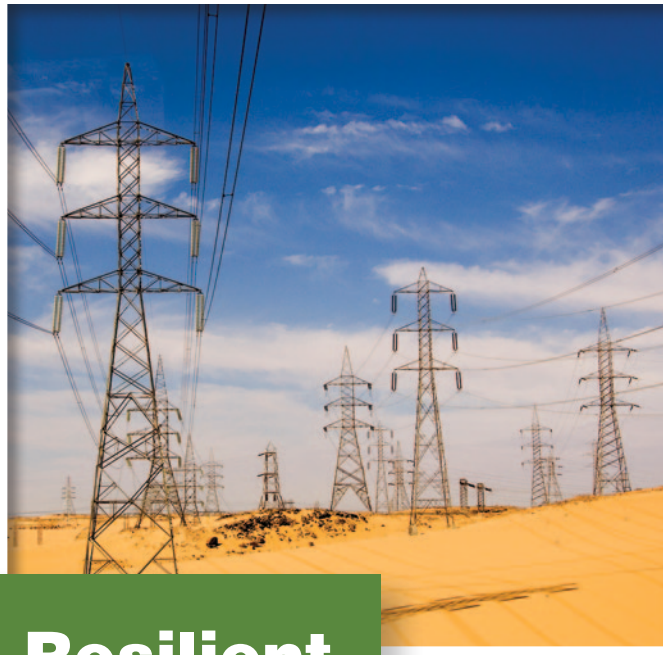
AFRICA REGION









Accelerating Climate-Resilient and Low-Carbon Development

The Africa Climate Business Plan

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AFRICA REGION

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Foreword

The 21st session of the Conference of the Parties to the United Nations Framework Convention (COP21), which takes place in Paris in December 2015, has the ambition of reaching an agreement on climate change that would limit global warming to less than 2°C above pre-industrial levels.

For Africa, more than any other region of the world, the outcome of these climate negotiations is of vital importance. The reason is simple. While Africa is the region that contributes the least to greenhouse gas emissions, African countries suffer the most from the impact of climate change. From the Sahel to the Horn of Africa, to the south of the continent and the small island nations, African countries are experiencing first-hand the devastating effects of more extreme weather patterns. In West Africa, for instance, where climate change scenarios suggest an increase in the frequency and intensity of tidal waves and storm surge, a potential sea-level rise of one meter would cause the loss of 18,000 km^2 of land, ultimately magnifying the damage to infrastructure and causing the displacement of populations.

There is an inextricable link between Africa's climate and development agendas. For example, we cannot separate agriculture and food security from climate change. A 1.5°C to 2°C increase in temperature by the 2030s and 2040s will lead to a 40 to 80 percent reduction in the area of land suitable for growing maize, millet and sorghum, the main staple foods in Africa. Research also shows strong evidence linking climate change to human conflicts.

Unless bold and decisive action is taken, climate variability and change will jeopardize or reverse Africa's hard-won development achievements and its aspirations for further growth and poverty reduction. Increasingly frequent droughts, floods, and cyclones threaten to drive Africans into poverty and create inescapable poverty traps. The correlation between climate, economic growth and poverty is well established, won't disappear, and will only grow stronger.

Adaptation to the effects of climate change is an enormous challenge. The costs of adaptation are staggering and will only continue to rise. Consider this: while the needs currently amount to $5–10 billion per year (in order to adapt to a 2°C warming), they could be as high as $20–50 billion around mid-century, and close to $100 billion in case of a 4°C warming. Unfortunately, the volume of climate finance flowing to Africa pales in comparison with the needs. Current levels of funding for adaptation in Africa amount to at most $3 billion per year, which is negligible considering the needs.

Fortunately, there is also some good news. On the issue of climate change, African leaders are speaking with one voice and transforming challenges into opportunities. The fact is that the continent is uniquely positioned to build resilience by betting on renewable sources of energy (plentiful in Africa) to bring power to its people, schools, health centers and businesses. For African governments, promoting climate-smart agriculture is also a priority. There is a range of agricultural management solutions, which can improve crop

productivity, enhance resilience to climate shocks and reduce carbon emissions. Delivering this triple win is essential to addressing Africa's food security agenda.

To help Africa deliver on its promises, the World Bank has prepared an Africa Climate Business Plan which will boost the region's ability to adapt to the changing climate while reducing greenhouse emissions through a number of concrete actions. Implementation of the Plan will enhance Africa's efforts to strengthen, power and enable resilience.

The ambition of the Plan is to raise $16 billion in climate finance by 2020, $5.7 billion of which is from IDA, and the rest from a variety of sources, including bilateral and multilateral sources, dedicated climate finance sources, and the private sector. The Africa Climate Business Plan will contribute to the World Bank Group's efforts to increase the share of its own financing dedicated to climate action—adaptation and mitigation—by one-third by 2020.

While this Plan is arguably only a partial contribution to meet Africa's financial needs for climate action, it is a meaningful one. The World Bank Group looks forward to working with African governments, Africa's development partners and the private sector to implement the activities included in the Plan. By galvanizing climate action, deploying expertise and mobilizing financing, together we can support Africa in its quest for a greener and more resilient future.

Makhtar Diop
Vice President, Africa Region, The World Bank

Overview

Africa's climate and development agendas are inextricably linked: if unaddressed, climate variability and change will jeopardize Africa's hard-won development achievements and its aspirations for further growth and poverty reduction. Climate drivers are involved in most of the shocks that keep or push African households into poverty. They include natural disasters (such as loss of assets and disability after floods), health shocks (such as health expenditures and lost labor income as a result of malaria), crop losses (as a result of drought or crop disease), and food price shocks. It is estimated that floods affected more than 1 million people in African cities between 1997 and 2008.

Climate-related factors will make poverty reduction ever more challenging in the future, for three reasons. First, warming on the order of 1.5°C–1.75°C above preindustrial levels is virtually unavoidable, as a result of past emissions of greenhouse gases. This warming (which could well be higher for parts of Africa) will cause loss of cropland, reduce crop production and fish catches, worsen undernourishment, and increase the risk of drought.

Second, as a result of the persisting gap between global pledges for climate mitigation and the abatement efforts needed to control further climate change, there is a considerable risk that further warming will materialize. If existing policies are not scaled up to attain the abatement targets that countries formulated in the lead-up to the Paris climate summit in December 2015, warming could approach, or even exceed, 3°C above preindustrial times.

Such an increase would have disastrous consequences for Sub-Saharan African. Warming in the range of 3°C–4°C above preindustrial temperatures would result in heat extremes affecting the vast majority of the continent's land area, heightened risks of extreme drought (particularly in southern Africa), sharp increases in the rate of crop failure (up to every other year in southern Africa), a 20 percent reduction in the yields of major staple crops, and, by the end of the century, flooding that would affect up to 18 million people a year.

Third, regardless of whether warming is contained below 2°C or exceeds that threshold, Africa will face considerable uncertainty regarding the effects of warming on local weather patterns and hydrological cycles. For every scenario for greenhouse gas concentration and associated warming, there is considerable uncertainty about the response of precipitation, run-off, groundwater recharge, and so forth. This uncertainty creates formidable challenges for development planning and the design of projects related to water management (irrigation, hydropower, water supply, flood control) and climate-sensitive infrastructure (for example, roads and bridges).

Given the threats posed by current climate shocks—and the even greater challenges linked to future climate change—the gap between needs and resource flows needed to scale up the continent's resilience to an increasingly hostile climate is alarming. Current levels of funding for adaptation in Africa are estimated to be on the order of $3 billion a year. Based on figures from the

World Bank and the United Nations Environment Programme (UNEP), Africa needs to spend $5–$10 billion a year today to adapt to a 2°C warming, $20–$50 billion to do so around midcentury, and close to $100 billion if warming increases by 4°C.

The Africa Climate Business Plan represents the World Bank's contribution to reducing the funding gap, which the Bank will do by deploying technical expertise, mobilizing financing from various sources, and facilitating the engagement of stakeholders on climate action.

The plan's emphasis is on adaptation, which is consistent with the priorities expressed by Africa's Intended Nationally Determined Contributions (INDCs). Of the 44 INDCs African countries submitted to the United Nations Framework Convention on Climate Change (UNFCCC) as of October 2015, 28 (63 percent) included an estimate of the financing needs for adaptation—a much higher figure than for the rest of the world (27 percent).

The plan supports the World Bank Group's overall goals to end extreme poverty by 2030 and promote shared prosperity in the developing world. Recent World Bank analysis (World Bank 2015b) indicates that climate change could push up to 43 million additional Africans below the poverty line by 2030—a stark reminder of the vital role enhancing climate resilience plays in poverty reduction.

The plan reflects contributions and inputs by a wide variety of partners with whom the Bank is already collaborating on the ground in an effort to increase Africa's resilience to climate variability and change. The initiatives included reflect dialogue held with African countries by the International Development Association (IDA), which will leverage as much as possible the support of other parts of the World Bank Group (e.g., IBRD, IFC and MIGA).

The plan aims to raise awareness of and accelerate resource mobilization for priority climate-resilient and low-carbon initiatives in Africa. It focuses on a dozen or so priority areas, clustered in three groups, where the World Bank, in collaboration with African governments and a variety of regional and international partners, expects to help achieve results in the near future. The plan contributes to meeting the World Bank Group's corporate objective of increasing the share of its financing for climate change by one-third (from 21 percent to 28 percent) by 2020.

The first cluster of the plan ("strengthening resilience") includes selected initiatives aimed at boosting the resilience of the continent's assets. These initiatives comprise Africa's natural capital (landscapes, forests, agricultural land, inland water bodies, and oceans, with a special focus on small island developing states); physical capital (cities and physical assets in coastal areas, including roads and other infrastructure); and human and social capital (including improving social protection against climate shocks for the more vulnerable and addressing the climate-related drivers of migration, in order to mitigate the effects of climate shocks on social cohesion).

The second cluster ("powering resilience") relates to opportunities for scaling up low-carbon energy sources in Africa. In addition to helping mitigate climate change, these activities yield considerable resilience benefits. Societies with adequate access to energy are less vulnerable to climate shocks, because

when power becomes more accessible, irrigation systems can be activated in times of drought, early warning systems and telecommunication systems can be deployed before and after natural disasters, alternative revenue-generating activities can be undertaken, health services can be provided more easily, study hours can be extended (contributing to better education), and so forth.

The third cluster ("enabling resilience") provides data, information, and decision-making tools for promoting climate-resilient development across sectors by strengthening the region's hydro-meteorological systems at the regional and county level and building the capacity to plan and design climate-resilient investments.

This plan is a living document that may be updated and expanded in the coming months to cover other areas not addressed in this version, such as health and transport, which the Bank is well positioned to support through sector dialogue and financial and technical assistance.

A preliminary assessment by World Bank staff estimates that implementing the Africa Climate Business Plan will require about $16.1 billion in the period 2016–2020 (table O.1) to achieve the outcomes described in this document

TABLE O.1 Fast-track and Longer-term Financing Required to Implement the Africa Climate Business Plan, by Component
($ million)

Component	Fast track (2016–20)	Longer term (by 2024)
I. Strengthening Resilience	10,363	13,490
Natural Capital		
Climate-smart agriculture	3,000	2,000
Climate-resilient landscapes	1,605	1,605
Integrated watershed management (Niger, Chad, Zambezi, Lake Victoria)	2,967	6,100
Ocean economies	220	280
Physical Capital		
Climate smart cities	1,025	1,025
Coastal resilience (West Africa)	450	550
Human and Social Capital		
Social protection	480	960
Migration drivers	616	970
II. Powering Resilience	5,398	7,402
Solar	3,240	4,760
Hydropower	1,208	792
Geothermal	950	1,850
III. Enabling Resilience	320	380
Africa hydro-met program	270	280
Africa climate resilient investment facility	50	100
Total	16,081	21,272

Note: The fast-track phase assumes resource mobilization by June 2020 (end of IDA18) and generation of outcomes by June 2023 (end of IDA 19). The longer-term phase assumes resource mobilization up to December 2024 (mid-term of IDA 20) and generation of outcomes by June 2026 (end of IDA20).

TABLE O.2 Financing Sources for the Fast-track Phase of the Africa Climate Business Plan

Source	Amount ($ million)
International Development Association (IDA)	5,683
Climate finance (Climate Investment Funds, Green Climate Fund, Global Environment Facility, and so forth)	2,227
Other development finance (bilaterals, multilaterals)	1,979
Private sector	3,515
Domestic sources	703
To be determined	1974
Total	16,081

and exemplified in table O.3. The business plan also defines results that could be achieved in the longer term (up to 2026), at an estimated cost of about $21.3 billion. About $5.6 billion of the financing of the plan's fast-track phase could come from national and regional IDA programs, $2.2 billion from various climate finance instruments, $1.9 billion from the rest of the development community, and $3.5 billion form the private sector, leaving almost $2 billion still to be found (table O.2).

