

Finance for Climate Action

A SNAPSHOT OF THE
WORLD BANK GROUP'S
CLIMATE WORK



WORLD BANK GROUP
Climate Change

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ABBREVIATIONS

ADB	Asian Development Bank	GHG	Greenhouse Gas
AfDB	African Development Bank	GWh	Giga Watt Hour
BioCF	Bio Carbon Fund	ha	Hectare
BMU	Federal Ministry for the Environment, Germany	IADB	Inter-American Development Bank
BMZ	Federal Ministry of Economic Cooperation and Development, Germany	IBRD	International Bank for Reconstruction and Development
BNPB	Badan Nasional Penanggulangan Bencana	IDA	International Development Association
BPBD	Badan Penanggulangan Bencana Daerah	IFC	International Financial Corporation
BRICKS	Building Resilience through Innovation, Communication and Knowledge Services Project	IMF	International Monetary Fund
Ci-Dev	Carbon Initiative for Development	JBIC	Japan Bank for International Cooperation
CIF	Climate Investment Funds	JICA	Japan International Cooperation Agency
CO ₂	Carbon Dioxide	kg	Kilogram
CONAFOR	National Forestry Commission of Mexico	kWh	Kilo Watt Hour
CSP	Concentrated Solar Power	LDCF	Least Developed Countries Fund
CTF	Clean Technology Fund	LDCs	Least Developed Countries
DRM	Disaster Risk Management	MDBs	Multilateral Development Banks
EBRD	European Bank for Reconstruction and Development	MDTF	Multi Donor Trust Fund
EC	European Commission	MIGA	Multilateral Investment Guarantee Agency
EIB	European Investment Bank	MLF	Multilateral Fund for the implementation of the Montreal Protocol
ESMAP	Energy Sector Management Assistance Program	MNA	Middle East and North Africa
EU	European Union	MW	Mega Watt
FCPF	Forest Carbon Partnership Facility	ODS	Ozone Depleting Substances
FIP	Forest Investment Program	OECD	Organisation for Economic Co-operation and Development
GDP	Gross Domestic Product	OECD DAC	Organisation for Economic Co-operation and Development-Development Assistance Committee
GEF	Global Environment Facility	OpenDRI	Open Data for Resilience Initiative
GFDRR	Global Facility for Disaster Reduction and Recovery	PPCR	Pilot Program for Climate Resilience
		PROFOR	Program on Forests

PV	Photovoltaic
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SAWAP	Sahel and West Africa Program
SCCF	Special Climate Change Fund
SREP	Scaling Up Renewable Energy in Low Income Countries Program

tCO ₂ e	Tonnes of Carbon Dioxide Equivalent
TF	Trust Fund
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBG	World Bank Group



Source: KACO new energy GmbH.

DELIVERING FINANCE FOR CLIMATE ACTION

All development finance is today being provided in a world shaped by climate change, posing risks to the achievement of core development goals and impacting poor people and the under-privileged the hardest. Tackling this requires strong public policies, including policies relating to finance, ensuring development is robust to climate challenges, while providing businesses and households the certainty and predictability to make long-term investments in climate-smart development.

Strong policy signals can include making clear long term goals to decarbonize the global economy before 2100, putting a price on carbon pollution, removing harmful and costly fossil fuel subsidies, and ensuring that development takes into account climate and disaster risks. These are the policies that can spur long term demand for clean growth and an increased commitment to resilient development.

Finance will play a critical role in making the transition to low carbon, resilient economies. In the period to 2030, the global economy will require US\$89 trillion in infrastructure investments across cities, energy and land-use systems and US\$4.1 trillion in incremental investment for the low carbon transition to deliver on the 2 degree Celsius goal.¹ Ultimately, such policies will unlock much needed financing by building the right environments to support a strong private sector, attract finance and expand the domestic revenue base.

All sources of financing will have a role to play in making a successful transition to low carbon

and resilient growth. The World Bank Group has been working with the multilateral, national and bilateral development banks on issues related to development and climate finance, including ways to demonstrate in a transparent and harmonized manner how much development finance is flowing to support climate action, assessing the resources mobilized beyond these institutions, and showcasing emerging best practices to make portfolios climate-smart and demonstrate the impact of investment flows.

Over 2011–14² the multilateral development banks (MDBs) collectively committed over US\$100 billion,³ or an average of US\$26.5 billion a year, to address climate mitigation and adaptation in developing and emerging economies. In calendar years 2013–14, the MDBs represented 40 percent of average climate finance flows of US\$57 billion⁴ a year from developed to developing countries, towards the US\$100 billion a year commitment⁵ for climate action by 2020.

This paper provides a snapshot of projects where the World Bank Group has deployed its own resources, with parallel sources of climate finance, to catalyze additional investments to tackle climate change.

2. Unless otherwise stated fiscal years are presented (July 1–June 30).

3. The World Bank and IFC represented around 40 percent.

4. Climate Finance in 2013–14 and the USD 100 Billion Goal, A report by the OECD in collaboration with Climate Policy Initiative, 2015.

5. The Copenhagen Accord and Cancun Agreements reached by the Conference of the Parties to the UNFCCC established and confirmed a collective commitment by developed countries to mobilize \$100 billion per year by 2020 to address the needs of developing countries (from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources). (Decision 1, CP16, para. 98 and 99).

1. Better Growth, Better Climate. The New Climate Economy Report. The Global Commission on the Economy and Climate. 2014.



Source: TerrAfrica.

MEASURING CLIMATE FINANCE AT THE WORLD BANK GROUP

The World Bank Group tracks the climate mitigation and adaptation co-benefits of all its financing, in response to commitments to its Board of Executive Directors.⁶ This methodology is harmonized across the MDBs that report jointly on an annual basis,⁷ and is closely aligned with the International Development Finance Club through an agreement reached in 2015 on Common Principles for Mitigation⁸ and Adaptation⁹ Finance Tracking, and with the OECD DAC Rio Markers.¹⁰

6. Refer to the Development and Climate Change, A Strategic Framework for the World Bank Group (2008) and Report from the Executive Directors of the International Development Association (IDA) to the Board of Governors: Additions to IDA Resources, Sixteenth replenishment, Delivering Development Results (2011).

7. <http://documents.worldbank.org/curated/en/2015/06/24641149/>.

8. <http://www.worldbank.org/en/news/feature/2015/04/03/common-principles-for-tracking-climate-finance>.

9. <http://www.worldbank.org/en/news/press-release/2015/07/09/development-banks-common-approach-climate-finance>.

10. <http://www.oecd.org/dac/environment-development/rio-markers-joint-tt-may-2015.htm>.

A development activity provides climate co-benefits if it:

- promotes efforts to reduce or limit greenhouse gas (GHG) emissions or enhance GHG sequestration
- Reduces the vulnerability of people or natural systems to the impacts of climate change and risks related to climate variability by maintaining or increasing adaptive capacity and resilience.

The latest joint-MDB report¹¹ was published in June 2015 gives a detailed overview of how climate finance is counted, where it is flowing, and how it has created impact. The MDBs have been jointly publishing this information since 2011.

11. <http://documents.worldbank.org/curated/en/2015/06/24641149/>



Source: World Bank.

WORLD BANK GROUP TRENDS IN CLIMATE FINANCE OVER 2011–15

The main agencies of the World Bank Group¹² have deployed balance sheet resources and dedicated climate funding to catalyze numerous projects, which have delivered significant benefits.¹³

Over the last five fiscal years, the Bank Group has committed an average of US\$10.3 billion a year¹⁴ of its own resources, or around 21 percent of commitments, to help developing countries and emerging economies mitigate and adapt to the challenges of climate change.

This represents an average of 182 climate operations a year or about 25 percent of all operations of the Bank Group. Cumulatively, over US\$50 billion dollars has been committed to more than 900 projects with climate-related activities, with 27 percent focusing on helping people and countries adapt to a changing climate and 73 percent on mitigating the impact of climate change. (Annexes 1–3).

Mitigation activities have included support for changes to urban transportation and railways, investments in hydropower, other forms of renewable energy,¹⁵ promotion of energy efficiency, for

TABLE 1 World Bank Group Trends in Climate Finance, 2011–15

Climate Finance at the WBG	2011–15 Average (3-year rolling average)
Climate Operations (number per year)	182
Climate Operations (% per year)	25
Climate Commitments (US\$ billion per year)	10.3
Climate Commitments (% per year)	21

example. Adaptation activities have included projects supporting coastal and flood protection, irrigation and draining systems, protection for forests and landscapes and developing resilient crop systems.¹⁶

Map 1 shows the geographical distribution of climate finance over 2011–15, reflecting country demand for development solutions.

Beyond investment funding, the Bank Group provides policy and technical advice, including on project design. While technical support to client countries on climate change may be small in financial terms, it can deliver major impacts for low-emission and climate-resilient development. Around 20 percent of the 1491 analytical and advisory products at the World Bank completed in 2015 delivered climate mitigation and adaptation co-benefits.

12. Including the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA).

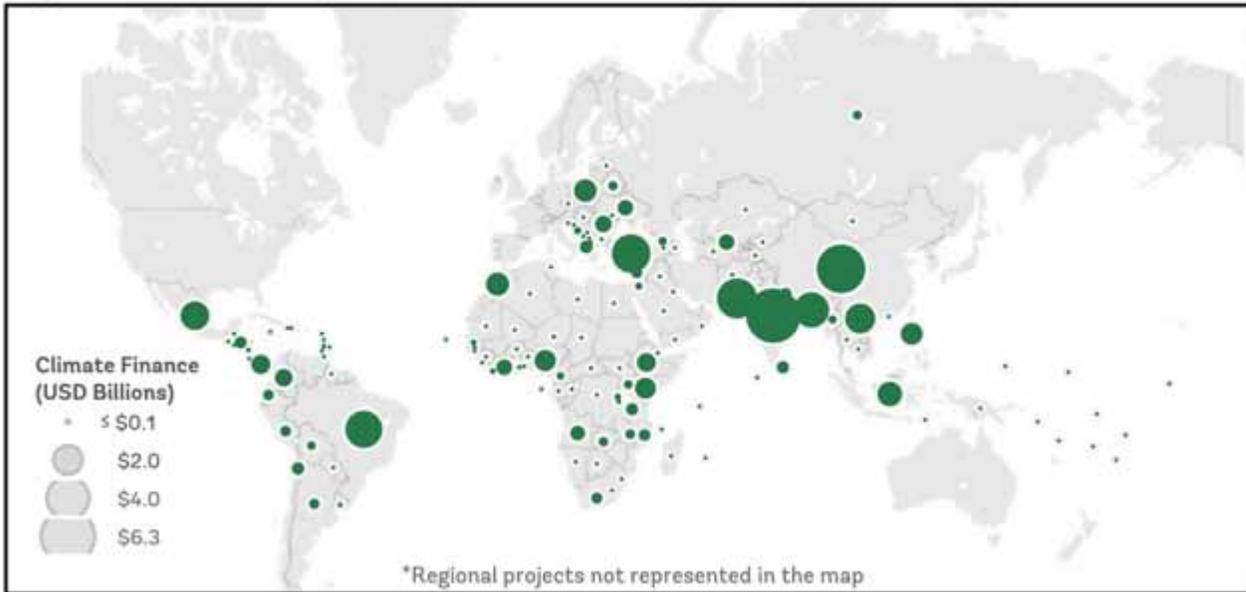
13. IFC finance numbers use only Long Term Finance for own account, unless otherwise stated.

