global community.** At the global level, energy production, transformation and use are the largest contributors to GHG emissions—and will remain so for years to come. Developed countries will continue to have higher energy use and emissions per capita for the foreseeable future. Reflecting their substantially larger population and an increasingly larger contribution to the global economy, absolute CO₂ emissions flows from non-OECD countries have recently surpassed emissions from OECD countries. Under future “baseline” projections by several sources, non-OECD emissions are expected to grow faster than emissions from OECD countries—but slower than in OECD compared to the respective economic growth rates (Figure 3). Bringing global emissions to the levels recommended by the IPCC translates into significant emission reductions by developed countries and slowing the growth of emissions in developing countries, with eventual stabilization in the long term. Even in a hypothetical case of emissions from developed countries becoming zero, a change in the emission trajectory of developing countries would be needed to stabilize global GHG concentrations at the levels considered manageable by the IPCC.

13. In the international arena, global climate policy is guided by the United Nations Framework Convention on Climate Change (UNFCCC). Adopted in 1992 to set goals for preventing “dangerous human interference with the climate system,” the UNFCCC has now been ratified by 192 Member States. Guided by *the principle of common but differentiated*

responsibilities and respective capabilities, the Convention seeks to commit industrialized countries to reduce their emissions and to help developing countries adapt to increased climate risks and to slow their emission-growth trajectories in a way that will support rather than hinder their economic development. The 1997 Kyoto Protocol was the first binding international instrument under the UNFCCC that codified GHG emission reduction targets for: 37 industrialized countries, economies in transition (EIT), and the European Commission (EC). The targets amount to an average of 5.2 percent against 1990 levels over the five-year period 2008–12. As of May 2008, 181 nations and the EC have ratified the treaty.

14. A series of major studies, including the IPCC Fourth Assessment Report (2007), the Stern Review of the Economics of Climate Change (2006), the UNFCCC Report on Investment Flows (2007), the International Energy Agency's (IEA) World Energy Outlook (2007) and Energy Technology Perspectives (2008), and the Organization for Economic Co-operation and Development Environmental Outlook (2008),³ have improved our understanding of the feasibility and costs of curbing GHG emissions. Limiting global GHG emissions so as to keep the impacts of climate change manageable will require deployment of currently available and future low-carbon technologies across a range of sectors on a global scale, along with other changes in economic activities and, where applicable, lifestyles. It should be noted that while energy is the main source of GHG emission globally and in developed countries, land use change, forestry, and agriculture currently account for almost 50 percent of GHG emissions in developing countries, pointing to additional opportunities in these sectors in the immediate future (see Chapter 4). Economic cost estimates from several recent studies vary from about 3 percent of global GDP (IPCC 2007) per year to annual costs of 0.5 percent of global GDP by 2030 (OECD 2008), suggesting the task is formidable but feasible (see Annex 2).

15. As evidence of changing climate is stronger than ever, it is in stark contrast to accelerated growth in global CO₂ emissions. Since 2000, the world experienced the highest growth in CO₂ emissions of the past several decades, surpassing projections used by the IPCC and most of the other above-mentioned studies. An analysis undertaken by the World Bank for 70 countries with the largest CO₂ emissions from fossil fuels shows that by several measures of CO₂ performance over 1994–2004, developed countries, as a group, have not fared better than developing ones.⁴ Progress toward the emission reductions targets under the Kyoto protocol has also been mixed (see Annex 1). There are significant differences in performance across individual countries within each group. A reversal in the global trend in emissions requires bolder actions by developed countries as well as bolder multilateral action.

³ See World Bank (2006). Clean Energy and Development: Towards an Investment Framework, available at [http://siteresources.worldbank.org/DEVCOMMINT/Documentation/20890696/DC2006-0002\(E\)-Clean_Energy.pdf](http://siteresources.worldbank.org/DEVCOMMINT/Documentation/20890696/DC2006-0002(E)-Clean_Energy.pdf)
Nicholas Stern (2007). The Economics of Climate Change: The Stern Review. Cabinet Office - HM Treasury, at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm
Source: "Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention" Dialogue working paper 8 (2007), at http://unfccc.int/files/cooperation_and_support/financial_mechanism/financial_mechanism_gcf/application/pdf/dialogue_working_paper_8.pdf
See the IPCC Fourth Assessment Report Synthesis Report, at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf
See OECD (2008). OECD Environmental Outlook to 2030, at <http://www.oecd.org/environment/outlookto2030>
IEA (2008). Energy Technology Perspectives 2008: Scenarios and Strategies to 2050, at <http://www.iea.org/w/bookshop/add.aspx?id=330>