The activities included in the pan are of a "pipeline" nature: they have not yet been approved by the governing bodies of the relevant financiers (although in several cases project preparation process is nearing completion). Box O.1 spells out the assumptions used to estimate financing.

By providing an organizing framework for different World Bank teams and their partners around a platform of concrete activities that will improve resilience, the Africa Climate Business Plan will help achieve results in the following areas:

- Resource mobilization. Two indicators will assess resource mobilization. The first is the share of resources in the total financing plan that are mobilized at different stages of implementation. The targets are 25 percent of funding to be mobilized by June 2017 (end of IDA17), 50 percent by December 2018 (midterm of IDA18), and 75 percent by June 2020 (end of IDA18). As the plan may also have catalytic effects on other interventions (in addition to those described in the document), the second indicator proposed is the share of IDA commitments to Sub-Saharan Africa with climate co-benefits, which the World Bank has been monitoring since 2011. The target is to increase this share from a baseline of 17 percent (the average across all sectors for the period FY11–FY15) to 22 percent over the period FY16–FY20. The increase would help the World Bank Group meet its recent commitment to increase climate finance.
- Increase in Africa's resilience to climate variability and change. A wide range of outcome indicators is proposed for each of the plan's components. The proposed aggregate target is for at least 75 percent of these indicators to be met by June 2023 (end of IDA19). The lower-than-100 percent target reflects the fact that the goals of the Africa Climate Business Plan are ambitious.

BOX O.1 Assumptions Used in Estimating Sources of Financing of the Africa Climate Business Plan

Funding of the business plan is based on the following assumptions.

International Development Association (IDA)
Resource mobilization for the fast-track part of the plan spans two IDA cycles: IDA17 (which ends June 30, 2017) and IDA18 (which will run from July 1, 2017 to June 30, 2020). Activities that would start in the earlier years of the plan would be considered for financing under IDA17; estimates of financing in the outer years of the plan refer to activities to be considered for support by IDA18 and are more tentative. The plan is fully consistent with the recently announced World Bank Group goal to increase the share of financing with climate co-benefits by one-third by 2020. That increase will be achieved through better integration of climate considerations into project planning and design. The additional technical work during project preparation needed to achieve such integration could be co-financed by dedicated resources mobilized by donors and partners.

Climate Finance
Funding estimates under this rubric comprise various instruments, including the Climate Investment Funds (in particular the Forest Investment Program [FIP]); the Global Environment Facility (GEF); the Forest Carbon Partnership Facility, including both the readiness and the carbon finance mechanisms; the Green Climate Fund (GCF); and other initiatives, such as the Central African Forest Initiative (CAFI). Estimates are based on consultations with staff of each financing institution (on eligibility, strategic fit, and so forth). Some GCF projects (such as the hydro-met project) have already been submitted to the GCF Secretariat; others are in preparation.

Other development finance (bilateral and multilateral institutions)
Figures included in this category are based on technical consultations with the staff of a variety of financing partners of the World Bank, including the African Development Bank (AfDB), the West African Development Bank (BOAD), and bilateral partners (including the Agence Française de Développement [AFD], the Department for International Development [DFID], the German Agency for International Cooperation [GIZ], and the Nordic Development Fund [NDF]). These consultations range from preliminary to advanced, but in general there is a reasonable expectation that a substantial portion of the funding identified will materialize.

Private sector
Estimates of private sector financing reflect the potential of projects to generate streams of revenues adequate to remunerate private investors. Private sector participation is expected mainly in the energy sector and to some extent in agriculture.

box continues next page

BOX O.1 Assumptions Used in Estimating Sources of Financing of the Africa Climate Business Plan *(continued)*

Domestic sources

Estimates of domestic financing are based on the record of government counterpart financing across World Bank projects.

To be determined

"To be determined" is an estimate of the residual gap that needs to be filled in order to fully finance the projects included in the plan. It is expected that this document will serve as a platform to help close this gap, by mobilizing additional interest and support from both existing and new partners with an interest in promoting climate-resilient low-carbon development in Africa (such as China and the Arab funds).

Two levels of organizational arrangements are proposed for rolling out the plan. At the external level, to ensure an adequate framework for successful implementation of the plan, the Bank will continue to systematically integrate climate change considerations into country and sector dialogue, in accordance with commitments made as part of the IDA17 Replenishment. This effort includes addressing climate change in Systematic Country Diagnostics (SCDs) and integrating climate considerations in Country Partnership Framework (CPFs), which will help identify the instruments (policy lending, investment lending, technical assistance, programs for results, guarantees, and so forth) that can best achieve the results envisaged by the plan and promote synergies with the Bank's work in the related areas of jobs and gender.

To nurture and expand partnerships for implementing the plan, the Bank will convene working-level meetings with organizations collaborating on specific components on an as-needed basis. It could also organize high-level conferences with a wide range of stakeholders. The first such meeting could take place in the early stages of implementation, in order to spur both fundraising and action on the ground. The second could take place toward the end of the implementation period (in late 2018, for example). It would be aimed at considering prospects for extending/scaling up the plan in order to achieve its longer-term goals.

Within the Bank, implementation of each of the plan's components will be spearheaded by a lead Global Practice (GP), collaborating as needed with other GPs and the Climate Change Cross-Cutting Solution Area (CCSA). Senior management in the Africa Region, the GPs, and CCSAs will provide strategic direction and oversight.

TABLE O.3 Fast-track and Longer-term Indicators of Headline Outcomes (Provisional)

Activity	Fast track (by 2023)	Longer term (by 2026 or later)
I. Strengthening Resilience		
Natural Capital		
Climate-smart agriculture	10 million farmers have adopted climate-smart agriculture practices	25 million farmers have adopted climate-smart agriculture practices
Forested landscapes	Intersectoral forest landscape planning has been conducted in 14 countries	Area under forest cover in targeted forest landscapes reaches 20 million hectares.
Climate-resilient landscapes	Pilot restoration interventions have taken place in at least 12 vulnerable landscapes	100 million hectares of degraded and deforested land in Africa have been restored by 2030
Niger Basin	Projects worth $1 billion are operational to increase the resilience to climate change of up to 3 million people, through improved natural resource management, irrigation, watershed management, and flood protection.	Projects worth $1.5 billion are operational to increase the resilience to climate change of up to 20 million people, through improved regulation of water flows through multipurpose dams and other infrastructure, natural resource management, irrigation, watershed management, and flood protection
Lake Chad Basin	Investments for $300 million in climate-resilient activities are under implementation	Investments for 600 million in climate-resilient activities are under implementation
Zambezi Basin	Preparation of large investments (such as hydropower, water transfers, irrigation etc.) is completed; investments in community infrastructure (small water supply schemes, conservation agriculture, check dams, flood protection etc.) is under way	Infrastructure investments to improve resilience to climate variability and change through increased energy production, increased irrigation, and improved flood control are under way
Lake Victoria Basin	Adoption of a formal climate-resilience policy document and a financing roadmap by the Sectoral Council of Ministers for the Lake Victoria Basin	At least $500 million of climate-resilient investments made, aimed at minimum 1 million beneficiaries of sustainable land management and diversified livelihoods in rural areas
Climate-smart ocean economies	4 countries present national climate-smart blue economy development plans to parliament	8 countries present national climate-smart blue economy development plans to parliament
Physical Capital		
Climate-smart cities	Investment in resilience-building activities is ongoing in four cities and initiated in another five	Investment in resilience-building activities is ongoing in 11 cities
Coastal resilience (West Africa)	Measures in place to reduce rate of erosion in 30 percent of identified coastal erosion hotspots and flood risks for 30 percent of the population in priority flooding areas	Measures in place to reduce rate of erosion in at least 70 percent of coastal erosion hotspots and flood risks for at least 70 percent of the population in priority flooding areas
Human and Social Capital		
Social protection	Increased percentage of people is engaged in diversified climate-resilient activities for their livelihood	Improved safety nets support the response to climate shocks
Migration drivers	Government policies and strategies related to climate change adaptation and migration are informed through key knowledge products, operational innovations, and knowledge exchanges	New innovative approaches are developed, through support to knowledge creation and just in-time technical assistance for addressing the drivers and impacts of migration

table continues next page

TABLE O.3 Fast-track and Longer-term Indicators of Headline Outcomes (Provisional) *(continued)*

Activity	Fast track (by 2023)	Longer term (by 2026 or later)
II. Powering Resilience		
Solar power	1 GW of grid-connected solar photo-voltaic power is generated 5 million off-grid consumers gain access to modern energy services	2 GW of grid-connected solar Photo-Voltaic power is generated 55 million off-grid consumers gain access to modern energy services
Hydropower	420 MW of reliable, clean, low-cost hydropower is developed in West Africa	545 MW of reliable, clean, low-cost hydropower is developed in West Africa
Geothermal	150 MW of geothermal generation capacity is developed	350 MW of geothermal generation capacity is developed
III. Enabling Resilience		
Africa hydro-met program	Hydro-met services are modernized and programs underway in 15 countries and 4 regional centers	Timely and reliable forecasts are made at the regional, national, and local levels
Africa Climate Resilient Investment Facility	On-demand advisory services on climate-resilient planning and design are provided to the developers of 20–30 projects	On-demand advisory services on climate-resilient planning and design are provided to the developers of 30–50 projects

Note: The table includes an indicative sample of the full range of outcome indicators provided in chapters 3–15 of this report. Indicators are subject to further validation; they will be periodically updated on a dedicated webpage (www.worldbank.org/africa/climateplan).

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Abbreviations

AFD	Agence Française de Développement
AfDB	African Development Bank
AFR GSURR	Social, Urban, Rural, and Resilience Global Practice (Africa)
ARLI	African Resilient Landscapes Initiative
ASP	adaptive social protection
CAADP	Comprehensive Africa Agriculture Development Program
CAFI	Central African Forest Initiative
CCAFS	Climate Change, Agriculture and Food Security
CCSA	Climate Change Cross-Cutting Solution Area
CGIAR	Consultative Group for International Agricultural Research
CIF	Climate Investment Funds
CIWA	Cooperation for International Waters in Africa
COMESA	Common Market for Eastern and Southern Africa
COP21	21st Session of the Conference of the Parties to the UN Framework Convention on Climate Change
CORAF	West and Central African Council for Agricultural Research and Development
CRIP	Climate Resilient Investment Plan
CRS	Catholic Relief Services
CSA	climate-smart agriculture
DANIDA	Danish International Development Agency
DFID	Department for International Development
EAC	East African Community
ECCAS	Economic Community of Central African States
ECHO	European Commission's Humanitarian Aid and Civil Protection department
ECOWAS	West African Economic and Monetary Union
ECRAI	Enhancing the Climate Resilience of Africa's Infrastructure
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agriculture Organization
FARA	Forum for Agricultural Research
FCPF	Forest Carbon Partnership Facility
FIP	Forest Investment Program
FY	fiscal year
GCF	Green Climate Fund
GDP	gross domestic product
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GIZ	German Agency for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)
GP	Global Practice

GPFD	Government Partnerships for Development
GSURR	Social, Urban, Rural, and Resilience Global Practice
IDA	International Development Association
IDA17	International Development Association, 17th replenishment
IDA18	International Development Association, 18th replenishment
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
ILM	integrated landscape management
INDC	Intended Nationally Determined Contribution
IOM	International Organization for Migration
IPCC	International Panel on Climate Change
IPP	independent power producer
JICA	Japan International Cooperation Agency
KNOMAD	Global Knowledge Partnership on Migration and Development
LVEMP	Lake Victoria Environment Management Program
NBA	Niger Basin Authority
NDF	Nordic Development Fund
NEPAD	New Partnership for Africa's Development
NGO	nongovernmental organization
NHMS	national meteorological and hydrological services
NORAD	Norwegian Agency for Development Cooperation
PPCR	Pilot Program for Climate Resilience
PPP	public-private partnership
PSNP	Productive Safety Net Program
PV	photovoltaic
REDD+	reduced emissions from deforestation and forest degradation
SADC	Southern Africa Development Community
SDG	Sustainable Development Goal
SIDA	Swedish International Development Association
tCO_2e	tonnes of carbon dioxide equivalent
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
USAID	United States Agency for International Development
WAEMU	West African Economic and Monetary Union
WFP	World Food Programme
WMO	World Meteorological Organization
ZAMCOM	Zambezi River Basin Committee

PART A

Context and Rationale

Climate change has a very strong effect on poverty in Sub-Saharan Africa, where millions of people depend on rain-fed agriculture or live in drought-prone zones in urban areas. Climate variability is already exacting a heavy toll on development; future change may have catastrophic impacts, as drought, floods, and storm surges could push millions of people into poverty and prevent millions of others from emerging from it.