14. The 3-year rolling average has been used to assess the percentage of finance with climate-co-benefits in any given fiscal year. This is the average of that fiscal year's percentage with the percentage of the preceding 2 years. The 2011–15 average number is calculated by taking the average of the available 3-year rolling averages for that period.

15. Energy and transportation sectors together account for 65% of WBG's mitigation finance.

16. The two major sectors with adaptation commitments are Water, sanitation and flood protection and the Agriculture, fishing, and forestry, together accounting for 58% of the WBG's adaptation finance.

MAP 1 The Global Scope of the World Bank Group's Climate Work, 2011–15



Source: World Bank.

MOBILIZING OTHER RESOURCES FOR CLIMATE ACTION

It's through the Bank Group and its ability to catalyze public and private funds that both countries and the public and private sectors have been able to benefit from a wide range of parallel sources of climate financing. Over the past five years, an annual average of US\$11.3 billion in public and US\$5.07 billion in private and other sources of financing have supported client projects with climate co-benefits together with funding from the World Bank and IFC.¹⁷

It is important to note there are a number of parallel sources of finance through Trust Funds that can support countries' readiness and climate finance investment objectives. The Bank Group has helped its client countries access other sources of external finance such as that provided by the Global Environment Facility (GEF), the

17. These numbers are calculated on a 3-year rolling average basis over fiscal years 2011-15. Together with the MDBs the WBG has developed a working methodology to assess the co-financing for climate action, or the public, private and other sources of financing that come alongside WBG resources in a climate project. This is not limited to resources where the World Bank Group had a direct involvement in raising resources. In allocating a climate benefit the following approach is used: if a project is assessed as having 50% in climate co-benefits, 50% of the co-financing is counted as climate co-financing. The methodology is new and is expected to evolve over time. Key discussions are underway on how to address double counting. Neither the World Bank nor IFC have dedicated systems to track climate co-finance, resulting in manual sourcing of data from Bank Group Board information. The data used to prepare this document was not subject to the Bank Group's normal operational and audit processes and should be considered preliminary only. There is no specific tracking system available to distinguish between public and private sources of co-financing. Consequently, all co-financing sources had to be assessed individually, which was not always possible due to time constraints. A more generic attribution was then applied based on historic data and project context. Note the IFC also tracks core mobilization. This is assessed at financial closure and counts if IFC can demonstrate that they played an active and direct role in raising resources.

Climate Investment Funds (CIF), various carbon funds, the Multilateral Fund of the Montreal Protocol, the Global Facility for Disaster Reduction and Recovery (GFDRR), the IFC-Canada Climate Change Program, and potentially the Green Climate Fund going forward¹⁸ (Box 1).

By seeking to blend funds from outside sources with its own, the Bank Group can help spur successful investments, crowd in other investors and create incentives to drive transformation (Figure 1). It's a move that has helped the Bank Group identify and take on risk; buy down the cost of new technologies and accelerate investments in new markets; test new products; expand resources to low income countries; and provide technical assistance, as well as support to build up capacity within countries, learning and knowledge exchange.

A clear example of this is the US\$8.1 billion pledged to the Climate Investment Funds (CIF). With funding from the Bank Group and regional development banks, 72 developing countries have been able to pilot low-emissions and climate resilient development through country-led programs and investments. At the program level, financing of US\$945 million from the CIF's Clean Technology Fund (CTF) is driving global investments in Concentrated Solar Power (CSP) and is expected to contribute more than a quarter of current global capacity. This financing is expected to attract an additional US\$8.4 billion in co-financing for projects in Chile, South Africa, and the Middle East and North Africa region delivering a projected

18. The World Bank (IBRD/ IDA) received accreditation to the Green Climate Fund in July 9, 2015 as an implementing entity with intermediary functions. For more information see: <http://www.worldbank.org/en/topic/climatechange/brief/green-climate-fund>.

BOX 1 Highlights of the World Bank Group's Work with Other Climate Funds

Climate Investment Funds (CIF): As of June 30, 2015 US\$4.6 billion in CIF funding had been approved by MDB boards alongside US\$9.3 billion from the MDBs' own resources. This helped to: (i) buy down the cost for strategically important but high cost technologies; (ii) Take on risks such as those in the very early stages of geothermal development; (iii) test new products/business models; (iii) break the short tenor/high interest rate cycle that prevails in many emerging markets that limits access to long-term, low cost capital in the domestic market for climate related investments; and (iv) expand the pool of resources available to low income countries and countries in high risk of debt distress. Following devastating floods in 2013, the CIF's Pilot Program for Climate Resilience provided Mozambique with support to climate-proof road infrastructure so that roads rebuilt under the Bank Group's fund for the poorest countries, IDA's crisis response window would be more resilient in the future.

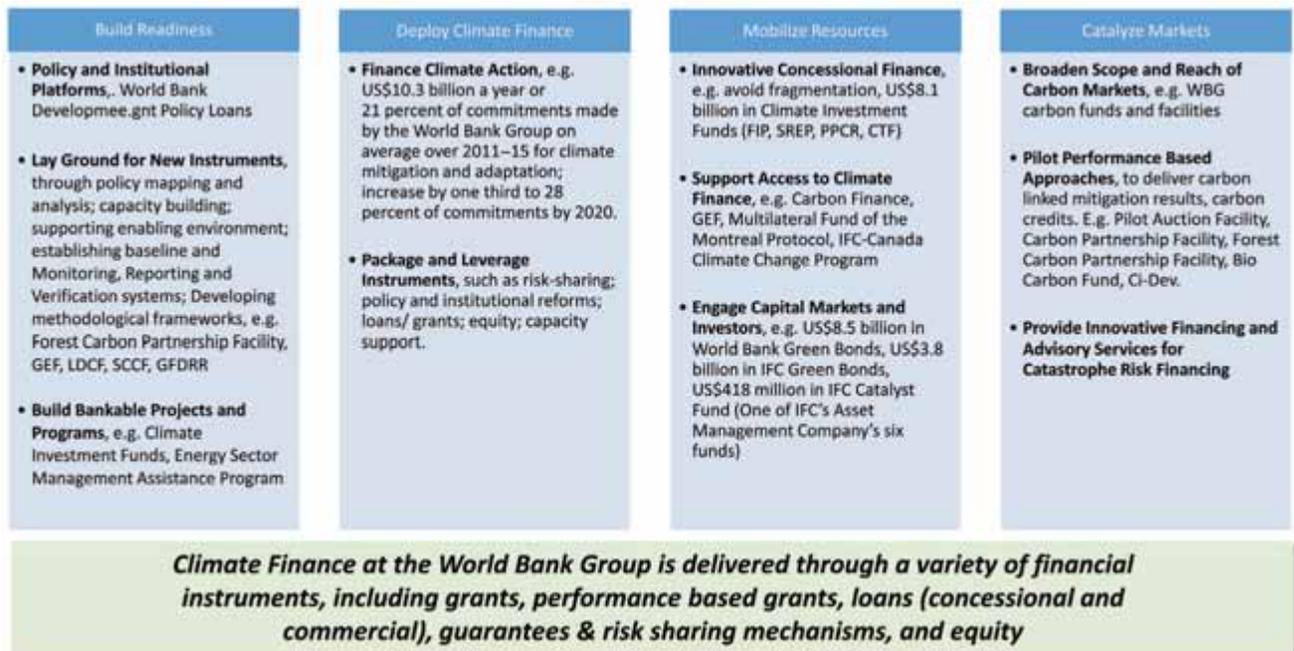
Carbon Funds: The World Bank Group launched the first global carbon fund, the Prototype Carbon Fund, in April 2000. In the following seven years, another 11 Kyoto funds and facilities were launched to pioneer a full range of flexibility mechanisms. The first generation of carbon funds successfully harnessed private sector funding, amounting to 56 percent of total peak capitalization of these funds at US\$2.76 billion. By the end of 2014, the Bank Group's Kyoto funds and facilities had delivered 196 million tCO_{2e}. Today, the Bank Group is shaping the next generation of carbon initiatives for the post-2012 period by developing new approaches to performance-based payments and piloting carbon instruments. The Bank Group has six different carbon initiatives, capitalized at US\$1.6 billion as of December 31, 2014, that aim to scale up emission reductions, build readiness for domestic carbon pricing plans, use auctions to put a price on carbon and increase access to energy in least developed countries (LDCs), and reduce emissions from deforestation and forest degradation. Overall 74 different public and private sector participants engage in the Bank Group's funds and facilities. Around 55 developing countries are being supported through more than US\$2 billion in funds for forests and landscapes including the Forest Carbon Partnership Facility (FCPF), the Forest Investment Program (FIP) and the Bio Carbon Fund (BioCF).

The Global Facility for Disaster Reduction and Recovery (GFDRR): GFDRR has invested up to US\$330 million since 2007 through more than 500 grants. It's helped over 80 countries develop innovative solutions to mitigate risk and mainstream disaster risk management into their development strategies, and build back after a catastrophe in a more resilient manner. In fiscal year 2015 alone, GFDRR-financed grants were delivered together with over US\$3.0 billion in financing from the World Bank.

Global Environment Facility (GEF): Over nearly 25 years US\$5.2 billion in World Bank-managed GEF grants have been channeled to client countries alongside US\$14.6 billion of IBRD/IDA funding and US\$22.2 billion from other sources. The GEF grants have crowded-in a diverse range of development, private sector and civil society partners for transformative low carbon programs, supported regional and global learning, and demonstrated efficiencies from cross program collaboration. Grants have helped to draw down risk on partner investments, for example the India Partial Risk-sharing Guarantee; build multi-stakeholder alliances, for example the Sahel and West Africa Program that supports the pan-African Great Green Wall Initiative to reverse land degradation and desertification in the Sahel and Sahara, boost food security and support local communities to adapt to climate change; strengthen institutional capacity, as in work on green energy schemes as Shanghai moves to become a low carbon city; demonstrate innovative approaches such as Concentrated Solar Power in Morocco; and transform policy, for example the introduction of climate friendly measures in transport in Mexico.

IFC's Concessional Climate Finance: This source of finance has supported climate-smart projects with high development impact that would not have been implemented otherwise due to unfavorable market conditions. IFC's sources of Climate Finance include the CIFs, GEF and some bi-lateral trust funds, including the IFC-Canada Climate Change Program.* In the last five years nearly US\$300 million in donor funds have been delivered with US\$1 billion of IFC investments and more than US\$4 billion of other private sector funds to support over 40 investment projects in 23 countries. This has helped to bridge gaps and address market barriers that obstruct private sector investment in areas of strategic importance. In Turkey, an initial concessional investment of US\$20 million in three local leasing companies helped catalyze renewable energy and energy efficiency lending, expand the sector and facilitate lending on purely commercial terms. It's also spurred IFC's ability to invest in new renewable energy technologies, develop new products, work in challenging markets and new sectors through innovative structures and build capacity in firms and governments to identify climate change opportunities and help countries develop regulatory environments that enable private sector investments.

*The IFC-Canada Climate Change Program is financed by a CN\$291.55 million contribution from the Canadian government. It is part of Canada's 2010 CN\$400 million commitment under the Copenhagen Accord.