⁴ *Growth and CO₂ Emissions: How do Different Countries Fare?* Bacon et al, the World Bank, 2007, at <http://siteresources.worldbank.org/INTCC/214574-1192124923600/21511758/CO2DecompositionfinalOct2007.pdf>

16. The past year witnessed impressive consensus-building on the urgency of addressing climate change that culminated in an agreement by the 13th Conference of Parties (COP) of the UNFCCC in Bali in December 2007 to launch negotiations towards comprehensive, long-term cooperative action by all countries. The framework for negotiations embraces mitigation of climate change (including, for the first time, consideration of reducing emissions from deforestation, sustainable forest management, reforestation, forestation, and forest and land degradation), adaptation, technology development and transfer, and provision of financial resources in support of developing countries' actions (see Box 2).

Box 2: Highlights from the Bali Action Plan

The Bali Action Plan was formulated by member countries of the UNFCCC at COP 13 in December 2007 in order to enhance the implementation of the Convention and negotiate long-term cooperative action. Reaffirming that socio-economic development and poverty reduction are global priorities, the Bali Action Plan calls for:

Enhanced action on mitigation of climate change:

- nationally appropriate, measurable, reportable and verifiable mitigation commitments or actions, including quantified emissions limitation and reduction objectives by all developed countries, taking into account differences in their national circumstances;
- nationally appropriate mitigation actions by developing countries in the context of sustainable development, supported by technology and enabled by finance and capacity building in a measurable, reportable and verifiable manner;
- policy approaches and incentives relating to emissions reductions from deforestation and forest degradation in developing countries;
- cooperative sectoral approaches and sector-specific actions, as well as market-based approaches.

Enhanced action on adaptation to climate change:

- international action to support implementation of adaptation actions;
- risk management and risk reduction strategies, including risk sharing and transfer mechanisms such as insurance;
- disaster reduction strategies;
- economic diversification to build resilience.

Enhanced action on the development and transfer of technology to support mitigation and adaptation:

- effective mechanisms for scaling-up the development and transfer of affordable and environmentally-sound technologies to developing countries, and ways to accelerate their deployment and diffusion;
- cooperation on research and development of current, new and innovative technology;
- mechanisms and tools for technology cooperation in specific sectors.

Enhanced action on the provision of financial resources and investment to support mitigation and adaptation:

- improved access to adequate, predictable and sustainable financial and technical support and provision of additional resources, including official and concessional funding for developing countries;
- positive incentives for developing countries to enhance mitigation and adaptation actions;
- innovative means of assisting developing countries that are particularly vulnerable to adverse impacts of climate change, including financial and technical support to capacity-building;
- incentives to implement adaptation via sustainable development policies;
- mobilization of public and private sector funding and investment, including facilitation of carbon-friendly choices.

17. **Climate change calls for reinvigorating the financial architecture for development at a scale not seen before.** Developing countries that have made lower historical contributions to GHG concentrations, have much lower per capita GDP and energy use, and are much more vulnerable to the impacts of changing climate. Yet, some analyses show that they may face bigger losses in GDP from certain global mitigation policies than the industrial world (OECD 2008). The UNFCCC and the Bali Action Plan require a cooperative arrangement to compensate developing countries for the cost of transition to a lower-carbon growth trajectory, transfer

technology, in a “measurable, reportable and verifiable” manner, and help with the adaptation needs so as not to compromise their growth and access to energy.

18. Emerging, and not yet completed, cost estimates for additional investments in developing countries point to a financial gap on the order of hundreds of billions of US dollars per annum for several decades. This is much beyond the current funds available through the dedicated global financing mechanisms, such as the Global Environment Facility (GEF) and international emissions trading (see Action Area 2). Importantly, financial resources are required *in addition* to the present level of Overseas Development Assistance (ODA), so as not to compete with achieving the MDGs. Even assuming that only a fraction of these amounts would be ODA-like financing, with a significant portion of investment flows coming from the private sector, the additional resource transfer needed by developing countries to secure their economic gains and future progress will be comparable to (and may exceed) the total current ODA flows.

19. **Road Map.** Helping developing countries access additional financial resources, technology, technical assistance and knowledge, and effectively use those in their national, regional, and local policies and programs so as to reconcile development needs with climate risks and constraints is at the core of the World Bank Group’s (WBG) approach, which is articulated in the following chapters. The next chapter describes WBG relations with the other players in the international arena of climate action. Chapter 3 outlines guiding principles and objectives for scaling up WBG engagement in addressing the development costs of climate change. Chapters 4–9 detail specific operational responses. Chapter 10 concludes with a summary of progress on developing the results framework and key actions the WBG will undertake in the next three years.