The Africa Climate Business Plan identifies a dozen areas where efforts could be stepped up to assist African countries in making their development more climate resilient. The plan is grounded in the World Bank's overall commitment to support climate-resilient and low-carbon development across the developing world and its solid engagement in technical and financial assistance to support climate action in Sub-Saharan Africa.

Chapter 1

Africa's Development and Climate Agenda

Climate is involved in most of the shocks that keep or push households into poverty (World Bank 2015b). These shocks include natural disasters (such as loss of assets and disability after floods); health shocks (such as health expenditures and lost income as a result of malaria); and crop losses (as a result of drought or crop disease) and food price shocks. The problem is particularly apparent in Sub-Saharan Africa, where climate shocks such as drought, floods, and storm surges are already ravaging the continent (map 1.1), pushing people further into poverty or frustrating their efforts to emerge from it.

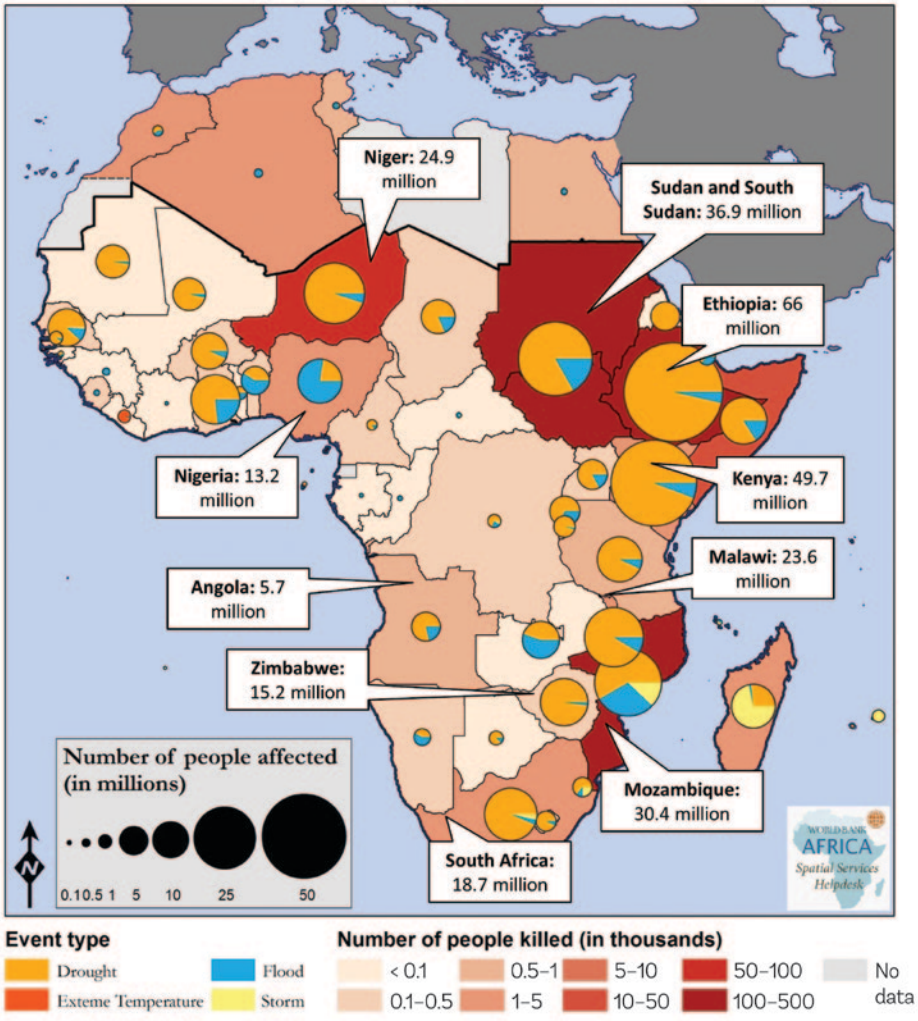
Rainfall variability drives most of Africa's agricultural production, given the continent's very limited irrigation infrastructure. As a result, GDP fluctuates widely (figure 1.1 illustrates the point with respect to Senegal), with important repercussions on the income of the poor and their ability to save and build the assets needed to escape poverty.

Climate-related factors will make poverty reduction ever more challenging in the future, for three reasons. First, a certain amount of global warming and associated climate change is virtually unavoidable. As a result of the greenhouse gases that have already accumulated in the atmosphere, it appears very likely that the world is irrevocably headed toward warming of about 1.5°C–1.75°C above preindustrial levels, irrespective of the outcomes of international negotiations to curb emissions. This global average conceals a wider range of increases, with several parts of Africa expected to be at the higher end of the range.

Even if warming does not exceed 2°C, the following impacts can be expected in Sub-Saharan Africa (World Bank 2013a):

- loss of 40–80 percent of suitable cropping areas for cultivars of maize, millet, and sorghum
- 10 percent reduction in per capita crop production, with significant consequences for food availability and food security
- 15–65 percent increase in levels of undernourishment (depending on the subregion), as a result of declines in crop yields and nutritional quality
- increasing drought risk, particularly in southern, central, and western Africa, with particularly severe implications for the 40 million people in Africa who earning their livings from livestock-based activities (De Haan and others 2015)
- declines in potential fish catches off the coast of West Africa (where fish account for as much as half of the animal protein consumed) of as much as 50 percent by midcentury.

MAP 1.1 Climate-Related Disasters in Sub-Saharan Africa



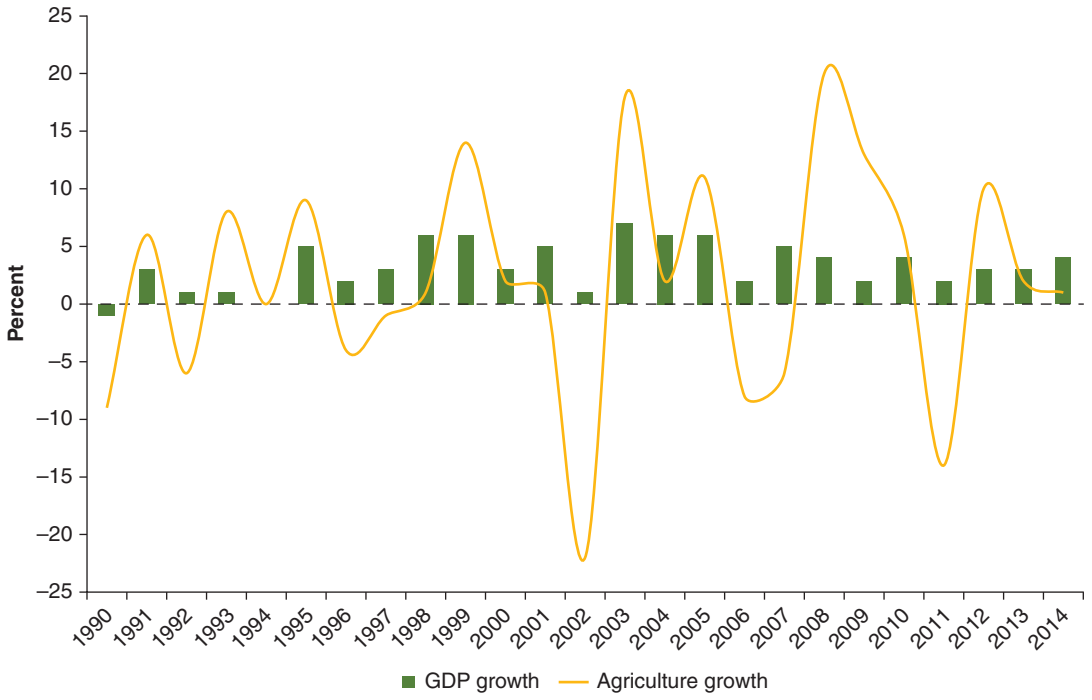
Note: Map covers period 1971–2012.

Second, as a result of the persisting gap between mitigation pledges and the abatement efforts needed to limit further climate change, there is a considerable risk that warming will approach or exceed 3°C above preindustrial times. The extent of the increase will depend on whether existing policies are scaled up to attain the targets indicated in the Intended Nationally Determined Contribution (INDC) submitted up to October 2015 (figure 1.2).[1]

Warming approaching 4°C above preindustrial levels would have disastrous consequences for Sub-Saharan African, as the *Turn Down the Heat* report (World Bank 2013a) documents:

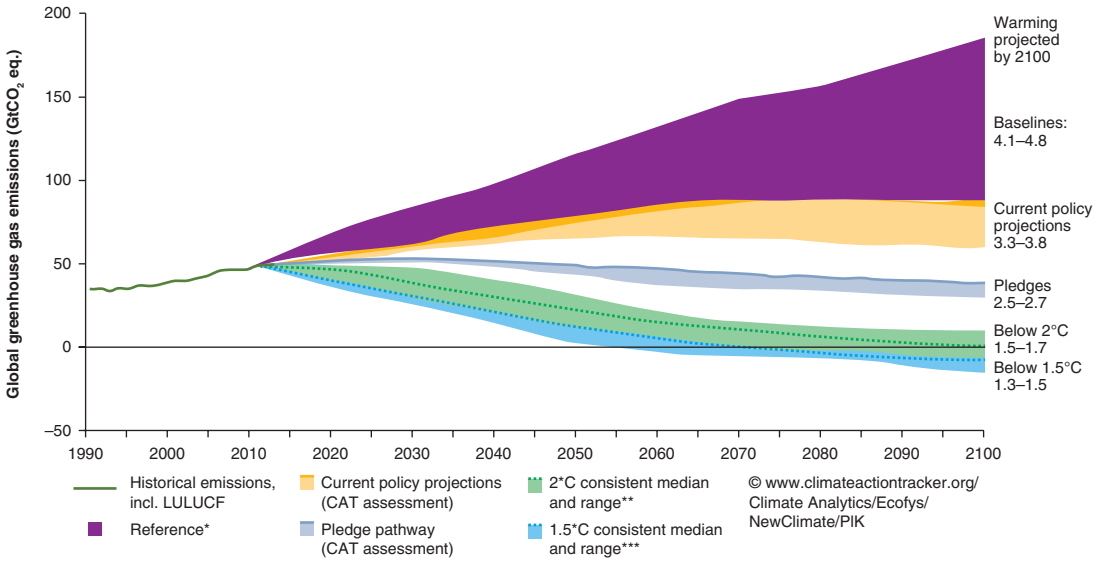
- Heat extremes would affect 70–80 percent of Africa's land area in the summer months.
- Southern Africa would be at risk of extreme drought, central Africa would be at risk of severe drought, and West Africa would face increased drought risk in general.

FIGURE 1.1 GDP Growth and Agriculture Growth in Senegal (1990–2014)



Source: World Bank estimates.

FIGURE 1.2 Projected Effect of Current Pledges and Policies on Increases in Average Global Temperature, 1990–2100



Source: Climate Action Tracker (CAT) (http://climateactiontracker.org/global.html), accessed October 2015.

Notes:

* 5%–95% percentile of ARS WGII scenarios in concentration category 7, containing 64% of the baseline scenarios assessed by the IPCC.

** Greater than 66% chance of staying within 2°C in 2100. Median and 10th to 90th percentile range. Pathway range excludes delayed action scenarios and any that deviate more then 5% from historic emissions in 2010.

*** Greater than or equal to 50% chance of staying below 1.5°C in 2100. Median and 10th to 90th percentile range. Pathway range excludes delayed action scenarios and any that deviate more than 5% from historic emissions in 2010.

- The rate of season failure in crop farming in southern Africa could increase to one in two years.
- Yields of major staple crops could fall by 20 percent.
- Floods could affect up to 18 million people a year by the end of the century.

Severe impacts are also likely on infrastructure in coastal zones, as a result of sea-level rise and weather extremes such as cyclones. Cities are also likely to be major hotspots of vulnerability (box 1.1).

Third, regardless of whether warming is contained below 2°C or exceeds that threshold, considerable uncertainty will exist regarding local weather patterns and hydrological cycles in Africa. For every scenario of greenhouse gas concentration and associated warming, there is a considerable uncertainty about the response of precipitation, runoff, groundwater recharge, and so forth. This uncertainty creates formidable challenges for planning and designing projects related to water management (irrigation, hydropower, water supply, flood control) and more generally climate-sensitive infrastructure (for example, roads and bridges).