FIGURE 1 Mobilizing and Leveraging Climate Finance at the World Bank Group

Source: World Bank.

generation capacity of 1.5 GW, or more than one-third of the current global capacity of 4 GW.

IFC, the Bank Group's private sector arm, also deploys innovative financial instruments to catalyze limited public funds and unlock private investment. Since 2005, IFC has provided over US\$13 billion in long-term financing for climate-related projects, including renewable energy, energy efficiency, sustainable agriculture, green buildings, and climate projects through financial intermediaries. In 2015, US\$75 million in concessional funds were committed to seven climate-smart projects with US\$150 million from IFC in projects worth over US\$650 million. More than half the commitments were in countries helped by the Bank's fund for the poorest countries, IDA, the International Development Association. In addition, US\$7.2 million was also provided to seven advisory projects. The IFC Catalyst Fund, managed by IFC's Asset Management Company, is another effective co-financing vehicle. To date,

it has raised more than US\$418 million from institutional investors and sovereign funds interested in green growth opportunities.

Green bonds are another powerful source of private sector led climate finance, which has emerged in recent years. The bonds support environmentally friendly activities, including projects that help mitigate climate change or help countries adapt to its effects by strengthening climate resilience. IFC and IBRD, the Bank Group's arm that provides loans and other assistance to primarily middle income countries, have worked to develop a robust, liquid market for green bonds. The World Bank has issued US\$8.5 billion in green bonds since it launched its first labeled green bond in 2008, with more than 100 transactions in 18 different currencies. The IFC has issued about US\$3.8 billion so far. This includes two US\$1 billion benchmark sales in 2013 that helped solidify and grow the green bond market, as well as the first Renimbi offshore green bond this year.



Source: IFC.

HIGHLIGHTS OF THE WORLD BANK GROUP'S CLIMATE WORK

Annexes 1–3 provide a snapshot of the World Bank Group's engagement on climate finance through illustrative case studies that show how funds are blended to deliver development solutions, which are sustainable and robust to climate impacts. Such examples shed light on some of the non-financial benefits the Bank Group can bring to a project to help deal with climate risks and crowd in additional public and private finance for climate action.

When collecting the information to develop this paper, some key lessons emerged from the diverse set of experiences across the Bank's institutions, including:

- Climate finance has been deployed across a range of areas, including energy, water, transportation and agriculture and for disaster mitigation, which underscores the cross-cutting nature of climate change. Climate change is truly felt across many sectors, industries and companies.
- In many cases, ensuring there is support for upstream analysis and planning, policy design and development is a good use of climate finance, and can help climate-smart projects be successfully

implemented. Bank involvement often spans all stages—from analysis to implementation—and takes place on a programmatic basis over a number of years.

- The Bank Group has a broad range of grants, guarantees and lending instruments at its disposal, and has been tailoring the use of these instruments to the needs of client countries to make projects work on the ground. This flexibility and collaboration across the Bank Group's institutions, and its engagement with partners including the MDBs, has been critical in ensuring projects integrate climate and disaster risk considerations in their design, and are financed and implemented.
- The World Bank and IFC have successfully deployed concessional climate funds to enable projects to move forward that would not have otherwise happened. In particular, many of these funds have been instrumental in unlocking and crowding in other, private, sources of capital for investments.



Source: World Bank.

SCALING UP CLIMATE FINANCE

To further boost climate impacts, the Bank Group focuses on helping create the right enabling environment to steer investments to lower carbon, resilient activities and mobilize finance for climate action.

Getting prices right through all fiscal measures including putting a price on carbon pollution, reforming subsidies and improving performance standards will help drive investment in low-carbon growth and generate revenue that can be used to boost prosperity and build resilience. In October 2015, a high level Carbon Pricing Panel¹⁹—convened by World Bank Group President, Jim Yong Kim, and IMF Managing Director, Christine Lagarde—called for a price on carbon ahead of the Paris climate talks to help steer the global economy towards a low carbon, productive, competitive future without the dangerous levels of carbon pollution driving warming. The Panel is complemented by a Carbon Pricing Leadership Coalition,²⁰ or voluntary action based group, bringing together the public and private sectors to help link business needs with public policies. This coalition, to be formally launched during the Paris climate talks, is aimed at supporting the

19. The panel includes German Chancellor Angela Merkel, Chilean President Michelle Bachelet, French President François Hollande, Ethiopian Prime Minister Hailemariam Desalegn, Philippines President Benigno Aquino III, Mexican President Enrique Peña Nieto, Governor Jerry Brown of California, and Mayor Eduardo Paes of Rio de Janeiro. They are joined in this effort by OECD Secretary General Angel Gurría. Private sector support for the Panel comes from US Institutional Investor CalPERS, ENGIE of France, Mahindra Group of India, and Netherlands-based Royal DSM. See: <http://www.worldbank.org/en/news/press-release/2015/10/09/world-bank-group-pledges-one-third-increase-climate-financing>.

20. <http://www.carbonpricingleadership.org/>.

introduction of carbon pricing, sharing experiences and boosting global, regional, national and sub-national understanding of emerging practices in implementing carbon pricing.

The Bank is also boosting its efforts to build resilience to climate-related disasters in development planning. In the past two decades, international public finance flows for disaster resilience have predominantly been used for post disaster recovery and reconstruction, rather than disaster prevention and preparedness.²¹ While adapting to climate change and building resilience has an upfront investment cost, actions can be more cost-effective in the long run than disaster relief if they are well-designed.²² According to World Bank research, US\$1 dollar invested in early warning systems can provide as much as US\$36 dollars in economic benefits, such as avoided property loss and more efficient production in sectors like agriculture, energy and transport.²³

21. Over 1991–2010 US\$106.7 billion of the US\$3 trillion committed in aid was allocated to disasters. Of this, only US\$13.5 billion addressed disaster prevention measures, US\$23.3 billion on post disaster reconstruction and rehabilitation and US\$69.9 billion was spent on disaster response. Kellett, J., & Caravani, A. (2013). *Financing Disaster Risk Reduction: A 20 year story of international aid*. Overseas Development Institute.

22. Government of the UK. 2012. *Foresight: Reducing Risks of Future Disasters—Priorities for Decision Makers*. Final Project Report. The Government Office for Science, London. (In all cases, a cost-benefit analysis of risk management is greatly influenced by value judgments on the discount rate, the time horizon over which benefits and costs are accrued, and the inclusion or exclusion of non-monetary outcomes, such as loss of human life).

23. Stéphane Hallegatte, 2012, World Bank Policy Research Working Paper (6058), *A Cost Effective Solution to Reduce Disaster Losses in Developing Countries: Hydro-Meteorological Services, Early Warning, and Evacuation*.

The seventeenth replenishment of IDA's takes an important step to support climate vulnerable client countries, building climate and disaster risk considerations into all levels of engagement from strategies to long term plans and operations. The CIF's Pilot Program for Climate Resilience (PPCR) has allocated US\$1.2 billion in pledges to support 18 countries (including two regional programs) in building their resilience and adapting to climate change and is extending its programmatic approach to 10 additional highly vulnerable countries, in preparation for full investment plans should new funds become available.

And in 2014, the World Bank launched the Small Islands States Resilience Initiative to scale up investment and technical assistance, share experience in disaster and climate resilience, and measure the progress in building resilience. Regardless of much financing into climate action is stimulated, public concessional finance will remain important for Least Developed Countries and Small Island Developing States.

To get climate finance flowing to where it is needed most, the Bank Group is looking at new areas where its climate impact can grow. There is growing evidence that warming close to 1.5°C above pre-industrial levels is already locked-in to the Earth's atmospheric system due to past and predicted emissions of greenhouse gases, posing real challenges to ending extreme poverty and boosting shared prosperity.²⁴ Meeting those challenges requires stepped up action to address climate impacts and mitigate emission of greenhouse gases.

To date, 159 developed and developing countries²⁵ to the United Nations Framework

Convention on Climate Change (UNFCCC) have submitted national plans, the Intended Nationally Determined Contributions (INDCs) towards reaching an agreement in Paris. These national plans represent trillions of dollars of potential country demand for climate relevant investments. An initial assessment²⁶ of the plans by the UNFCCC shows they cover 86 percent of global greenhouse gas emissions and will reduce global average emissions per capita by about eight percent 2025 and nine percent by 2030. They are currently estimated to have the capability of limiting the temperature rise to around 2.7 degrees Celsius by 2100 and include actions to adapt to climate change as well as to address mitigation. To meet the goal to limit warming within 2 degrees Celsius, these commitments will need to be translated into investments, including in resilient infrastructure.

In response to these challenges, the Bank Group will seek to leverage and blend its own and other sources of finance to help countries move on after the Paris talks toward low carbon, resilient growth. In October 2015, the Bank Group pledged a one third increase in direct climate financing and announced annual funding could potentially total US\$29 billion annually, with the support of its members. Currently, 21 percent of the Bank Group's funding is climate related and that could rise to 28 percent in 2020 in response to client demand, representing a one-third increase in climate financing. The Bank Group now provides an average of US\$10.3 billion a year in direct financing for climate action. If current financing levels were maintained, this would mean an increase to US\$16 billion in 2020. At the same time, the Bank Group plans to continue to current levels of leveraging co-financing for climate related projects: at current financing levels that would mean up to

24. Turn Down the Heat series of reports, World Bank (2012, 2013, 2014). See: <http://www.worldbank.org/en/topic/climatechange/publication/turn-down-the-heat>

25. As of November 10, 2015 159 Parties had formally submitted INDCs to the United Nations Framework Convention on Climate Change. For more information see: http://unfccc.int/focus/indc_portal/items/8766.php.

26. A synthesis report by the UNFCCC looked at 146 submissions from all developed countries and 75 percent of developing countries (as of October 1).

another US\$13 billion a year in 2020. The direct financing and leveraged co-financing together represent an estimated US\$29 billion.

To guide its future work, the Bank Group is developing a Climate Action Plan to go before its Board of Executive Directors in the first half of 2016. The Climate Action Plan will provide an umbrella for engagement and action post-Paris that will embrace initiatives like the Africa Climate Business Plan,²⁷ to be officially launched in Paris, which provides a platform to orient the Bank's climate action in Sub-Saharan Africa.

The Bank Group will support continued engagement with private financiers to accelerate investments and develop innovative financing instruments to leverage existing financing that have the potential to go to scale. And it will continue its efforts to complement its support to clients to access international climate finance, including through the Green Climate Fund and innovative finance models like the Pilot Auction Facility²⁸ that stimulate investment in projects

that reduce greenhouse gas emissions or boost resilience while maximizing the impact of public funds and leveraging private sector financing.

An important underpinning will be the ongoing work with a group of twenty-one financiers,²⁹ including the MDBs, some members of the International Development Finance Club and private financial institutions that support the five voluntary Principles to Mainstream Climate Change into Financial institutions, including on promoting transparency on climate finance flows and co-financing. The World Bank, IFC and MIGA support these Principles that have the potential to further mainstream climate change considerations within the operations of institutions that support them. This can further support the Bank Group's efforts to expand financing for climate investments.

27. The plan will strengthen the resilience of the continents natural and physical assets; scale up low carbon energy sources; and enable resilience through data, information and decision-making tools for promoting climate-resilient development across sectors.