BOX 1.1 How are Climate-Related Shocks Affecting African Cities?

African cities are slated to face disproportional impacts of disaster and climate change. The problem will affect a growing number of people, as the urban population of Africa is estimated to rise from its current level of 472 million to 659 million by 2025 and 1 billion by 2040.

The poor will be especially hard hit, for several reasons. They often settle in undesirable parts of cities, including hazard-prone areas. Unsanitary living conditions in many settlements increase the risk of disease and epidemics. Housing is often informal, raising the risk of eviction or destruction of home. Settlements are prone to collapse and fire damage and are more easily destroyed by natural disasters.

Proximity to coasts and rivers leaves cities at high risk from climate change. Heavy rainfall upstream is compounded by degraded watersheds and in some cases forced dam releases, resulting in exceptionally high river levels. Unplanned settlements, many in high-risk areas, coupled with aging and inadequately maintained drainage infrastructure, particularly in low-lying urban areas, exacerbate the situation, leaving millions of people vulnerable to flooding.

Medium-size cities (cities with populations of 500,000–1 million people) are increasingly grappling with recurrent disasters. Dakar experiences recurrent flooding; the 2009 floods affected almost 360,000 people and caused $100 million in damages and losses. Recurrent floods in Bangui, the capital of the Central African Republic, cause on average $7 million in damages and losses a year. Floods in 2009 left 14,500 people in Bangui—including some 6,000 children—homeless, and the malaria, diarrhea, and other water-borne diseases that followed the floods affected thousands more.

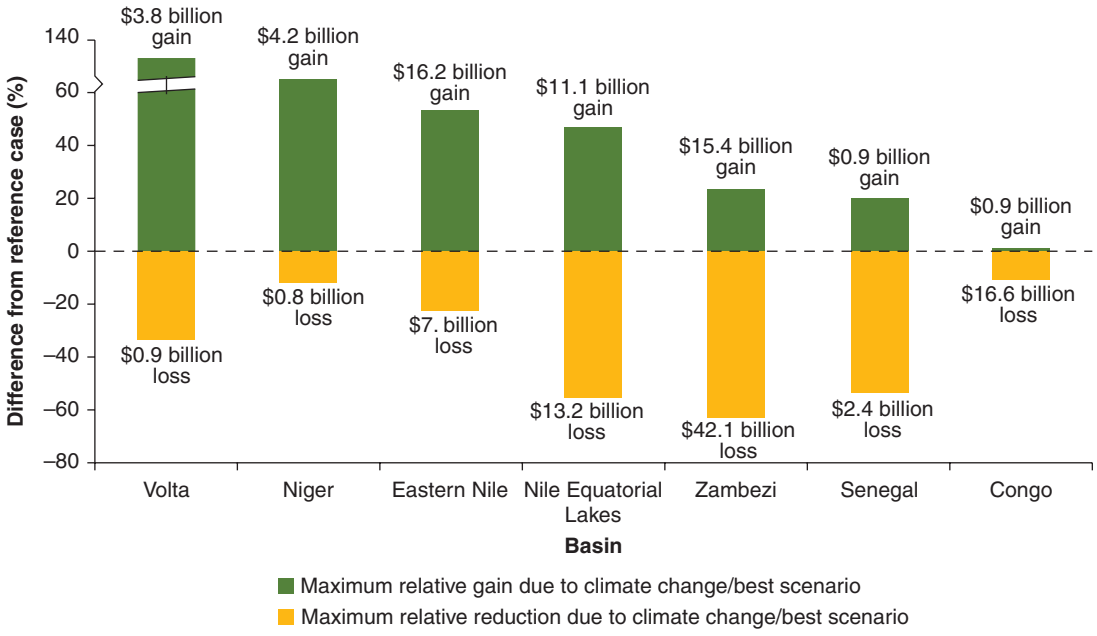
By 2025 about 66 new cities will be added to the 81 cities currently in the medium-city range. This group of cities needs support to enhance their capacity to manage climate related risks.

In the case of hydropower, failure to integrate climate change in project planning and design across Africa's major river basins could entail revenues losses of 5–60 percent (depending on the basin) and increases in consumer expenditure for energy of up to three times the baseline values (Cervigni and others 2015) (figure 1.3). In wet climate scenarios, business-as-usual infrastructure development could lead to forgone revenues of 15–130 percent of the baseline (assuming the larger volume of precipitation is not used to expand the production of hydropower).

Given the threats posed by current climate shocks—and the even greater challenges linked to future climate change—the gap between needs and resource flows needed to scale up the continent's resilience to an increasingly hostile climate is alarming. Current levels of funding for adaptation in Africa are estimated to be on the order of $3 billion a year. According to the World Bank and the United Nations Environment Programme (UNEP), the annual spending needed to adapt to a 2°C warming is on the order of $5–$10 billion today, $20–$50 billion around midcentury, and about $100 billion if warming increases by 4°C above pre-industrial levels (figure 1.4).

The priority attached to adaptation is reflected in the INDCs submitted by African countries. Of the 44 INDCs African countries submitted to the United Nations Framework Convention on Climate Change (UNFCCC) as of October 2015, 28 (63 percent) included an estimate of the financing needs for adaptation. This figure is more than two and half times as high as in the rest of the world (where just 21 of 88 [24 percent] INDCs included such an estimate).

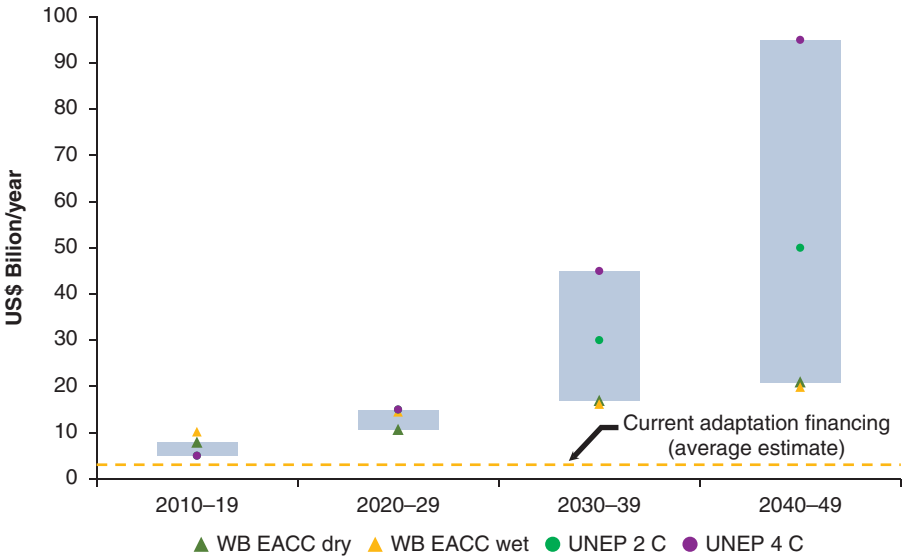
FIGURE 1.3 Projected Changes in Hydropower Revenues as a Result of Climate Change



Source: Cervigni and others 2015.

Note: Estimates cover the period 2015–50 and reflect economic outcomes across a range of 120 climate change scenarios. Green bars show the largest increase (and red bars the smallest decrease) in hydropower revenues relative to the no-climate-change reference case. Revenues are discounted at 3 percent. The opportunity for increased revenues will not be seized unless project design is modified in anticipation of increasing water availability.

FIGURE 1.4 Financing Required to Support Africa's Climate Adaptation Agenda



Sources: Data from Climate Policy Initiative 2014, UNEP 2014, and World Bank 2010b.

Note: WB EACC = estimates from the World Bank report on the Economics of Adaptation to Climate Change (World Bank 2010b), including the wet and dry climate change scenarios analyzed in the report. UNEP 2 C and 4 C refer to the estimates in UNEP (2014) of adaptation costs in the two scenarios of 2°C and 4°C degrees warming.

This business plan represents a major contribution by the World Bank to reduce Africa's adaptation gap and meet the needs expressed by Africa in the INDCs. It outlines the Bank's plans for deploying technical expertise, mobilizing financing from various sources, and facilitating the engagement of stakeholders on climate action. The plan was prepared in the lead-up to the 21st Session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP21), in recognition of the fact that COP21 offers a key opportunity for harnessing political leadership and financial support around the activities included in the plan.

The plan reflects the contributions and inputs of a wide variety of partners with whom the Bank is already collaborating on the ground to increase Africa's resilience to climate variability and change. The initiatives included in the plan reflect the dialogue held with African countries by the International Development Association (IDA), which will leverage the support of other parts of the World Bank Group (the International Bank for Reconstruction and Development [IBRD], the International Finance Corporation [IFC], and the Multilateral Insurance Guarantee Agency [MIGA]).

The plan supports the World Bank Group's overall goals of ending extreme poverty by 2030 and promoting shared prosperity and greater equity in the developing world. Recent analysis (World Bank 2015b) indicates that climate change could push as many as 43 million Africans below the poverty line—a stark reminder of the vital role of enhancing climate resilience in reducing poverty.

Note

1. An INDC identifies the actions a national government intends to take under the agreement to be reached at the Paris meeting of the Conference of the Parties of the United Nations Framework Convention on Climate Change in December 2015.

Chapter 2

Scaling up World Bank Support to Climate Action in Africa

Foundation of the Business Plan

The Africa Climate Business Plan is firmly grounded in the World Bank Group's overall commitment to support climate-resilient and low-carbon development across the developing world. Following the adoption in 2008 of the Strategic Framework on Development and Climate Change (SFDCC), the institution developed a regional strategy for Sub-Saharan Africa, "Making Development Climate-Resilient" (World Bank 2009). That strategy articulated a vision and key operational priorities for the Bank Group's climate-related work in Sub-Saharan Africa based on four pillars:

- making adaptation and climate risk management a core component of development
- taking advantage of mitigation opportunities
- focusing on knowledge and capacity
- scaling up financing opportunities.

Since 2009 the Bank has made considerable progress in supporting climate action in Africa. It has mobilized substantial resources for climate action, building on a solid foundation of analytical work and regional platforms for cooperation and technical assistance, such as the TerrAfrica and Cooperation for International Waters in Africa (CIWA) programs (box 2.1).

An important vehicle for financial support is the suite of windows included in the Climate Investment Funds (CIFs), which provide resources for climate-resilient, low-carbon development in 25 Sub-Saharan African countries (box 2.2). In Africa the World Bank implements CIF-financed projects in partnership with the African Development Bank.

Over the five years for which climate finance tagging of World Bank operations is available (FY11–FY15), an estimated $7.6 billion of IDA financing in Africa provided support for activities with climate co-benefits (adaptation, mitigation, or both). Ninety-five percent of the total was for projects mapped to the agriculture, energy, environment, social protection, urban development, and water sectors. For these sectors, the share of activities with climate co-benefits to total financing was about 30 percent, well above the corporate average of 20 percent (figure 2.1).

Other sectors, such as transport, have not featured as prominently to date but have an important role to play going forward. Building the

BOX 2.1 Supporting Climate-Resilient Development through Regional Partnerships

The TerrAfrica partnership (kick-started by the Bank and currently housed in the New Partnership for Africa's Development [NEPAD]/Africa Union) has helped prepare and finance two umbrella investment programs aimed at improving land management and thereby contributing to climate resilience. The first is the $1.25 billion Strategic Investment Program for Sustainable Land Management, which includes 36 operations in 26 countries (12 of which are Bank financed). This program has expanded sustainable land management practices on an estimated 250,000 hectares of land. The second is the nearly $2 billion World Bank Group-Global Environment Facility Sahel and West Africa Program (SAWAP), in support of the Great Green Wall Initiative. It supports implementation of a country-driven vision for integrated natural resource management for sustainable and climate-resilient development in 12 countries in West Africa and the Sahel.

The TerrAfrica Leveraging Fund—funded by the European Community, the Netherlands, and Norway, to the tune of $23 million—provides seed money to support activities that have the potential to leverage wider sustainable land and water management benefits. It helps scale up such practices, fills gaps, and provides resources to support integrated approaches. It supports targeted activities typically in the $10,000–$350,000 range that existing funding mechanisms are not already adequately covering.

The Cooperation in International Waters in Africa (CIWA) program supports African countries as they seek to overcome complex political, financial, technical, and logistical barriers that arise in managing and developing international waters for climate-resilient growth. The program balances support for institutional development and information systems with assistance that helps riparians advance and improve the quality of investments. Typical institutional support goes to developing climate-relevant information and modeling systems, strengthening the institutional and legal framework that underpins countries' ability to cope with change, and facilitating citizen engagement and stakeholder access to climate-relevant information. Typical investment activities supported by the program include providing support for facilitating agreement among countries support and preparing regionally relevant investments in climate resilience, informing and sharing good practice on climate-resilient infrastructure implementation, and advancing resource mobilization for technically sound projects. The CIWA program supports the integrated watershed management projects in the Niger, Zambezi, and Lake Chad basins that are described in the business plan.

BOX 2.2 Climate Investment Funds (CIF) Support to Sub-Saharan Africa: Selected Examples

The Climate Investment Funds (CIF) help 72 developing countries pilot low-emissions and climate-resilient development. Its four components—the Clean Technology Fund (CFP), the Forest Investment Program (FIP), the Pilot Program Climate Resilience (PPCR), and the Scaling up Renewable Energy Program (SREP)—are supporting 33 programs in 25 countries in Sub-Saharan Africa.

BOX 2.2 Climate Investment Funds (CIF) Support to Sub-Saharan Africa: Selected Examples *(continued)*

The PPCR is currently supporting three Sub-Saharan Africa countries (Mozambique, Niger, and Zambia), and programs for support for six more countries are in the pipeline. Mozambique is receiving $102 million in investment funding from the PPCR to strengthen its climate resilience, with complementary assistance on the policy side being delivered through a programmatic Development Policy Lending series implemented by the World Bank. Areas of support include infrastructure upgrades, better resource management, enhanced climate services, and the development of local and national capacities for climate-resilient planning and action. The package of financing includes support for addressing climate risks to the road infrastructure, including through development of climate-resilient national roads standards to achieve transformative impact at the national level.

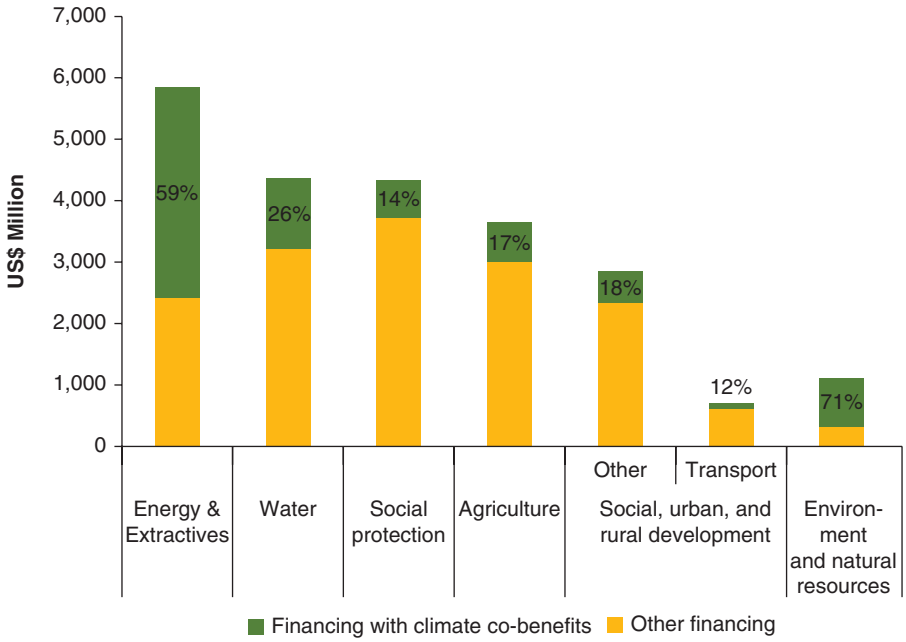
With $63 million of PPCR support, the government of Niger is helping 38 rural communes prepare or revise their local development plans and annual budgets in ways that better integrate climate-sensitive initiatives. The participatory and locally led process involves all stakeholders in the communes. The government is planning to scale up this experience to other communes. The PPCR is also supporting an advisory services project that promotes the use of affordable, efficient irrigation equipment by smallholder farmers. It aims to provide evidence of the benefits from commercial, sustainable irrigation systems, which are needed to encourage private sector interest to scale up and increase the impacts of the program.

In Zambia the PPCR supported the establishment of the Interim National Climate Change Secretariat under the Ministry of Finance as a dedicated unit overseeing implementation of key climate change initiatives. With the Ministry of Finance at the helm, Zambia mainstreamed climate resilience measures into its Sixth National Development Plan. Strong political buy-in for the PPCR leveraged a tripling of the national budget allocation for PPCR-specific investments in FY15. National budgetary allocations are slated to increase progressively to set the secretariat on a path to sustainability once PPCR funding is exhausted, in 2019.

The SREP program is supporting off-grid electrification efforts through the deployment of mini-grid systems in Ghana, Kenya, Mali, Liberia, Tanzania, and possibly other African countries as they prepare SREP investment plans. The vastness of many countries in Sub-Saharan Africa, coupled with low population densities, makes access to electricity through grid expansion extremely challenging and expensive. Mini-grid rural electrification schemes are one of the best options for bringing modern energy services to a large proportion of the population for a long time. Most SREP-supported mini-grid projects focus on hybridizing existing diesel mini-grids with renewable energy, mostly solar photovoltaic (PV) technologies.

The SREP program is also actively engaged in geothermal energy. It is providing $126.5 million to Ethiopia, Kenya, and Tanzania to support 710 MW in new capacity, including the first large-scale projects in Ethiopia and Tanzania. The International Finance Corporation (IFC) is implementing an advisory project supported by $2.3 million of SREP funds in Tanzania to establish an enabling environment for the country's geothermal development that is conducive to private sector investment. The drafting and/or revising of geothermal laws is a crucial first step in developing Tanzania's untapped geothermal potential, which is estimated to exceed 650 MW.

FIGURE 2.1 IDA Commitments to Africa in Selected Sectors, by Type of Financing



Note: Percentages show share of total financing with climate co-benefits. All figures are for FY2011–15.

resilience of road networks will support access to key services and markets that are critical for development. Improved urban planning and freight logistics and the development of rail transport can support lower carbon transport modes while delivering important economic, health, and other benefits.

Structure of the Business Plan

This business plan identifies about a dozen priority areas in which the World Bank and its partners could focus in the coming years to ramp up support to Africa's climate agenda. The areas—selected on the basis of country and regional dialogue and an assessment of opportunities that could generate results in a relatively short time—are organized in three clusters.

The first cluster ("strengthening resilience") includes selected initiatives aimed at boosting the resilience of the continent's assets. These initiatives comprise Africa's natural capital (landscapes, forests, agricultural land, inland water bodies, oceans); physical capital (cities and physical assets in coastal areas); and human and social capital (including improving social protection for the more vulnerable people against climate shocks and addressing the climate-related drivers of migration, thereby mitigating the effects of climate shocks on social cohesion).

The second cluster ("powering resilience") relates to opportunities for scaling up low-carbon energy sources in Africa. In addition to helping

mitigate climate change, these activities yield considerable resilience benefits. Societies with inadequate access to energy are also more vulnerable to climate shocks; when power becomes more accessible, irrigation systems can be activated in times of drought, early warning systems and telecommunication systems can be deployed before and after natural disasters, alternative revenue-generating activities can be undertaken, health services can be provided more easily, study hours can be extended contributing to better education, and so forth.

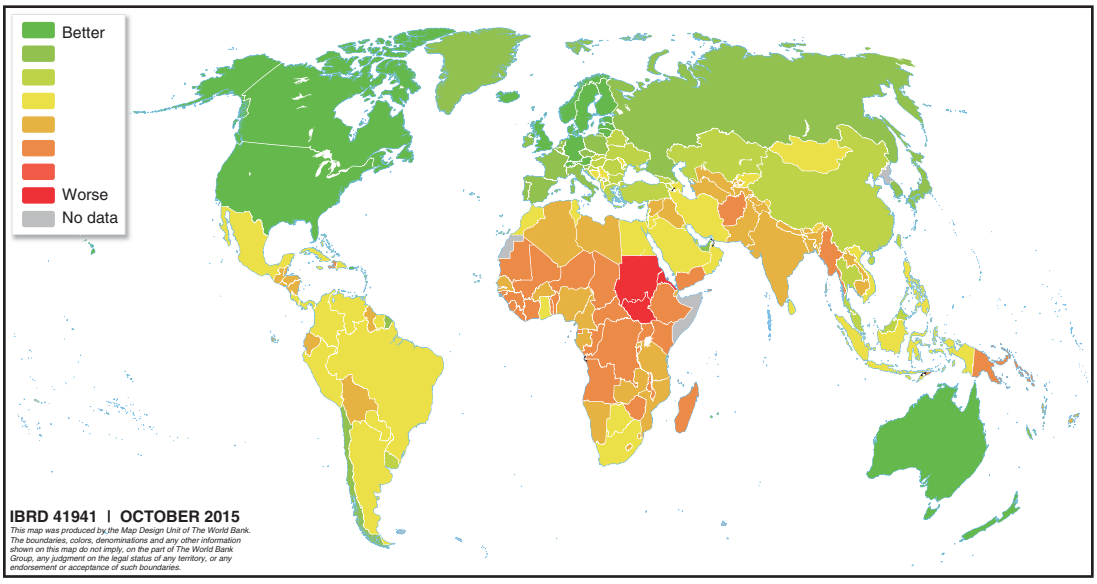
The third cluster ("enabling resilience") provides data, information, and decision-making tools for promoting climate-resilient development across sectors by strengthening hydro-meteorological systems at the regional and county level and building the capacity to plan and design climate-resilient investments.

Selecting Priority Areas for Strengthening Resilience

African countries are considerably more vulnerable to climate variability and change than much of rest of the developing world (map 2.1). What are the key sources of vulnerability for Africa? What should the priorities be for investing in strengthening resilience on the continent?

One way to set priorities is to consider the effects of climate-related stressors on the different types of capital that underpin the functioning of social and economic systems. Natural capital (including land, forests, landscapes, water, and fisheries) is a direct source of income and employment for a large

MAP 2.1 Vulnerability to Climate Change, by Country



Source: Adapted from University of Notre Dame Global Adaptation Index (ND-GAIN) (http://index.gain.org/).

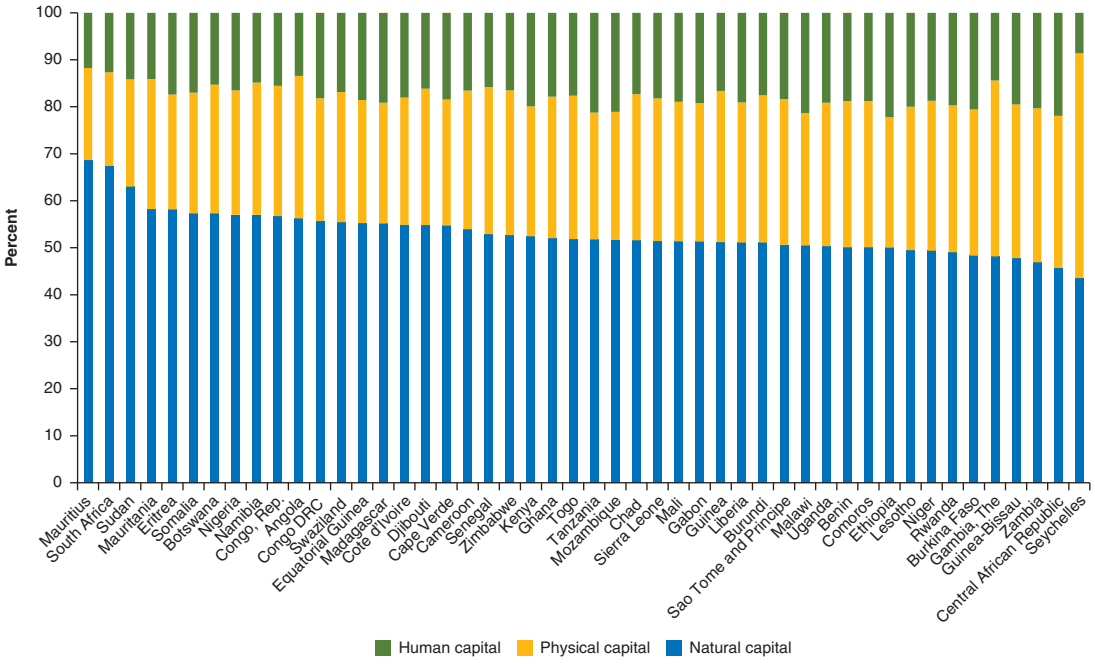
share of Africa's people. Climate change affects the ability of natural capital to deliver its wide range of products and services (including food, fodder, timber, and the regulation of water cycles), some of them vital. Sustaining and managing natural capital is key to the ability of a country to invest in the other types of capital in a sustainable fashion.