28. The Pilot Auction Facility's results-based payment mechanism will set a floor price for future carbon credits in the form of a

tradable put option, which will be competitively allocated via auction. In a first phase, it will support projects that reduce methane emissions at landfill, animal waste, and wastewater sites facing low carbon prices.

29. As of November 17, 2015.



Source: TerrAfrica.

ANNEX 1

ENGAGING THROUGH THE PUBLIC SECTOR TO BUILD CLIMATE RESILIENCE

TRANSFORMATIVE AND INTEGRATED SOLUTIONS FOR RESILIENT LANDSCAPES MANAGEMENT IN THE SAHEL AND WEST AFRICA

Land degradation, desertification and drought are global challenges, pronounced in Sub-Saharan Africa. The Great Green Wall Initiative³⁰ is a trans-African initiative led by the African Union (AU) that aims to reverse land degradation and desertification, boost food security and support local communities to adapt to climate change in the Sahel and South Africa.

The Bank Group's TerrAfrica³¹ Platform is supporting this initiative through a US\$1.1 billion flexible investment umbrella program, the Sahel and West Africa Program (SAWAP). Twelve country-led, multi-sector investment operations in Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan and Togo are connecting ecosystems nationally and regionally. A regional hub project, called Building Resilience through Innovation, Communication and Knowledge Services (BRICKS), is providing opportunities for south-south learning and communication across this portfolio.

Innovative geographic and socio-economic approaches connect protected areas, forest lands, woodlands, agro-silvo-pastoral lands, croplands and irrigated agricultural lands. They help secure ecosystem services from the landscape mosaic, enhance adaptive capacity and build climate

30. GGWI: <http://www.greatgreenwallinitiative.org/>.

31. TerrAfrica: www.terrafrica.org.

MAP 2 The Great Green Wall Initiative



Source: World Bank.

TABLE 2 Resilient Landscapes Management in the Sahel and West Africa

Source	Instrument	Amount (US\$ million)
IDA/IBRD	Credit/Loan	789.3
GEF	Grant	97.8
Others**	Grant/In-kind	216.7
Total		1103.7

**Government, bilaterals/Trust Funds, beneficiaries. Note also that additional parallel financing is not included in the table.

resilience. Integrated landscape management solutions and strategic planning, supported by government commitments and strong partnerships, are transforming vulnerable landscapes.

The Great Green Wall Initiative provides a platform to leverage finance from the World Bank, GEF, FCPF, Norway, the EU, government contributions and other trust funds. By doing so, it ensures a long-term, programmatic and coordinated approach to investments in resources and ecosystems. Ethiopia's Sustainable Land Management Program, for example, is helping to address the drivers of land degradation and deforestation, contribute to more sustainable land use and livelihoods and boost the climate resilience of ecosystems and people.

SUPPORTING ADAPTIVE DELTA MANAGEMENT IN BANGLADESH

The Bangladesh Delta, a mega-delta, is Asia's largest and the world's most populated delta. Like all delta environments, it is a highly complex system shaped by natural and human factors. Effective management of this unique and dynamic delta environment is essential for the wellbeing of millions of people. Population growth, economic development and climate change are among the main transforming drivers in the Bangladesh Delta.

Despite remarkable economic growth in recent years, poverty³² remains prevalent in Bangladesh and integrally linked to disaster risk. A 2013 report ranked Bangladesh among the 11 countries most at risk of disaster-induced poverty.³³ The country is one of the most vulnerable globally to cyclones and floods, and is located in a seismically active and high-risk region. High population density, compounded with rapid and unplanned urbanization, have also increased vulnerability to earthquake risk. Recent events, such as the collapse of the Rana Plaza in Dhaka in 2014, serve as



Source: Stephan Bachenheimer, World Bank.

a reminder of structural deficiencies in buildings and infrastructure that make them vulnerable to other risks involving earthquakes, fire, as well as heavy rainfall, storms, and strong winds.³⁴

Bangladesh has been proactive in setting up the institutions to manage disasters and mainstream disaster management into development plans. The Disaster Management Act of 2012 outlines the legal framework for disaster management and established the Department of Disaster Management to coordinate national disaster management interventions across government agencies.³⁵ The priorities of the National Plan for Disaster Management for 2010–15 have been incorporated in high level policy and operational documents. Effective disaster management is one of the sub-goals of the Government of Bangladesh's Vision 2021, and the Bangladesh Perspective Plan for 2010–21, the Sixth Five Year Plan 2011–2015 and the National Sustainable Development Strategy identify disaster risk reduction as a priority area.³⁶

The World Bank has been assisting Bangladesh by incorporating disaster risk management

32. 47 million people in poverty and 26 million people in extreme poverty, World Development Indicators. Available at: <http://data.worldbank.org/country/bangladesh>.

33. Shepherd A., Mitchell T., Lewis K., Lenhardt A., Jones L., Scott L, and Muir-Wood R. 2013. The geography of poverty, disasters and climate extremes in 2030. Overseas Development Institute.

34. World Bank. 2015. Urban Resilience Project. Project Appraisal Document. Report No: PAD1023.

35. The National Disaster Management Council and Inter-Ministerial Disaster Management Coordination Committee ensure coordination of disaster-related activities at the national level. At the city level, the Standing Orders on Disaster gives the mandate to City Corporations to lead emergency response within their jurisdictions. City Corporation Disaster Management Committees have responsibilities across the DRM cycle, from risk identification and reduction, to emergency response and recovery.

36. Government of Bangladesh. 2015. National progress report on the implementation of the Hyogo Framework for Action (2013–15). Available at: <http://www.preventionweb.net/english/hyogo/progress/reports/>.

TABLE 3 Addressing Climate Change and Disaster Risks in Bangladesh, 2007–14

Source	Instrument	Amount (US\$ million)
GFDRR	Grant(s)	6.9
IDA	Credit(s)	1,247.0
Trust Fund	Grant	28.0
PPCR*(World Bank and IFC)	Grant(s)	28.5
PPCR* (IFC)	Loan	10.0
Total		1,320.4

*An additional US\$21.5 million in grant resources and US\$50 million in concession loans from the PPCR are channeled through the Asian Development Bank.

into many development loans alongside GFDRR that has supported analysis, brought in specialized expertise and provided technical assistance and co-financing. Over 2007–14, GFDRR provided nine grants totaling US\$6.9 million to Bangladesh. Support has been shaped by a Damage, Loss and Needs Assessment for Cyclone Sidr, led the World Bank and GFDRR.³⁷

Several priorities were subsequently financed including the World Bank’s 2007 Emergency Cyclone Recovery and Restoration Project (2008–17, US\$324 million of IDA³⁸ and US\$28 million in trust fund resources co-financed by GFDRR to respond to immediate restoration needs such as ensuring more resilient coastal and river embankments, supporting agriculture recovery and building cyclone shelters. This was subsequently scaled up in the Coastal Embankment Improvement Project (2013–20, US\$375 million World Bank and US\$25 million from the Pilot Program for Climate Resilience or PPCR), with GFDRR support for research, which is helping to deal with saltwater intrusion on to farmlands.

In June 2015 the World Bank, IFC and the 2030 Water Resources Group partnered with the governments of Bangladesh and the Netherlands

on the preparation and implementation of the Bangladesh Delta Plan 2100. The plan aims to create a long-term vision for delta management, prepare for various climate scenarios and responses, identify and organize government institutions to address challenges, and create and facilitate a long-term investment program bolstered by private sector and development partner participation. The Bank Group is now assessing opportunities to transform its engagement based on the delta principles of “anticipation”, “flexibility” and “concerted action” to help spur the pathway to adaptive management of the Bangladesh Delta.

MANAGING LANDSCAPES IN ETHIOPIA’S HIGHLANDS

Ethiopia is, with the World Bank and other partner support, in the midst of one of the greatest landscape transformations in history, with a massive land area being brought back into production and generating important benefits to people through climate resilient ecosystems. The Sustainable Land Management Program currently targets six highland regions where 80 percent of the people live. With this transformation, thousands if not millions of people have been raised out of extreme poverty and are increasingly securing sustainable income streams from restored landscapes³⁹ and tenure improvements.

Now specific investments are being planned to more directly address deforestation drivers critical to sustain economic development in the country and boost the prospects of the lowest income earners. About 60 percent of Ethiopia’s forest is located in the regional state of Oromia that serves as a water tower for much of Ethiopia as well the Horn of Africa. Through a comprehensive new land use program that blends different sources of finance, the World Bank is helping to improve land use and reduce deforestation trends in Oromia. This includes a US\$68 million⁴⁰ from the BioCarbon Fund’s Initiative for

37. Other World Bank programs and loans to Bangladesh include elements which support Bangladesh’s preparedness for disaster risks. The amounts listed here are specifically relating to climate resilience.

38. Includes additional finance.

39. <https://www.youtube.com/watch?v=nak-UUZnvPI>.

40. This project is appraised but not yet approved by the Bank’s Board.

TABLE 4 Managing Landscapes in Ethiopia's Highlands

Source	Instrument	Amount (US\$ million)
IDA	Credit	50.0
IDA	Grant	12.5
MDTF (Norway)	Grant	42.7
GEF	Grant	17.3
LDCF (at GEF)	Grant	4.6
BioCarbon Fund (Norway, UK, US)	Emission Reduction Purchase Agreement (ERPA)	50.0
BioCarbon Fund	Grant	34.0
FCPF	Grant	3.6
Total		214.7

Sustainable Forest Landscapes (supported by Norway, the United States and the United Kingdom). A US\$50m emissions reductions purchase agreement for 28 million hectares—a jurisdiction the size of Italy—is also combined with a US\$18m grant to strengthen the enabling environment so sectors, stakeholders and financing can be mobilized for sustainable land use.

The program in Oromia also establishes a platform for leveraging current and future projects, initiatives, and private sector activities that address deforestation and forest degradation and contribute to sustainable land use and livelihoods. By doing so it brings together initiatives such as the Sustainable Land Management Program financed by the World Bank, Norway, GEF, Canada and Germany; the Agricultural Growth Program, Productive Safety Net Program, Promoting Basic Services Program, National Improved Cook Stoves Program, Land Investment for Transformation, and the Mass Mobilization Campaign.

The platform also brings together civil society and private sector activities such as the IFC/Nespresso project cofounded by the Bank's BioCarbon Fund, the Sustainable Trade Initiative, a forest coffee certification project supported by the Japan International Cooperation Agency (JICA), other REDD+ projects like the Bale Mountain Eco-regional Project supported by Farm Africa and SOS Sahel.

TABLE 5 Disaster Risk Management in Indonesia

Source	Instrument	Amount (US\$ million)
IBRD	Loan	475.2
GFDRR	TA/Grant	6.2
Total		481.4

Ethiopia is setting precedents through this innovative approach to climate change, forests and sustainable land management. For the Oromia Program, the grant signing is being targeted for early 2016. The emission reduction purchase agreement is expected to be signed within a year of the grant signing.