Physical capital includes cities, infrastructure, and other kinds of produced capital. Climate extremes such as floods, storm surges, and heat waves are already straining cities, roads, drainage systems, power plants, ports, and other types of infrastructure. Future climate change will probably require the rethinking of planning strategies and the raising of building standards to ensure adequate resilience of the built environment to the harsher climate of the future.

Climate change also threatens the ability to build and maintain human capital, through health and education, which is key to development. Rising temperatures and more frequent floods are likely to make African societies more vulnerable to water- and vector-borne diseases. Climate shocks also prevent households from saving and setting aside the resources needed for their children's education. And increasing evidence suggests that climate shocks—particularly when combined with a range of other social, ethnic, and religious factors—contribute to the emergence of conflicts, which leads to the erosion of social and human capital (through displacement, death, disease, and so forth).

In most African countries, vulnerability is a multidimensional problem (figure 2.2). Across the continent, interventions are required to strengthen

FIGURE 2.2 Sources of Climate Vulnerability Across African Countries, 2013



Source: Data from the database of the University of Notre Dame Global Adaptation Index (ND-GAIN) (http://index.gain.org/).

Note: Figures represent the relative contributions to the ND-GAIN aggregate index of vulnerability. Natural capital includes vulnerability indicators related to food, ecosystems, and water. Physical capital includes vulnerability indicators related to habitat and infrastructure. Human capital refers to vulnerability indicator of health.

the climate resilience of all three forms of capital, although the mix of actions will be country specific. The Africa Climate Business Plan therefore proposes a multidimensional approach to strengthen resilience, with interventions targeted at the different forms of capital that are likely to be affected by climate variability and future change (table 2.1).

The selection of activities included for each type of capital is not exhaustive; it reflects some of the Bank's current areas of engagement, established directions for future assistance, and comparative advantages.

Other sectors, such as transportation, are also contributing to the Bank's efforts to improve climate resilience in Sub-Saharan Africa. Transport supports mobility and access to services that are critical to the fight against poverty; roads provide access to markets for agricultural goods that are necessary to maintain rural livelihoods, for example. Improving transport

TABLE 2.1 Components of the Strengthening Resilience Cluster of the Africa Climate Business Plan

Area of intervention	Vulnerabilities to be addressed
Natural Capital	
Climate-resilient landscapes	Africa's forests, and the broader landscapes of which they are part, are key sources of livelihoods for millions of Africans. Climate variability and change, combined with land conversion (which is often fueled by climate change), will affect the productivity of these ecosystems and their ability to sustain livelihoods.
Climate-smart agriculture	Climate variability and change (heat waves, droughts, floods, extreme weather) reduce agricultural productivity, depressing farm incomes and affecting the employment and well-being of 40–60 percent of Africans.
Integrated watershed management (Niger, Chad, Zambezi basins)	Climate change is affecting hydrological cycles, increasing the severity and frequency of flood episodes and dry spells. It is making it more difficult to plan and finance investments in irrigation, water supply, and energy production interventions.
Ocean economy (East Africa)	Climate variability and change affect key ocean-based sources of livelihood, such as fisheries, aquaculture, and tourism.
Physical Capital	
Climate resilience of coastal zones (West Africa)	Coastal areas are estimated to account for 56 percent of West Africa's GDP. Two major climate-related challenges—erosion and flooding—threaten the sustainability of these areas. Erosion is expected to worsen as the sea level rises. Floods caused by severe weather events and poor infrastructure and planning threaten the livelihoods and health of people in coastal cities and rural areas.
Climate-smart cities	Sub-Saharan Africa is the fastest-urbanizing continent in the world, with an average urban population growth rate of 3.4 percent. Poor people in urban areas are particularly vulnerable to climate change, because they often have no other option but to settle in wetlands, floodplains, landfills, garbage dumps, and rocky areas. Climate-friendly urban transport solutions, such as bus rapid transit (BRT), can help improve urban mobility and reduce greenhouse gas emissions.
Human and Social Capital	
Drivers of migration	Increasing evidence indicates that climate change and environmental degradation are threat multipliers—factors that interact with other risk drivers and sources of vulnerability to exacerbate fragility in states and societies and create conditions conducive for conflict and large-scale migration.
Social protection	Limited savings and access to finance inhibit poor households' ability to cope with and recover from disasters. In response to climate shocks, poor households are often compelled to sell productive assets for immediate liquidity, remove children from school, and take other steps that have lasting and scarring effects on the affected individuals, their households, and society. These actions threaten to undo years of hard-won development gains.

TABLE 2.2 Cut-Off Dates for Fast-Track and Longer-Term Phases of the Africa Climate Business Plan

Goal	Fast track	Longer term
Mobilize resources	June 2020 (end of IDA18)	December 2024 (midterm of IDA20)
Generate outcomes	June 2023 (end of IDA19)	June 2026 (end of IDA20)

connectivity can create economic opportunities in lagging regions with higher rates of poverty and inferior access to critical services (education and health in particular) than urban and economic core areas. Ensuring that the transport network is resilient to climate variability and change, including extreme events, is important for overall national resilience.

This plan is a living document that will be updated and expanded in the coming months to cover other areas not addressed in this version, such as health and transport, which the Bank is well positioned to support through sector dialogue and financial/technical assistance.

The rest of this report identifies the background and development challenge, the proposed set of activities, the expected outcomes, the climate-related benefits, the financing requirements, and key partners for each priority area. To allow for incremental progress in implementation, the plan includes two separate time horizons, one for resource mobilization and another for the generation of results (table 2.2). The cut-off dates for each phase were selected to line up with the cycles of replenishment of the International Development Association (IDA).

PART B

Strengthening the Resilience of Africa's Assets

To reduce the risk posed to their development prospects by climate variability and change, African countries need to strengthen the resilience of their natural, physical, and human capital. Natural capital can be protected by making farmland, landscapes, watersheds, and oceans more resilient. Physical capital can be preserved by adopting smart climate policies for cities and coastal areas, which are particularly vulnerable to climate change. Human capital can be protected by boosting social protection and addressing the drivers of migration. This part of the business plan provides detailed proposals in each of these areas.



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Chapter 3

Promoting Climate-Smart Agriculture

The World Bank will support climate-smart agriculture (CSA) in Sub-Saharan Africa by advocating for the main regional CSA initiatives, fostering adoption of improved CSA policies, and financing national and regional investment programs to scale up adoption of CSA technologies and management options (table 3.1). Within the context of the Comprehensive African Agricultural Development Program, the World Bank is also developing an investment facility that will support countries in the preparation of proposals on CSA as well as other topics prioritized in the 2014 Malabo Declaration on Accelerating Agricultural Growth and Transformation. The so-called Malabo facility may be used to support investments not only through the World Bank but also

TABLE 3.1 Support to Climate-Smart Agriculture: At-a-Glance Summary

Activity	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
Engage in advocacy, awareness raising, and resource mobilization in support of key initiatives in the region: • Vision 25 × 25 in support of the Malabo Declaration on accelerated agricultural transformation • The Africa Climate-Smart Agriculture Alliance • The West African CSA Alliance	• Improvement in capacity to implement CSA policies in 10 countries • Integration of CSA into regional agricultural policies in West Africa	• Improvement in capacity to implement CSA policies in 20 countries • Integration of CSA into regional agricultural policies across Africa
Support adoption of evidence-based policies and institutional strengthening for CSA	• Strengthening of evidence base for CSA policies in 10 countries • Adoption of improved CSA policies in at least three countries	• Strengthening of evidence base for CSA policies in 20 countries • Adoption of improved CSA policies in at least five countries
Provide financial and technical support for national and regional investment programs to scale up adoption of CSA technologies and management options	• Adoption of CSA practices by 10 million farmers • 1 million hectares of farm land with CSA-compatible infrastructure and practices • Improved pastoral systems in place in seven countries	• Adoption of CSA practices by 25 million farmers • 3 million hectares of farm land with CSA-compatible infrastructure and practices • Improved pastoral systems in place in 15 countries
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
African governments, as convened through the African Union Commission; CGIAR, CRS, CARE, Concern International, FAO, GIZ, OXFAM, World Vison; COMESA, EAC, ECOWAS, SADC; CORAF, FANRPAN, FARA, NEPAD; DFID, NORAD; World Bank client countries	$3,000 million	$2,000 million

through other financiers (ministries of finance, other multilateral institutions, bilateral sources). It will operate in coordination with the proposed Climate Resilient Investment Facility.

Sectoral Background and Development Challenges

Agriculture is a major economic driver in Africa and key to poverty alleviation and food security: Growth in the sector reduces poverty by about three times as much as growth in other sectors. Agriculture typically represents 30–40 percent of GDP in Africa and employs up to 65 percent of the labor force, providing livelihoods for millions of smallholders and their families.

Africa is home to more than 225 million undernourished people. It also has the world's highest rate of stunting (40 percent) (FAO 2014). Farm families in Africa and other parts of the world are already overrepresented among the poor. Climate change will strongly reduce their chances of escaping poverty.

Climate variability is already reducing productivity. Crop productivity simulations show that cereal yields between 1981 and 2002 would have been 2–3 percent higher in the absence of climate shocks—an estimated production loss of 40 million tons of grain a year (Lobell and Field 2007). Without actions to improve the resilience of agriculture, a rise in average temperatures of 2°C by the middle of the century might reduce yields by up to 20 percent (Schlenker and Lobell 2010). Additional temperature increases would cause exponentially more harm. More irregular rainfall amplifies temperature risks; the consequent droughts may trigger famines.

Agriculture and agriculture-driven land use produce significant greenhouse gas emissions (24 percent of the global total [IPCC 2014]), but they can also become a part of the solution. CSA practices such as agro-forestry and improved livestock and pasture management can reduce emissions and remove carbon out of the atmosphere.

African agriculture must strive to attain a triple win: dramatically increasing productivity, enhancing the resilience of farming systems, and achieving lower emissions. CSA can deliver on all three goals (Box 3.1).

Commensurate measures to preserve and increase transportation connectivity for agricultural communities will have a reinforcing effect on agricultural resilience by making it easier for increased harvests to find their way to markets, enabling the efficient distribution of agricultural inputs, and allowing for the efficient movement of food products to regions experiencing poor harvests as a result of climate change.

BOX 3.1 Increasing African Food Security While Reducing Greenhouse Gas Emissions through Climate-Smart Agriculture

African agricultural and livestock systems are extremely vulnerable to climate change: Drought, heat, extreme events, changes in water availability, disease, and pest infestations, to name but a few of the many complex impacts, reduce yields and increase the rate of animal deaths.

Falling yields come at a time when population growth and increasing incomes will require African agricultural systems to almost triple overall production. Doing so in a business as usual scenario would triple agriculture and land use–related emissions, catapulting Africa to near the top of international agricultural emission contributors and threatening achievement of the 2°C goal. CSA investment plans, projects, and policies can help address these challenges and increase production, enhance resilience, and reduce emissions. Indeed, with the help of low-carbon agricultural production systems, Africa could triple food production while controlling emissions.

The widespread use of high-efficiency, low-energy irrigation systems could reduce drought stress, enabling higher production and lower losses as a result of natural disasters and improving energy efficiency per kilogram of food. Scaling up agro-forestry would dramatically reduce fertilizer use

box continues next page

BOX 3.1 Increasing African Food Security While Reducing Greenhouse Gas Emissions through Climate-Smart Agriculture *(continued)*

and capture carbon in trees and soils. More efficient livestock systems would increase protein availability while reducing emissions per kilogram of meat or dairy produced. Conservation agriculture techniques would protect soils from wind and water erosion. Weather information and early warning systems would enable farmers to take better decisions, reducing risk and protecting yields in uncertain climate and weather conditions.

All CSA measures share two important features. First, they reduce pressure for land use change by increasing yields per hectare. Integrated landscape approaches help capture these benefits in forests and savannahs. Second, they improve the efficiency of agricultural inputs (fertilizer, water, feed conversion), thereby reducing emission intensity.

Initiatives to Address the Challenges and Enhance Resilience

At the 2014 Malabo Summit, convened by the African Union within the context of the renewal of the Comprehensive African Agricultural Development Program (CAADP), African heads of state committed to accelerating agricultural growth and enhancing the resilience of livelihoods and production systems by 2025. They endorsed Vision 25 × 25, which aims to have 25 million farmers in Africa using CSA practices by 2025.

The Africa Climate-Smart Agriculture Alliance aims to reach 6 million farming families with CSA by 2022.[1] Its initial focus is in Ethiopia, Kenya, Malawi, Niger, Uganda, Tanzania, and Zambia.

The Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), and the Southern Africa Development Community (SADC) are jointly implementing the Initiative for Climate Smart Agriculture in Eastern and Southern Africa, funded by the European Commission, the Norwegian Ministry of Foreign Affairs, and the U.K. Department for International Development (DFID). The initiative aims to establish evidence-based policies on CSA that may attract adaptation and mitigation finance to the region.

Under the CAADP umbrella and with the support of the German Agency for International Cooperation (GIZ), the New Partnership for Africa's Development (NEPAD) is implementing a program on adaptation of agriculture to climate change that supports selected regional economic communities and African Union member states in implementing climate change adaptation strategies.

The Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) operates a series of CSA initiatives in eastern and southern Africa focused on evidence-based policy making, strengthened institutional capacity, and cross-country watershed management.

Many initiatives on CSA are thus underway. This business plan will help these efforts source funding and explore their synergies.

In June 2015, in Bamako, a West African CSA alliance was launched and a framework for the integration of CSA into regional agriculture policy was discussed during a high-level forum hosted by the West African Economic and Monetary Union (ECOWAS) and the Permanent Interstate Committee for drought control in the Sahel (CILSS).

World Bank CSA lending operations in Africa include two major CSA projects under preparation in Niger and Kenya. Discussions are ongoing in many other countries.

The Consultative Group for International Agricultural Research (CGIAR) and the Africa Climate-Smart Agriculture Alliance have developed a framework document that guides investment on CSA for Africa.[2] It outlines country-led action to support and enhance existing country CSA programs. The document can guide countries seeking to become more climate smart by developing national CSA action plans. As part of the Africa Climate Resilient Investment facility described later in this business plan, countries would also receive assistance through a CSA center of excellence, supported by the World Bank and hosted by the African Union and NEPAD.

CSA country readiness assessments and investments plans based on this framework will be developed in three pilot countries. They could be showcased at COP21 to demonstrate best practice and form the basis of broader dialogue with partners and donors. In addition, two World Bank–assisted country investment operations will be prepared and presented to deliver a proof of concept of the framework approach.

The Malabo facility will be established to support the next step of CAADP financial intermediation. It will be operational by December 2016. The World Bank, the African Development Bank, the International Fund for Agricultural Development (IFAD), the German Federal Ministry for Economic Cooperation and Development (BMZ), DFID, NORAD, USAID, Agence Française de Développement (AFD), and other multilateral and bilateral sources will be invited to provide funding in order to enhance investments in sustainable agricultural development.

With the assistance of the World Bank, a CSA center of excellence would be established at the African Union in Addis Ababa or at NEPAD in Pretoria, to support the Malabo facility and the Africa Climate Resilient Investment Facility. The center would offer technical assistance (through the Food and Agriculture Organization [FAO], Climate Change, Agriculture and Food Security [CCAFS], and other centers of the CGIAR) as requested by countries. It would ensure regional coordination, shared learning among participating countries, and preparation of tailored country support packages.

The center would provide assistance in the following areas:

- assessing CSA country readiness by taking stock of ongoing CSA activities
- determining CSA preparedness, policy needs, investment gaps, and human capacity constraints

- developing integrated national CSA strategies and investment plans, with building blocks and clear roadmaps for implementation
- translating CSA strategies into transformational action on the ground and engaging with the private sector and other partners
- promoting best-practice learning and results tracking systems to maximize lessons learned.

Expected Outcomes

With the center of excellence in place, CSA country readiness assessments and investments plans would rapidly multiply across Africa. Within 12 months of COP21, 10 readiness assessments and investment plans would be developed; within 24 months the number would increase to 30. A rapid scale-up of CSA–related lending in Africa would lead to five investment operations within 12 months of COP21, 15 within 24 months, and 30 within 36 months.

Financing Plan

Table 3.2 describes the financing plan.

Key Partners

The World Bank will deploy comprehensive resources, including IDA/IBRD and trust funds, to support the objectives outlined above. Given the growing role of the private sector in agricultural development, the Bank will team up with other branches of the World Bank Group, including IFC and MIGA.

TABLE 3.2 Support to Climate-Smart Agriculture: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	240	Co-funding of IDA credits
IDA	1,300	From countries and regional IDA allocations; figure assumes a tripling of IDA funding with climate co-benefits in agriculture over the baseline (FY11–FY15)
Private sector	240	Investments by private corporations in the context of government-led integrated CSA investment projects
Climate finance (GCF, GEF, CIF, and so forth)	100	Based on country quotas
Other development finance (bilaterals, multilaterals)	320	AfDB, IFAD, USAID, and other bilaterals
To be determined	800	Private sector, lower-level governments, NGOs, and farmer organizations
Total fast track (resources raised by 2020)	**3,000**	
Longer term (additional resources raised by 2024)	**2,000**	

It will collaborate with traditional and emerging partners in the sector, including other multilateral institutions, bilateral donors, the Green Climate Fund, and private sector investors. It will collaborate with traditional and emerging partners in the sector, including other multilateral institutions, bilateral donors, the Green Climate Fund, and private sector investors.

Notes

1. The Africa Climate-Smart Agriculture Alliance was convened by the New Partnership for Africa's Development (NEPAD). It brings together the Consultative Group for International Agricultural Research (CGIAR), the Food and Agriculture Organization (FAO), the Forum for Agricultural Research in Africa (FARA), and the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) as well as several large NGOs (CARE, CRS, Concern International, Oxfam, and World Vision).
2. See https://ccafs.cgiar.org/climate-smart-agriculture-prioritization-framework#.VhKOaNLluUk.



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Chapter 4

Creating Climate-Resilient Landscapes

The World Bank advocates for poverty alleviation, shared prosperity, and sustainability to move toward a climate-resilient, low-carbon, and sustainable development path. Sustainable management of natural resources for resilient landscapes is at the heart of achieving these objectives. The Bank's work on building the resilience of African landscapes is based on promoting the use of an integrated landscape management approach that recognizes the importance of moving beyond single-sector interventions in order to take into account the resilience of both ecosystems and livelihoods.

Within the broader landscape thematic area, two work lines have been selected for inclusion in the Africa Climate Business Plan. The first is support to forested landscapes, a key source of livelihood for many communities across Africa. The second is the Africa Resilient Landscape Initiative, focused, for the purpose of this plan, on the Horn of Africa and eastern Africa.



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4.1 FORESTED LANDSCAPES

The World Bank will support the climate and forest agenda in Africa through a range of instruments that will help slow deforestation, prevent forest-related carbon emissions, and promote sustainable use of forests for improved livelihoods and enhanced resilience to climate change (table 4.1).

Sectoral Background and Development Challenges

Africa's forests, landscapes, and ecosystems contribute to poverty alleviation, shared prosperity, and inclusive green growth by providing goods and services that sustain the livelihoods of the rural poor and contribute raw materials to other economic sectors.[1] Forests are a critical resource for Africa's poor: The poorest fifth of the population earns more than 30 percent of its income from forest and environmental resources—more than the share generated by agriculture.

Africa's forests are under extreme pressure because of demands for food, fuel, and fiber. Demand for new land, timber, fuel wood, charcoal, bush meat, and medicinal plants, coupled with weak governance and inadequate enabling conditions, poor land use management and tenure security, and illegal activity, contribute to forest loss and degradation. Illegal use of forests, unclear tenure rights, disenfranchised stakeholders, and unskilled managers pose significant challenges to managing forest resources well.

Climate change poses a key challenge for Africa's forests and the people who depend on them. Forest degradation and land conversion create greenhouse gases. Climate change can result in droughts and stresses on fragile ecosystems, increasing the risk of forest dieback, forest fires, and pest infestations.

TABLE 4.1 Support to Forests and to Reduced Emissions from Deforestation and Forest Degradation (REDD+): At-a-Glance Summary

Activity	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
• Support the development of national REDD+ strategies and implementation arrangements (legal framework, capacity building, governance structures, monitoring and verification systems, stakeholder engagements platforms, feedback and grievance redress mechanisms, and so forth) • Fund early investments in demonstration activities in forest landscapes • Fund performance-based payments for REDD+ and enhanced carbon stocks	• 10 REDD+ strategies designed • 14 strategic environment and social assessments for REDD+ conducted • Policy and institutional strengthening activities for REDD+ conducted in 10 countries • Five Measurement, Reporting, and Verification (MRV) systems designed and operational • Intersectoral forest landscape planning conducted in 14 countries • Platforms for civil society engagement in REDD+ created or strengthened in 14 countries	• 20 million hectares under forest cover in targeted forest landscape • 40 million tCO_2e in emissions reductions and carbon sequestration achieved • 8 million hectares brought under enhanced biodiversity protection
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
BioCarbon Fund (BIOCF), Forest Carbon Partnership Facility (FCPF), Forest Investment Program (FIP), Program on Forests, TerrAfrica, UN-REDD Programme, bilateral partners	$850 million	$850 million

Protecting forests can contribute to adaptation and resilience to climate change, because forests protect water supplies and ecosystem services and provide an important safety net for the poorest households.

Programs for reduced emissions from deforestation and forest degradation (REDD+) can potentially yield financing for development and job creation in poor communities. REDD+ efforts have catalyzed a vibrant and inclusive dialogue on planning, strategy, opportunities, and tradeoffs on land and forest issues with only small investment. They are laying the groundwork for building consensus on the role of forests, the ways in which they can contribute to sustained economic growth, and the need to improve land use planning and recognition of rights, which could generate more investment in the sector in the future.

Initiatives to Address the Challenges and Enhance Resilience

The Bank's work on forests in Africa and beyond rests on the following tenets:

- Enhanced and sustained engagement is necessary to move toward sustainable management of forests as an essential contributor to economic development and poverty alleviation.
- Improved management and conservation of forests will require efforts outside the sector to address drivers of deforestation, trade-offs, and competing incentives for land use and conversion.

- Countries need an enabling environment in which farmers and smallholders can invest in trees and landscapes as part of fuelwood provision, rural enterprises, and forest-based ecotourism.
- Deforestation, landscape degradation, and soil erosion impose increasingly heavy economic costs that undermine efforts to improve agricultural productivity and protect the watersheds that contribute to needed hydropower development.

Adaptation to and mitigation of climate change and conservation of biodiversity provide useful entry points for policy dialogue and sources of finance that can help move this agenda forward.

The Bank is helping client countries access climate finance opportunities that can act as incentives to shift toward more sustainable practices. It has invested in improving forest sector planning, governance, and consultation to put in place REDD+ programs in 14 countries. Forest Investment Programs (FIPs) have been complemented by measures to enhance the capacity of indigenous people and local communities to participate in REDD+ through the FIP Dedicated Grant Mechanism for Indigenous People and Local Communities. The Bank is continuing to build on the TerrAfrica program, which has created a platform for forging a common vision to addressing Africa's most daunting land management issues.

In the Democratic Republic of Congo, the Republic of Congo, Ethiopia, Ghana, Liberia, and Mozambique, the Bank is helping implement an integrated portfolio of well-funded engagements on forests, landscapes, and biodiversity. Most of these countries have large tracts of forest and recognize the importance of improving forest management as part of spurring economic development and mitigating the effects of climate change. The Bank is supporting these countries' efforts to improve governance systems, address drivers of deforestation, and engage communities in improving practices with better benefit sharing. These endeavors are putting clients in a position to access larger sources of financing through payments for performance (under the Forest Carbon Partnership Facility Carbon Fund, the BioCarbon Fund, and bilateral arrangements). Success in addressing deforestation issues and accessing climate finance is also sending a signal to other development partners and the private sector, which helps mobilize or leverage other forms of financing that can scale up good practices and sustain sectoral transformation.

Investment programs such as the FIP are increasing the number of programs piloting forest investments. FIP has committed resources to three new country programs (in the Republic of Congo, Côte d'Ivoire, and Mozambique) and has provided Cameroon, Rwanda, Uganda, and Zambia with financial resources to develop forest related investment plans.

New streams of funding are being made available. One is the Central African Forest Initiative (CAFI), being created to increase investments in the Congo Basin. It is expected to substantially reduce greenhouse gases from deforestation and forest degradation, improve local livelihoods, enhance the functioning of ecosystems, and increase access to performance-based payments to reinvest in sustainable forest landscapes.