DISASTER RISK MANAGEMENT IN INDONESIA

Located in the Pacific "Ring of Fire," Indonesia is the world's largest archipelago with more than 17,000 islands and a population of nearly 250 million people. Indonesia is consistently ranked among the most disaster-prone countries in the world.⁴¹ Volcanic activity, earthquakes, tsunamis, floods, landslides, droughts, and forest fires frequently occur in Indonesia. Over the past two decades, ten natural disasters such as floods, earthquakes, tsunamis, and wildfires have resulted in post-disaster costs of over US\$24 billion.⁴² Climatic changes are expected to exacerbate existing hazards. Socioeconomic dynamics contribute to this vulnerability. More than half of the population lives in urban areas, primarily located in coastal zones, exposed to hazards and 11.4 percent of people live below the country's poverty line.⁴³

Following the 2004 Indian Ocean Tsunami, Indonesia enacted a new Law on Disaster Man-

41. World Bank. Natural Disaster Hotspots, A Global Risk Analysis (Washington, DC: Disaster Risk Management Series, 2005).

42. EM-DAT 2009. International Disaster Database. Université Catholique de Louvain. Brussels.

43. World Development Indicators, 2013; UNDP Human Development Index 2014.

agement, by use of regulations and implementing guidelines. The regulatory framework calls for a comprehensive approach to disaster risk reduction and shared responsibility between national and local governments. It established agencies for disaster management at the national (*Badan Nasional Penanggulangan Bencana/BNPB*) and local level (*Badan Penanggulangan Bencana Daerah/BPBD*).

Several World Bank loans have helped to mainstream disaster risk management into development plans including: two three-year National Action Plans for Disaster Risk Reduction, a 2014 National Action Plan on Climate Change Adaptation and National Disaster Management Plans (most recently for 2015–19), and national Medium-Term Development Plans (*Rencana Pembangunan Jangka Menengah Nasional*). These loans include a US\$250 million loan for the Western Indonesia National Roads Improvement Project, the Third National Program for Community Empowerment loan of US\$217 million, and the Aceh-Nias Livelihoods and Economic Development Program loan of US\$8.2 million. Collectively these are improving disaster response by providing contingency funds which can be rapidly accessed in the event of an emergency, building the capacity of urban communities and local governments to prepare disaster informed community development plans and improving the government's ability to work with poor rural households in Nias to identify needs, develop and sustain livelihoods.

Parallel financing, through six GFDRR grants totaling US\$6.2 million over 2008–14, has helped build up the institutional capacity of government and civil society for disaster risk reduction, preparedness, and resilient recovery, ensure greater availability of disaster risk information, as well as raise awareness. GFDRR support has primarily been channeled through two programmatic grants—Mainstreaming Disaster Risk Reduction Phase I (US\$1.2 million) and Phase II (US\$1.6 million)—and a US\$2.4 million grant to mainstream disaster risk reduction into the Third National Program for Community Empowerment in Urban Areas (*Program Nasional Pemberdayaan*

Masyarakat/PNPM-Urban).⁴⁴ GFDRR has also been working through its regional thematic programs, including on safe schools, OpenDRI, and Disaster Risk Financing and Insurance.

A PROGRAMMATIC APPROACH TO FORESTS MANAGEMENT IN LIBERIA

Over the past 10 years, the Bank Group has partnered with Liberia on its long standing commitment to reform the forest sector. These reforms aim to balance and integrate community, commercial, conservation and carbon uses of the forest; reduce emissions from deforestation and forest degradation, foster sustainable forest management and enhance forest carbon stocks (REDD+). The Bank Group has provided technical assistance to help Liberia meet conditions that enabled sanctions imposed by the UN Security Council in 2001 to be lifted in 2006; helped strengthen Liberia's protected area network; and supported REDD+ Readiness. An agreement has recently been signed between Norway and Liberia for a forests REDD+ program.

44. World Bank. 2010. Indonesia—Third National Program for Community Empowerment in Urban Areas Project. Washington, DC: World Bank. Available at: <http://documents.worldbank.org/curated/en/2010/03/11928138/indonesia-third-national-program-community-empowerment-urban-areas-project>.



Source: PROFOR.

TABLE 6 A Programmatic Approach to Forests Management in Liberia, 2005–15

Source	Instrument	Amount (US\$ million)
GEF (WB)	Grant(s)	2.7
GEF (IFC)	Grant	2.0
IDA	Grant	2.0
PROFOR	Grant	0.8
BNPP	Grant	0.1
CHYAO	Grant	0.4
FCPF	Grant(s)	8.8
IDA	Concessional Loan	15.0
Government of Norway/BIOCF	Grant	100.0
LICUSTF	Grant	0.4
FLEG	Grant	0.02
EITI	Grant	0.02
Total		132.2

A coordinated effort by the Government of Liberia, the Forest Development Authority and the support of development partners have resulted in major achievements on the design and implementation of the REDD+ Strategy. Reforms, policies and initiatives have helped manage Liberia's forests in a balanced way for long-term sustainable and resilient growth; support community livelihoods; and ensure that national and global heritage is conserved. Bank Group support has been combined with trust fund resources, through a range of instruments spanning technical assistance, development policy operations, investments, results based payments.

Since 2011, grant resources from the Forest Carbon Partnership Fund (FCPF) have helped build Liberia's capacity to participate in a large-scale system of positive incentives for REDD+. They are supporting a consultative and quantitative analysis of different land use options for a national REDD+ Strategy. The governments of Liberia and Norway are supporting the Liberia Forest Program through three distinct, interrelated projects: US\$12.5 million in supplemental financing for a Second Poverty Reduction Support

Development Policy Operation; US\$37.5 million in support for improvements forest landscape management and benefit-sharing in targeted areas; and US\$5 million in IFC support to renew rubber plantations. These three projects will improve the legal framework, support capacity building, and help establish necessary governance structures and monitoring and verifications systems. They will support investments in conservation, commercial and community forestry activities. A Results-Based Carbon Payment operation will pay for verified emission reductions and sequestered carbon.

The program will contribute climate change mitigation, biodiversity conservation, provision of ecosystem services, clarification of land tenure and rights, improved livelihoods and stronger governance. Climate finance has been a catalyst for forest conservation and continued carbon sequestration.

PROMOTING RURAL LOW-CARBON DEVELOPMENT THROUGH MEXICO'S FOREST AND CLIMATE PROGRAM

Mexico's forest and climate change program benefits from decades of experience at the community level and works to promote the sustainable management of forests and economic opportunities for rural communities. Led by the National Forestry Commission (CONAFOR), the program incentivizes rural communities to reduce deforestation and forest degradation, and ensure continuity in the management of natural resources at the landscape level. Support of around US\$480



Source: Talli Nauman, TRF

TABLE 7 Promoting Rural Low Carbon Development through Mexico's Forest and Climate Program

Source	Instrument	Amount (US\$ million)
IBRD	Loan	350.0
FIP (CIF)	Loan and Grant	42.0
FCPF Readiness Fund	Grant	8.8
FCPF Carbon Fund	Results-Based Payment	60.0
Total		460.8

* An additional US\$18 million was channeled through complementary activities with financial intermediaries implemented by the Inter-American Development Bank.

million comes from a wide range of sources and instruments across the forest value chain. At the core of the Program, the US\$392 million investment (US\$350 million in IBRD loans, US\$16.4 million in loans from the Forest Investment Program (FIP) and US\$25.6 million in FIP grants) support over 3,350 communities and *ejidos* nationwide to make sustainable forest management a pathway to economic development and increase the contribution of forests to climate change mitigation and adaptation.

A Readiness Preparation Grant of US\$8.8 million from the Forest Carbon Partnership Facility (FCPF) Readiness Fund has also supported CONAFOR in finalizing the national REDD+ strategy and nationwide consultation process.

Building on the innovations piloted in the "REDD+ Early Action Areas" under the IBRD and FIP-financed Forest and Climate Change Program, CONAFOR is now developing a large scale Emission Reduction Program in five states (Jalisco, Chiapas, Campeche, Yucatán and Quintana Roo) that aims to foster rural low-carbon development. The Program covers almost 30 million hectares of land, 60 percent of which is covered by forest. The FCPF Carbon Fund will provide \$60 million in results-based payments for activities that sustainably reduce deforestation associated with carbon emissions. Under the Emission Reduction Program, CONAFOR plans to strengthen the collaboration with the Ministry of Agriculture to support integrated solutions to the communities/

ejidos that tackle the major drivers of deforestation (e.g. agricultural practices, livestock expansion, slash and burn practices).

Overtime, the Bank has also cooperated with Mexico through a series of GEF grants that strongly underpin this work, with operations piloting a market-based system to contract payment for environmental services in forest landscapes, and current support to mainstream climate change adaptation in coastal forests.

ENHANCING WATER RESOURCE MANAGEMENT IN THE SENEGAL RIVER BASIN

In the Senegal River Basin, economic growth and poverty reduction require extra efforts to develop energy and agriculture while protecting people's livelihoods and health. And to achieve that, requires careful planning which takes in to account increased climate risks and uncertainty. As one of the most advanced basin organizations in the region, and the only one to jointly own and manage water infrastructure, the Organisation pour la Mise en Valeur du Fleuve Senegal is well-positioned to undertake the kind of cross cutting investments like those proposed in the Senegal River Basin Multi-Purpose Water Resources Development program.

The first phase of this program mobilized US\$110 million from IDA and nearly US\$31 million in co-financing, including from the African Development Bank, the European Commission, and bilateral support from France and the Netherlands. Its objective was to help improve sector planning, support regional cooperation and advance water resources development.

TABLE 8 Senegal River Basin Climate Change Resilience Development Project

Source	Instrument	Amount (US\$ million)
IDA	Credit	212.5
GEF	Grant	4.0
LDCF	Grant	12.0
Total		228.5

In a second phase, this program aims to strengthen trans-boundary water resources management in the Senegal River Basin, including climate change adaptation and the implementation of priority actions of a strategic action plan. This project has attracted co-financing from the GEF and its Least Developed Countries Fund (LDCF) to help increase the project’s sustainability, boost the resilience of the Basin’s people and improve environmental management practices. The program is helping to consolidate and further strengthen the institutional, legal and technical framework of the Senegal River Basin. Supported activities include those which will generate income, and water resource development and planning. GEF and LDCF co-financing is helping to identify and address knowledge gaps on climate resilience in projects.

As a result, more than 58,000 small holder or subsistence farmers will gain improved access to irrigated land, agroforestry or enhanced water resources management, including improved flood control measures. About 5,000 water user association members or project beneficiaries are expected to increase their climate resilience

capacity through pilot projects. Regional and national water resource management, fisheries and agriculture agencies are also expected to benefit from technical training, management support, improved processes, systems and equipment.

ROLLING OUT CLIMATE SMART AGRICULTURAL TECHNOLOGIES IN SENEGAL⁴⁵

Agriculture is becoming an increasingly risky business in Senegal and many other Sub-Saharan African countries, due to ever increasing risks linked to weather variability, pests, diseases, drought, inundation, frost, hurricanes, and more. These risks have a severe impact on farming families as well as the economy as a whole (Figure 2). In Senegal for example, erratic, insufficient or late

45. Source for Figure 2 and Table 10: Niane Ndoye, Aifa Fatimata (2015). *Using climate smart agriculture to build farmers’ resilience in Senegal*. Blog post, available online under: <http://blogs.worldbank.org/nasakiliza/using-climate-smart-agriculture-to-build-farmers-resilience-in-senegal>.

FIGURE 2 Comparison of Primary Sector and Agriculture Value Added Growth and GDP Growth in Senegal

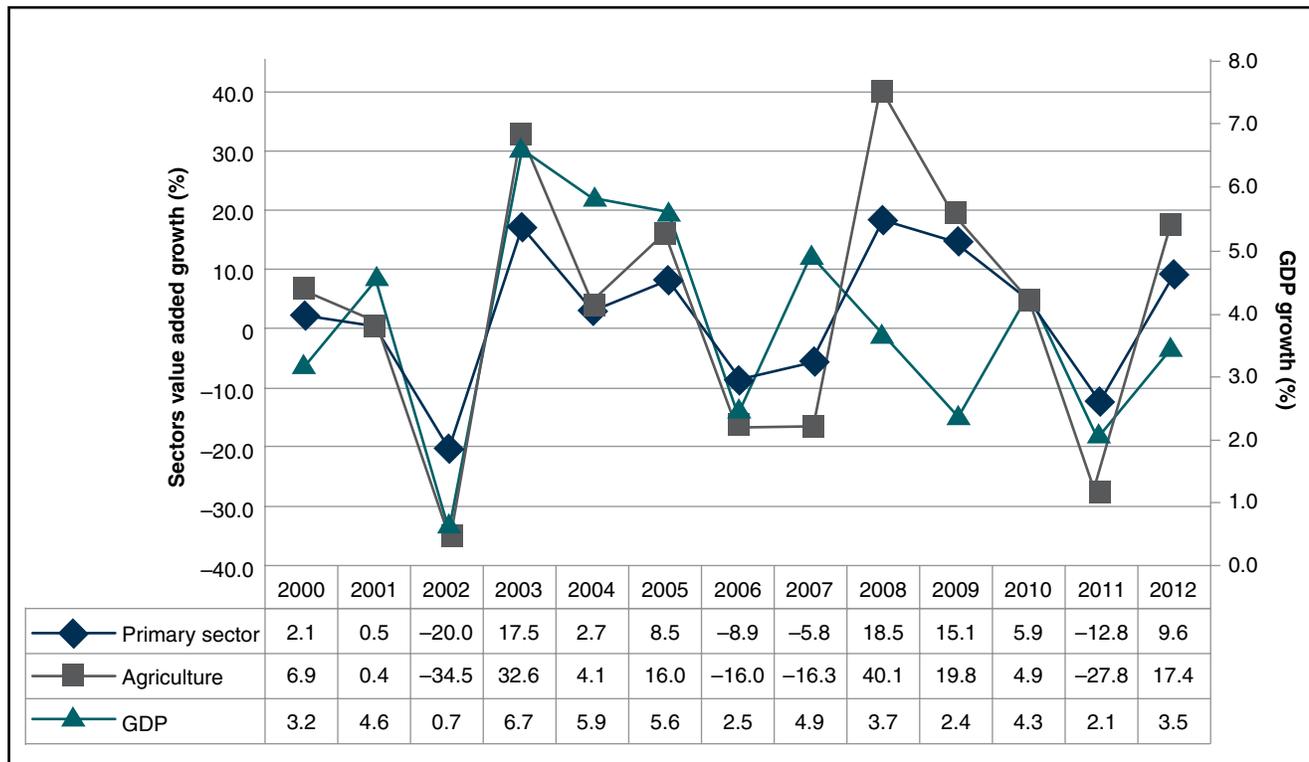


TABLE 9 Rolling Out Climate Smart Agricultural Technologies in Senegal

Source	Instrument	Amount (US\$ million)
IDA	Credit	60.0
Total		60.0

rainy seasons observed in 2002, 2006, 2007 and 2011 resulted in a decrease in agricultural and economic growth.

The West Africa Agricultural Productivity Program is generating and disseminating climate-smart agricultural technologies to support agricultural producers and agribusinesses to sustain agricultural growth and build resilience to climate change.

And in Senegal alone, with its partners, the Regional Study Center for the Improvement of Drought Adaptation and the Senegalese Agricultural Research Institute, the program has developed seven new high-yielding, early-maturing, drought resistant varieties of sorghum and millet. Released in 2012, these varieties are now being largely distributed to farmers and are resulting in positive yields, even during years where there is a rainfall deficit such as 2011 and 2014. An early maturing variety of sorghum with a high sugar content stalk is set to be released this year. These varieties have so far supported 30,000 farmers to adopt climate-smart technologies, helping them to build resilience to climate shocks and protecting them against the previous experiences of the negative impact of crop failures.

BOOSTING COMMUNITY AND INFRASTRUCTURE RESILIENCE TO CLIMATE CHANGE IN TAJIKISTAN

Tajikistan is a mountainous landlocked country in Central Asia, endowed with abundant glaciers that supply the country and region with valuable water resources. It is also very vulnerable to climate variability and change. This affects agriculture and water management and especially women and poor people. Hydropower systems provide more than 90 percent of the country's electricity generation and chronic electricity shortages are becoming more acute with climate change. Climate change threatens the achievement of development priorities that include food and energy security.

The Pilot Program for Climate Resilience (PPCR) is a key element of Tajikistan's response to climate change and development challenges. Climate resilience investments in key economic sectors are expected to leverage resources from the PPCR and partners—IDA, the European Bank for Reconstruction and Development (EBRD) and the GEF. Six PPCR investments are building the resilience of water management and hydroelectric infrastructure, improving capacity to integrate climate resilience into development and investment plans, and supporting land management measures that enhance rural livelihoods through greater resilience to climate-related impacts.

The World Bank is supporting the *Central Asia Hydrometeorology Modernization Project* that is developing and sustaining climate services by upgrading hydro-meteorological observation networks, investing in modeling and forecasting capacity, and enhancing the delivery of timely, accurate, and actionable weather and climate

TABLE 10 Beneficiaries of New Varieties of Sorghum

Year	Sample of Producers Beneficiaries of New Varieties of Sorghum				National Average Yield (kg/ha)	Yield Increase (%)
	Sample of Producers	Area Cropped by Producer (ha)	Production (kg)	Average Yield (kg/ha)		
2011/12	159	0.83	1309	1775	882	101
2013/14	310	0.81	985	1216	846	44

information. It is part of a broader multi-country program to encourage convergence in approaches and information, and data sharing among hydromet services in the region. The World Bank also supports the *Environmental Land Management and Rural Livelihoods Project* to increase the productive assets for rural populations sustainably. The large rural poor population rely on subsistence agriculture and agro pastoralism and face lower agricultural yields and higher food prices due to climate change. About 34,900 people have benefitted from these investments, of which 45 percent are women.

A complementary project, with support from the Asian Development Bank (ADB), is integrating climate resilience in national and local planning processes, which will include a national adaptation strategy. ADB also supports critical investments in irrigation and household water supply systems for the Pyanj River Basin that is vulnerable to droughts, floods and mudflows.

PPCR investments include two first-of-a-kind private sector investments. First, a PPCR concessional loan and funding from the European Bank for Reconstruction and Development (EBRD) addresses climate resilience and maximizes investment in the aging 126 MW Qairokkum hydropower system, depended upon by half a million people. Complementary grant resources from the PPCR support rehabilitation efforts by

modeling water inflows into the reservoir and the plant's electricity generation capacity under different climate change scenarios. The PPCR will support the hydropower operator to adjust operational management systems to account for climate change. Secondly, a unique blend of funding is helping to establish a dedicated resilience financing facility—one of the first in the country. A private sector investment that blends concessional loans of US\$5 million from the PPCR and US\$13 million from EBRD will pilot an innovative financing facility that helps climate-resilient, water-efficient and energy-efficient technologies to be adopted by small businesses, farmers and households.

Tajikistan's strategic program for climate resilience has become a model for the region, with Central Asian countries engaged in the preparation of the Climate Adaptation and Mitigation Program for Aral Sea Basin. This program lays the foundation for regional cooperation on climate change and ensures that stakeholders have access to improved climate change knowledge services and increased financing for climate investments. IDA resources are also supporting Tajikistan, Uzbekistan, and a regional institution in these objectives.

ADOPTING SUSTAINABLE AGRICULTURE AND LIVESTOCK PRACTICES IN URUGUAY

Uruguay's agriculture sector is a major contributor to GDP, jobs and export earnings. For more than a decade, the Ministry of Agriculture, Livestock, and Fisheries has been fostering growth in agricultural productivity and climate change adaptation and mitigation, through sustainable intensification approaches applied across productive systems and value chains.

To support Uruguay's long-term vision the Bank's Sustainable Management of Natural Resources and Climate Change project is helping farmers to adopt improved environmentally sustainable agricultural and livestock practices

TABLE 11 Boosting Community and Infrastructure Resilience to Climate Change in Tajikistan

Source	Instrument	Amount (US\$ million)
IDA	Credit	16.5
GEF	Grant	5.4
PPCR**	Grant	57.7
PPCR**	Loan	15.0
Total*		94.6

* Parallel financing is provided EBRD of US\$66 million.

** US\$54.3 million of PPCR resources were channeled through ADB and EBRD.

TABLE 12 Adopting Sustainable Agriculture Practices in Uruguay

Source	Instrument	Amount (US\$ million)
IBRD	Loan	49.0
Adaptation Fund	Grant*	9.97
Total		58.97

*An Adaptation Fund Grant financed the project *Helping Small Farmers Adapt to Climate Change* which targeted similar beneficiaries. This funding was not included as part of the project financing.

by establishing an Agricultural Information and Decision Support System.⁴⁶ It is also realizing on farm investments on climate smart agriculture and livestock management, and providing support and training to farmers and medium-size producers.

46. The National System for Agricultural Information centralizes and analyzes agricultural, economic and climate data from 25 national agencies to improve decision-making on agricultural policy and investments. It provides oversight of the soil-use and soil-management plans produced by farmers for government use, and offers several tools to increase farmers' access to information, including an early-warning system for livestock management, an agrochemical control system, rural risk assessments, soil and land use plans, and water studies for irrigation.

The program aims to provide technical assistance and financial incentives, on a matching grant basis, to about 4,000 family farmers and medium-size producers to invest in economically and environmentally sustainable agricultural and livestock production practices to improve their resilience to extreme climatic events. It seeks to train about 6,000 farmers, including large-scale farmers, to enhance their capabilities to adapt to climate change; and about 1,500 rural workers involved in natural resource management activities. Farmers' organizations are being supported so they can better assist their members to prepare and implement measures aimed at climate change adaptation and mitigation. To date, 7,380 family farmers and medium-size producers have been trained on climate-smart agricultural practices, covering a total area of 2,841,000 hectares.

As a consequence of the climate smart agricultural approach, Uruguay has quadrupled its agricultural production within a decade while increasing the resilience of their productive systems to climate change and significantly reducing greenhouse gas emissions associated with food production, with current technologies estimated to reduce carbon emissions by about 8.8 million tons CO₂ per annum.

ANNEX 2

WORKING WITH THE PUBLIC SECTOR ON LOW CARBON DEVELOPMENT

UPGRADING AND GREENING THE RIO DE JANEIRO RAIL SYSTEM IN BRAZIL

Despite being a relatively rich southeastern State, Rio de Janeiro still has a relatively high level of extreme poverty and income inequality, insufficient urban transport infrastructure and a large fraction of the population at risk. Vulnerable people include the poor, who mainly reside in the periphery of the Rio de Janeiro's metropolitan region, far from economic and social opportunities; and women, who are subject to a relatively high level of gender-based violence, often while commuting.

Building on a 20-year partnership, the Bank is supporting the State of Rio in promoting sustainable urban transport in the Rio de Janeiro metropolitan region through investment loans, development policy loans and technical assistance that are working across transport, urban development, and poverty and gender issues.

TABLE 13 Upgrading and Greening the Rio de Janeiro Rail System in Brazil

Source	Instrument	Amount (US\$ million)
IBRD	Loan	811.0*
ESMAP	Grant	0.02
Gender Trust Fund	Grant	0.15
Total		811.17

* US\$0.5 million additional came alongside this for the Enhancing Public Management for Service Delivery Project.

An investment loan is financing more than 100 new energy efficient trains to improve services and reduce travel times for poor people, living on the periphery, providing them with access to jobs, schools and health care, and offering an alternative to more carbon intensive modes. The higher frequency train service is expected to encourage denser urban development around stations, as an alternative to sprawl. Greenhouse emissions per passenger from electrified mass transit, such as the system in Rio, are estimated to be one-sixth of emissions generated by cars and one-third of those generated by buses. The new trains incorporate regenerative braking technology, increasing their efficiency over older trains.

Together with a grant from Energy Sector Management Assistance Program (ESMAP), planning capacity was boosted with identifying ways to sustainably promote urban mobility, including non-motorized transport options such as cycling and walking, low-income housing along the rail corridor, comprehensive urban transport and logistics planning, climate change adaptation and intelligent transportation systems.

A Bank development policy operation complemented this by promoting physical and tariff integration between railways and other transport modes to reduce user costs; reforming bus concessions to prioritize the more efficient and less polluting railway system; and supporting greater coordination to consolidate metropolitan governance and planning of urban transport. It helped to improve urban transport services for women by implementing programs to reduce harassment, for example, the Via Lilac Program, together with finance through a gender trust fund. The program is taking advantage of the vast transport network

to install information kiosks that increase awareness about gender-based violence and is helping women access specialized services locating social assistance centers and day care facilities at rail stations.

REDUCING TRANSPORT EMISSIONS THROUGH INDIA'S EASTERN DEDICATED FREIGHT CORRIDOR

The World Bank is supporting the Government of India to develop a dedicated freight rail corridor which will create a new platform for economic growth. World Bank loans of US\$2.725 billion will transform the achievable capacity, productivity and service performance of this critical backbone of the Indian economy. The 1,176 km in heavy haul freight lines will increase commercial speeds (from 25 km/h to 60 km/h) and improve service reliability. By improving physical infrastructure, reforming institutions and introducing competition in the railways sector, the project will double freight volumes and improve connectivity and market integration for freight-consigning industries. The project will reduce transport related GHG emissions by more than half over 30 years.

Analysis of cumulative GHG emissions estimates that by 2041–42, some 67 million tons of CO₂ will be saved as a result of diverting freight from road haulage to rail transport. CO₂ emissions associated with railway assets will be offset by investments in solar power and wind energy and an afforestation program.



Source: World Bank.

TABLE 14 Eastern Dedicated Freight Corridor, India

Source	Instrument	Amount (US\$ million)
IBRD	Loan	975.0
IBRD	Loan	1,000.0
IBRD	Loan	650.0
Total		2,625.0

Technological solutions will also improve the energy efficiency of railway operations. This includes: communication based train control, driver advice systems, regenerative braking, aerodynamic profiling of rolling stock, and on-board lubrication. The project is actively pursuing these options which would further reduce the carbon intensity of the freight rail operations.

The project is leveraging expertise and knowledge from projects in China and countries in Europe and Central Asia that have developed freight corridors. Follow on technical assistance and analysis will help maximize the benefits of the new dedicated line and drive regional and national development.

The Eastern Dedicated Freight Corridor project will be a catalyst for accelerated economic development in the relatively poorer states in India such as Uttar Pradesh and Bihar. By contributing towards a major shift of freight from roads to rail, the project will reduce congestion in cities. By freeing capacity on the existing railway lines, more passenger services will be available enabling communities to access employment opportunities, health care, education and other social services.

RISK COVERAGE FOR CLEAN POWER IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

MIGA provided US\$91 million in political risk insurance for a hydropower project in Lao People's Democratic Republic (PDR). The bulk of the guarantee, US\$86 million, covered a non-shareholder loan by Fortis Banque SA/Fortis Bank NV of Belgium (representing itself and acting as agent for a

TABLE 15 Risk Coverage for Clean Power in Lao PDR

Source	Instrument	Amount (US\$ million)
MIGA	Guarantee	91.0
IBRD	Partial Risk Guarantee	50.0
IDA	Grant	20.0
Total		161.0

number of banks) against the risks of expropriation, breach of contract, war and civil disturbance, and transfer inconvertibility in both Lao PDR and Thailand. The rest of the coverage protected EDF International of France against the risk of transfer restriction in Lao PDR.

The total project cost was US\$1.2 billion, the largest investment ever in Lao PDR. The project involved the development, construction, and operation of a trans-basin power plant using water from the Nam Theun River. In addition to the construction of a dam, the project provided increased environmental protection in Lao PDR, with a biodiversity area being set aside and conserved; improved housing and higher incomes for the 6,200 villagers who were re-settling from the reservoir area; provided a robust and proactive mitigation and compensation program to help communities downstream prepare for changes to their livelihoods; introduced special measures to ensure that revenues from the project were used effectively to reduce poverty; and provided a continued commitment by the World Bank to monitor the project and ensure that it is fully and properly implemented.

Lao PDR has an average income level of less than a dollar a day, with levels considerably lower in rural areas and few options for generating income. The project is expected to generate an estimated US\$1.9 billion in foreign exchange earnings over a 25-year period through the export of 995 MW of electricity to Thailand. The income generated by the project is providing key funding for Lao's National Growth and Poverty Eradication Strategy, enabling the country to increase the amount of money it can invest in health, education, and basic infrastructure for the benefit of

the poor. The project is producing 75 MW of power for domestic consumption.

MIGA's guarantee was key to lowering the project's risk profile, which in turn enabled the government and developers to attract commercial financing at better rates and gave the investor the assurance needed to go ahead with the deal. MIGA's guarantee complemented a US\$50 million partial risk guarantee issued by the World Bank, as well as a US\$20 million grant from the International Development Association.

MOROCCO'S INCLUSIVE GREEN GROWTH PROGRAM

Morocco is a champion of environmentally sound policies and domestically driven climate action. Since at least 2009, green growth has been a core development priority. Morocco set an ambitious renewable energy target of having 42 percent of its installed capacity from renewable energy sources by 2020, and a 15 percent reduction in projected energy demand mainly through energy efficiency measures, and is phasing out of its energy subsidies. Morocco has so far allocated US\$2 billion to achieve its renewable energy objectives. And the country's agricultural policy aims to enhance agricultural productivity, improve water resource management and introduce agricultural practices that deliver adaptation and mitigation benefits.

The World Bank estimates around 10 percent of the country's wealth is directly attributable to natural assets that are rapidly being eroded—a 2004 estimate placed the annual cost of environmental degradation at 3.4 percent of GDP. Agriculture and fisheries together account for nearly 20 percent of GDP and face resource management constraints, around land and water that imperil their future performance and growth.

TABLE 16 Morocco's Inclusive Green Growth Program

Source	Instrument	Amount (US\$ million)
IBRD	Loan(s)	600.0
Total		600.0

People face vulnerability with around 17 percent of the population in 2012 employed in fisheries, agriculture and forestry industries.

Morocco's sustainability agenda is mainstreamed across the Bank's water, energy, transport and agriculture portfolio, including in a Development Policy Program on Inclusive Green Growth. This program is providing technical assistance to inform legislative and regulatory reforms that can promote revenue diversification in rural Morocco where 70 percent of the poor live, improve natural resource management and shift towards low carbon growth. It introduces sustainable practices such as direct agricultural seeding and participatory groundwater management, and develops new eco-tourism and aquaculture sectors with the potential to create jobs and diversify revenues. It strengthens the national control framework for illicit fishing practices to relieve pressures on stocks and help mitigating risk on the earning potential of artisanal fishermen. It supported the enactment of Morocco's national coastal zone law which had failed to pass parliamentary approval for the past 20 years.

Finally, it encourages reforms supporting Morocco's low carbon growth agenda, such as energy efficiency regulation in the building sector; opening the low voltage and middle voltage renewable electricity market to private investors; establishing a regulatory agency for the electricity sector, and phasing out diesel, gasoline and heavy fuel oil subsidies.

CATALYZING A MARKET FOR CONCENTRATED SOLAR POWER IN THE MIDDLE EAST AND NORTH AFRICA

Concentrated Solar Power (CSP) technology has enormous unexploited potential as a reliable source of renewable energy, especially in the Middle East and North Africa (MNA), a region which has abundant solar resources and good proximity to energy demand from the European Union. The rationale for Europe to open its energy markets is as follows: (i) solar conditions are far better in MNA than in the EU, and it would be economically



Source: Dana Smillie, World Bank.

efficient for Europe to access lower cost renewable energy generation from MNA, and (ii) to promote political stability, MNA would benefit from better economic integration with Europe. Exploiting solar potential requires a large-scale CSP portfolio to be deployed across the MNA region.

Morocco has already taken an initial step with investments in CSP. This was dependent on CSP technology becoming more commercially viable. While the initial idea was for Morocco to export some of its green power to Europe, which would take advantage of higher electricity tariffs in Europe compared to Morocco, Morocco eventually invested in CSP without such exports, given the potential for CSP to reduce its dependency of fossil fuels. If Europe were to open its energy markets this would further foster the development of green power in MNA.

The Bank's work on CSP in Morocco began at Ain Beni Mathar with a GEF funding of US\$43.2m and AfDB investment. The Integrated Thermo-solar Combined Cycle Power Plant, commissioned in 2011, sought to increase the market share of low-GHG-emitting technologies and to test the viability of solar thermal technology. The World Bank Group mobilized \$2.5 billion for the first 500 MW CSP facility—the Ouarzazate/Noor CSP Project, with the Clean Technology Fund as a catalyst. The primary objective was to install CSP at sufficient scale to test and demonstrate the storage technology, and trigger important cost reductions, economies of scale, and overall improvements in technology. The aim was to

TABLE 17 Catalyzing a Market for CSP in the Middle East and North Africa

Source	Instrument	Amount (US\$ million)
IBRD	Loan	400.0
CTF (CIF)*	Loan	435.0
GEF	Grant	43.2
Total		878.2

*Disbursed through the World Bank and the African Development Bank. US\$1,638 million in parallel loans from the MDBs and bilaterals and US\$564 million in commercial equity.

deliver local economic benefits by building the renewable energy industry, improving energy security, shifting subsidies and the energy system away from reliance on fossil fuels and reducing Morocco's trade deficit.

A number of key factors helped overcome a range of financial, technical and political barriers. There was strong public support for the project and close alignment across key public partners, including the Government of Morocco that established favorable regulatory and renewable policy frameworks to encourage the private sector.

A specialized entity—MASEN—was established to realize CSP projects with financial support to implement the ambitious Moroccan solar plan. The project design incorporated lessons from other CSP projects around the world and a carefully designed public-private partnership model allowed the optimal alignment of risks between public and private players. The GEF delivered early grant support to demonstrate the operational viability of CSP.

Significant financial and technical contributions were provided by international financial institutions including about US\$1 billion⁴⁷ in early concessional financing—including from the Bank and US\$197 in concessional loans from the CIF's Clean Technology Fund—helping drive costs down by an estimated 25 to 30 percent.

47. Other international funders include EIB (EUR 250 million), AFD (EUR 100 million), KfW/ BMZ (EUR 100 million), AfDB (US\$245 million), EC (EUR 30 million grant), BMU (Germany) (EUR 15 million grant).

TABLE 18 Improving Chiller Efficiency in the Philippines

Source	Instrument	Amount (US\$ million)
MLF	Grant	1.0
GEF	Grant	2.6
Total		3.6

MASEN took the lessons learned during the complicated and lengthy tendering process of this first phase to refine and replicate the financing model for the second phase of the CSP complex, which consisted of two separate plants on the same site. Contributions of US\$238 million from the CTF and US\$400 million from the Bank (including the restructuring of the original US\$200 million IBRD loan) for the 350 MW Noor II and III has since helped to generate further cost reductions. In 2015, ACWA Power won the competitive bid to construct the two new CSP plants offering an average power tariff of about US\$0.16/kWh, roughly 10 percent below that obtained for the first phase.

When fully operational in 2018, the 510 MW Noor CSP complex is expected to be the largest of its kind in the world; to reduce carbon emissions by 760,000 tons a year; and supply power to 1.1 million people.

IMPROVING CHILLER ENERGY EFFICIENCY IN THE PHILIPPINES

The air conditioning sector is one of the largest consumers of energy, as well as ozone depleting substances (ODS). It is a key sector of the Philippines economy, given its contribution to the broader development space, which involves various stakeholders including importers, manufacturers, installation technicians, and enterprises engaged in servicing equipment that use refrigerants.

The World Bank is assisting the Philippines in their effort to phase out the use of ODS while maximizing climate benefits. The Philippine Chiller Energy Efficiency Project, financed by a US\$2.6 million GEF grant and a US\$1 million grant from the Multilateral Fund for the Implementation

TABLE 19 Catalyzing Private Sector Engagement in Turkey's Renewable Energy and Energy Efficiency Markets

Source	Instrument	Amount (\$ million)
IBRD	Loan	1,000.0
IFC	Loan	93.0
CTF (CIF)	Loan	172.0
Total*		1,265.0

* US\$988 million in parallel financing was provided by EBRD, JBIC, the EC, Turkish Government, Banks and the Private Sector.

of the Montreal Protocol (MLF), provides financial incentives to encourage commercial establishments to replace near end-of-life building chillers with more energy-efficient and environment-friendly technology. The project has so far allowed the replacement of 40 commercial chillers. It is expected that the replacement of aged and inefficient chillers will generate around 60 GWh in cumulative energy savings.

CATALYZING PRIVATE SECTOR ENGAGEMENT IN TURKEY'S RENEWABLE ENERGY AND ENERGY EFFICIENCY MARKETS

“Partnering with the multilateral development banks through the CTF has helped Turkey to scale up investments in energy efficiency, renewable energy, and smart grids by empowering its own national private and banking sector. The fact that Turkey has been a first mover in achieving results on the ground has inspired investors and emboldened us to be even more ambitious not only in the scale of investments we seek to achieve but also in the types of renewable



Source: Climate Investment Funds.

technologies we are considering.”—Turkish Minister of Energy and Natural Resources, Taner Yildiz.

Strong government policy and support, coupled with investments from the multilateral development banks (MDBs) and the Clean Technology Fund (CTF) played a catalytic role in creating a market for renewable energy technologies and energy efficiency, increasing capacity for sustainable energy lending, and leveraging private sector capital.

In a first phase, US\$172 million from the CTF supported private sector investment in renewable energy and energy efficiency through complementary programs with Turkish financial intermediaries. Implemented by the Bank, IFC and EBRD through different local institutions (private sector banks, national development banks, and private leasing companies) these programs addressed common barriers to renewable energy and energy efficiency finance. They built technical capacity among banks to evaluate energy efficiency and renewable energy projects and assess risks, educated the industry about the benefits of energy efficiency, and provided loans at more favorable terms, with lower interest rates and longer tenors, than available in the market.

The CTF investment attracted nearly US\$2 billion co-financing (US\$1 billion from the Bank, US\$218 million from EBRD, US\$93 million from IFC, and US\$25 million in funding from JBIC and the European Commission, and the Turkish government, banks, and private sector) through 430 sub-projects in Phase I alone (through end of 2012). These projects will save 902,000 tCO₂e and US\$568 million in avoided oil imports per year.

This market has progressed from barely existent to one that could be financed on purely commercial terms over 2009 to 2014.⁴⁸ This is significant for Turkey where energy efficiency investments have the greatest impact on energy independence⁴⁹—today significant amount of Turkey's energy is being supplied from imported sources.

48. Based on IFC's experience.

49. Calculated in terms of primary energy savings per dollar invested based on an impact assessment of the CTF in Turkey conducted by Econoler in 2012.

ANNEX 3

WORKING THROUGH IFC TO ENGAGE THE PRIVATE SECTOR ON CLIMATE ACTION

PENONOME WIND POWER PLANT, PANAMA

In 2014 IFC completed a US\$300 million financing package for the largest wind farm in Central America, construction of Phase II and III of the Penonome wind power plant. In addition to IFC's US\$80 million loan, IFC mobilized an additional US\$204 million in outside managed funding. Once operational, the 86 wind turbines with an installed capacity of 337.5 MW are expected to generate roughly the equivalent of five percent of Panama's total energy demand. The project is the largest grid-connected wind farm in Panama and will cut energy prices and reduce Panama's dependence on fossil fuels, also cutting about 400,000 tons of carbon emissions per year—similar to taking 84,000 cars off the road.

JORDAN'S SOLAR PHOTOVOLTAIC (PV) PROGRAM

IFC is helping fund the construction of seven solar PV projects that will boost Jordan's renewables use and transform its energy sector. The project is the



Source: Prizma.

largest fully commercial private sector-led solar initiative in the Middle East and North Africa. The seven plants have a combined capacity of 102 MW, and will become Jordan's first private industrial-scale solar PV park, generating 212 gigawatt hours each year of non-polluting, sustainable power. To put this in context, as of December 2014 the total utility scale PV capacity in the Middle East and North Africa region was 10 MW and there have been no privately financed grid connected PV projects in the region. The seven plants will cut carbon dioxide emissions by 123,000 tons annually.

IFC is acting as lead arranger for all seven plants. As of May 2015, IFC had invested US\$79.66 million and mobilized an additional US\$107 million. This follows financing of US\$221 million from IFC for Jordan's 117-megawatt wind farm in 2013, and is part of a broader strategy to boost power capacity in Jordan.

ON-LENDING FOR CLIMATE PROJECTS THROUGH ITAÚ UNIBANCO, BRAZIL

By lending through financial intermediaries, IFC is able to finance smaller projects and build local capacity to fund projects that reduce greenhouse gas emissions and help countries to adapt to climate. This is particularly important for renewable energy in Brazil, where access to reliable and affordable energy from diversified sources is critical to securing long-term competitiveness and sustainable economic growth. In Brazil, IFC provided a US\$100 million investment and an additional US\$300 million syndicated loan to Itaú Unibanco for on-lending to climate-related deals, such as renewable energy, water treatment, and

energy efficiency projects. As a result, installed capacity of renewable energy is expected to increase by 10 percent.

ODEA BANK INVESTMENTS IN GREEN BUILDINGS, TURKEY

Driven by rapid urbanization, and strong demographics, Turkey will build or refurbish about 13 million housing units over the next ten years. Buildings account for about 33 percent of energy consumption in Turkey and are the largest contributor to the country's greenhouse gas emissions. Green buildings offer a solution to energy consumption concerns but Turkey lacked specialized financing products for homebuyers. There was also a perception that building green would add about 30 percent to project costs rather than actual increased costs of less than 12 percent. IFC has provided Odea Bank US\$44.5 million, US\$22.5 million under IFC's Managed Co-lending Portfolio Program (funded by the People's Bank of China) and US\$14.7 million in concessional funds from the Clean Technology Fund, all to support investments in green buildings in Turkey. IFC's advisory services have helped stimulate demand and build the pipeline for green mortgages through awareness raising campaigns.

ADDRESSING RISING DEMAND FOR AFFORDABLE HOUSING IN VIETNAM

There is a window of opportunity to shape the cities of the future and make them more climate friendly by investing in resilient design and green growth plans. Vietnam has a growing demand for 70,000 low to middle income housing units in Ho Chi Minh City. IFC has made a US\$7.5 million equity investment to finance the expansion of Nam Long Investment Corp that will enable the company to build 8,000 apartments in the country's largest city. The Nam Long Housing project will help alleviate acute shortages of affordable housing and improve living standards of people on low incomes by providing access to quality affordable housing. The planned green construction for the buildings

will help reduce water use and materials, and the deployment of energy efficiency technologies will help reduce around 1,000 tons of CO₂ per year.

RENOVATING ROYA-AFFECTED COFFEE PLANTATIONS IN NICARAGUA

New pests and diseases caused by the changing climate are impacting yields in many regions of the world and, as such, adaptation remains critical for helping farmers make their land use more sustainable and investing in promising technologies. Coffee is Central America's leading export. Coffee rust, or la roya—a disease that attacks coffee leaves and chokes off nutrition to the coffee cherries—has affected up to 70 percent of plantations in some countries with serious immediate economic and social impacts on thousands of farmers and workers.

In Nicaragua, where coffee represents 19 percent of exports and is one of the largest sources of employment with 270,000 jobs, as much as 40 percent of the coffee fields have been affected. IFC placed US\$12 million and mobilized an additional US\$12 million for a US\$30 million long-term lending facility, which provides financing and technical assistance to farmers for renovation of roya-affected coffee plantations and diversification of crops. The project will help about 550 farmers to replant and renovate their farms, providing them with new coffee varieties which are resistant to the fungus as well as technical support to improve their agricultural practices.

It is worth noting that this initiative builds on earlier efforts undertaken by the Bank using GEF funds, namely through a grant of US\$0.75 million for a Renewable Energy and Forest Conservation project that focused on the sustainable harvest and processing of coffee and allspice.

CONCENTRATED SOLAR POWER IN SOUTH AFRICA

South Africa's power sector is its largest source of carbon emissions. IFC provided financing to support clean power production through the first

Concentrated Solar Power (CSP) plants to be publicly tendered in South Africa, with a combined installed capacity of 150 MW.

Abengoa Khi, or the 50 MW Khi Solar One project, was supported through US\$15 million in concessional funds from the Clean Technology Fund and circa US\$40 million from IFC's own account.

Abengoa KaXu, or the 100 MW KaXu Solar One project, is supported by US\$26.5 million in concessional funds from the Clean Technology Fund and circa US\$42 million from IFC's own account. When it began producing electricity in early 2015 it was the first utility-scale CSP plant to operate in the developing world.

A third CSP project called Abengoa Xina, or the 100 MW Xina project, is now being constructed with support of circa US\$38 million from IFC's own account. These three projects will further help develop the CSP market domestically and in other emerging markets and mitigate more than 442,000 metric tons of greenhouse gas emissions a year.

The successful completion of KaXu and Khi have helped catalyze a new wave of CSP plants in the Northern Cape, and the South African government is considering a significant increase in its target for CSP installed capacity by 2030 from its original goal of 1,200MW.