Expected Outcomes

The expected outcomes are conservative estimates based on results from country emissions reductions programs by 2025. Investments in forests and REDD+ will help countries move from a condition of degraded landscapes with low productivity and high incidences of poverty to improved landscapes with better productivity, sustainable livelihoods, and more equitable sharing of benefits. These investments, coupled with improved governance and inclusive participation, are expected to lead to (a) improved economic outcomes from productivity and livelihood opportunities for local communities; (b) enhanced social benefits and community empowerment (from institutional support, communications, capacities; (c) more sustainable forest and land stewardship (from better policies, incentives, and practices); and (d) greater forest and agricultural biodiversity, soil conservation, habitat connectivity, and ecosystem services. Ecosystem services provide benefits to downstream users and other sectors of the economy. Such services include water conservation, flood prevention, run-off and siltation control, protection of fisheries, and conservation of biodiversity.

Forest- and climate-related investments can also improve the livelihoods of forest-dependent people and help preserve cultures and traditions. Forest investments also generally help build the capacity of government agencies responsible for forest and natural resource management as well as the communities that use and depend on these resources.

Climate-Related Benefits

Forest- and climate-related investments improve the livelihoods and increase the resilience of rural communities in targeted regions who manage agricultural and forestry landscapes for their livelihoods. Smallholder farmers, including women, can gain access to new skills, technologies, and markets that contribute to their ability to adapt to change and deal with economic shocks. Enterprises of all sizes can benefit from clearer policies and regulatory processes, more productive landscapes, and improved management practices among their suppliers.

Investments also contribute directly to the mitigation agenda by addressing drivers of deforestation and improving land and forest management and stewardship, which allows greater carbon storage in the natural environment. Many programs provide explicit support and incentives for reducing emissions by offering results-based payments linked to verified performance at the field level.

Financing Plan

Table 4.2 describes the financing plan.

TABLE 4.2 Support to Forests and to Reduced Emissions from Deforestation and Forest Degradation (REDD+): Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	
IDA	0	
Private sector	0	
Climate finance (GCF, GEF, CIF, and so forth)	590	Three countries (to be determined) will receive additional Forest Carbon Partnership Facility (FCPF) REDD+ readiness grants; three countries will develop FIP investments and programs for their respective Dedicated Grant Mechanism for indigenous peoples and local communities (DGM) (the Republic of Congo, Côte d'Ivoire, and Mozambique); two to three countries will receive performance-based payments from the Forest Carbon Partnership Facility (FCPF) Carbon Fund; two to three countries will receive financing from the Central African Forest Initiative (CAFI).
Other development finance (bilaterals, multilaterals)	0	
To be determined	260	Two to three countries will access additional FCPF readiness funds; two to three additional countries will access investment funds through the FIP, CAFI, GEF, or other sources; two to three additional countries will access performance-based payments through the FCPF Carbon Fund.
Total fast track (resources raised by 2020)	**850**	
Longer term (additional resources raised by 2024)	**850**	

Key Partners

Key partners in the region includes the governments of Burkina Faso, Cameroon, the Central African Republic, the Republic of Congo, the Democratic Republic of Congo, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Liberia, Madagascar, Mozambique, Nigeria, Uganda, Tanzania, Togo, and Zambia; the European Union and the governments of France, Germany, Norway, the United Kingdom, and the United States; and the FCPF, FIP, and UN-REDD.



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4.2 THE AFRICAN RESILIENT LANDSCAPE INITIATIVE

The World Bank will support the African Resilient Landscape Initiative (ARLI), which will use a landscape approach to integrate multiple sectoral initiatives, facilitating linkages and coordination among them. The initiative will mobilize financial and technical resources from multiple sources to help design and implement country- and region-specific integrated landscape-level strategies. Through ARLI, the Bank will support resilient landscapes in the Sahel, the Horn of Africa, and East Africa by combining geographical and socioeconomic approaches to managing land, water, and forest resources in support of food security and inclusive green growth (table 4.3). Connecting various type of land uses (including agriculture, woodlands, agro-silvo-pastoral lands, croplands, and irrigated agricultural lands) promotes productivity, resilience, carbon sequestration, biodiversity, water regulation and quality, national security, and regional stability.

Sectoral Background and Development Challenges

The multidimensional challenges of poverty, population growth, land degradation, deforestation, unsustainable watershed management, climate variability, unsustainable land use, migration, and fragility have undermined resilience to natural and economic shocks. These challenges require integrated solutions across borders. Creating resilient landscapes that strengthen the integrity of ecosystems to provide the full range of services for productive sectors and livelihoods, including migrant and fragile communities, requires collaborative action at scale. It also requires coordination of planning and

TABLE 4.3 Support to Climate-Resilient Landscapes: At-a-Glance Summary

Activity	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
Launch, operationalize, and support of the African Resilient Landscape initiative, including through the following activities: • Preparation and implementation of the Resilient Landscapes for Development Program (RLDP) in Eastern Africa and the Horn of Africa (Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda) • Preparation and implementation of sustainable landscape management in Ghana • Preparation and implementation of the sustainable agricultural land program in Madagascar • Preparation and implementation of the agriculture and natural resources landscape management program in Mozambique • Preparation and implementation of the resilient natural resource management for growth program in Tanzania	• Institutions, information, and policy reforms for restoration and resilience strengthened in 12 countries • Pilot restoration interventions aimed at enhancing ecosystem resilience and promoting sustainable livelihoods implemented and sustained in at least 12 vulnerable landscapes	• 100 million hectares of degraded and deforested land put under restoration by 2030 • Changes in vegetation cover effected on 100 million hectares • Targeted institutions benefiting from training and capacity building activities to address risks and response to climate variability. • Carbon accumulation rates in biomass and soil increased by 20M tCO2e over baseline
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
African Union; NEPAD; regional economic communities; the European Union and the governments of France, the Netherlands, and Norway; UN bodies; civil society stakeholders; others	$755 million	$755 million

management decisions across a range of sectors and stakeholders, supportive policies and regulations, investments in effective programs, capacity building to generate learning, replication of good practices, and strategies for scaling up successful programs.

The World Bank is increasingly supporting its country clients in their efforts to implement a more integrated landscape approach to managing competing demands for land, water, and other natural resources. The landscape approach is based on recognition of the complex interlinkages among the different components of natural capital, an insight of great importance to the communities that live in a reality in which all is connected (that is, in the landscape).

Initiatives to Address the Challenges and Enhance Resilience

The following initiatives are under way:

- The Burundi Sustainable Coffee Landscape Project is piloting sustainable land and water management practices.
- The Regional Pastoral Livelihoods Resilience Project seeks to enhance the resilience of pastoral and agro-pastoral communities in cross-border drought-prone areas of Kenya and Uganda and to improve government capacity to respond to a crisis or emergency.
- The Regional Sahel Pastoralism Support Project (PRAPS) seeks to increase access to essential productive assets, services, and markets for

pastoralists and agro-pastoralists in selected transborder areas and along transhumance axes in six Sahel countries (Burkina Faso, Chad, Mali, Mauritania, Niger, and Senegal) and to strengthen country capacities to respond to pastoral crises and emergencies.
- The Rwanda Landscape Approach to Forest Restoration and Conservation Project is demonstrating landscape management for enhanced environmental services and climate resilience in one priority landscape.
- The Sahel and West Africa Program (SAWAP), in support of the Great Green Wall Initiative, seeks to expand sustainable land and water management in targeted landscapes and climate vulnerable areas in Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, and Togo.

Building on the TerrAfrica platform, the Africa Union/NEPAD is establishing a broad-based African Resilient Landscapes Initiative (ARLI).[2] ARLI, which will be launched at COP21, will assist developing countries in (a) promoting the inclusive and sustainable use and management of natural resources, centered on people's social, economic, and environmental welfare and resilience; (b) scaling up and leveraging sectoral interventions, so that the whole is greater than the sum of individual interventions in terms of ecological and economic gains; and (c) ensuring the integrity, restoration, and sustainable management of landscapes across the region. It envisions bringing together elements of sustainable forestry management practices, sustainable farming practices (climate-smart agriculture), and pastoralism within African landscapes.

ARLI will commit to bringing 100 million hectares of degraded and deforested land under restoration in Africa by 2030. Doing so would improve soil fertility and food security, increase access to clean water, combat desertification, increase biodiversity and habitat, create green jobs, bolster economic growth and livelihood diversification, and increase the capacity for climate change resilience and adaptation. ARLI will also support implementation of the African Landscapes Action Plan.

ARLI's goal will be achieved through implementation of multiple cross-sectoral investments, including the following programs:

- Sustainable Landscape Management (Ghana)
- Sustainable Agricultural Land Program (Madagascar)
- Agriculture and Natural Resources Landscape Management (Mozambique)
- Resilient Natural Resource Management for Growth (Tanzania)
- Resilient Landscapes for Development Program (Ethiopia, Kenya, Somalia, South Sudan, Sudan, Uganda, and a regional project])

Expected Outcomes

Expected outcomes include the following:

- enhanced resilience of ecosystems and people and sustainable livelihoods

- stronger institutions, information, and policy reforms for restoration and resilience (achieved through training and capacity building on integrated landscape management or carbon accounting in productive landscapes)
- restoration of pilot vulnerable landscapes.

Climate-Related Benefits

Landscape approaches and on the ground investments will generate the following benefits:

- land use planning with integrated climate adaptation and mitigation objectives
- sectoral investments (agriculture, conservation, transport, infrastructure, mining, water, and so forth) with mainstreamed climate benefits
- planning at the landscape level involving land use options that result in reduced gas emissions and decreased pressure on forests
- secured multiple ecosystem functions that simultaneously contribute to enhance climate resilience and adaptation
- conservation of valuable ecosystems (for example, wetlands and peat lands, which perform important regulatory services and constitute large carbon sinks)
- large-scale and multisectoral transfer of knowledge, technology, and support for joint landscape planning.

Financing Plan

Table 4.4 describes the financing plan.

TABLE 4.4 Support to Climate-Resilient Landscapes: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	
IDA	355	IDA funds will be included in some Horn of Africa countries as well as in projects in Mozambique and Tanzania.
Private sector	0	
Climate finance (GCF, GEF, CIF, and so forth)	240	GEF: $40 million, GCF: $200 million (expected leverage to be confirmed)
Other development finance (bilaterals, multilaterals)	0	
To be determined	160	Consultations are under way with bilateral governments and communities; confirmation is expected during project preparation
Total fast track (resources raised by 2020)	**755**	
Longer term (additional resources raised by 2024)	**755**	

Key Partners

Key partners include the African Union; NEPAD; regional economic communities (COMESA, ECCAS, ECOWAS, SADC); UN bodies; the African Development Bank; other international organization; the European Union and the governments of France, the Netherlands, and Norway; and civil society organizations.

Notes

1. Africa's forested area is estimated at 675 million hectares—about 17 percent of the global forest area and 23 percent of the land area in the region (these figure do not include trees outside forests or on agricultural land, although they are important, especially in more densely populated areas, including western Kenya, parts of semi-arid and subhumid West Africa, and parts of Uganda, Ethiopia, and Madagascar). Five countries—the Democratic Republic of Congo, Sudan, Angola, Zambia, and Mozambique—account for more than half of the region's forested area.
2. TerrAfrica is an Africa-based and Africa-led partnership of 26 Sub-Saharan countries and 20 partners, including regional economic communities, UN bodies, international organizations, the European Union, bilateral donor agencies, and civil society organizations. It aims to reverse land degradation and build resilience by adopting policies and programs that promote sustainable land and water management practices under a landscape approach.



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Chapter 5

Promoting Integrated Watershed Management

The World Bank is actively engaged in integrated management of Africa's watersheds, through policy dialogue, technical assistance and financial support, with a particular emphasis on the management of trans-boundaries water resources, though vehicles such as the Cooperation in International Waters in Africa (CIWA) program. This component of the business plan intends to scale up support to four selected basins (the Niger, Lake Chad, Zambezi, and Victoria basins), with the goal of strengthening the ability of riparian countries in these basins to manage their water resources for sustainable development in a climate-resilient way.



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5.1 NIGER RIVER BASIN

The World Bank will support climate-resilient development in the Niger River Basin through the preparation of a Climate Resilience Investment Plan (CRIP) and the cofinancing of its implementation (table 5.1).

Sectoral Background and Development Challenges

Nine countries in West and Central Africa—Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Mali, Niger and Nigeria—share the Niger River Basin. Its surface area, which spans nearly 1.5 million square kilometers, is marked by a mosaic of climates, ecosystems, human settlements, and agricultural production systems. The population in the basin is highly vulnerable. Seven of the 10 basin countries are among the 20 poorest countries in the world, and 4 are landlocked. Most of the countries in the Niger Basin have predominantly rural populations that rely on rain-fed agriculture, pastoralism, and other natural resource–based livelihoods. Food security and social well-being depend mostly on unpredictable and extreme rainfall patterns, particularly in the Sahel part of the basin.

Climate change is exacerbating these challenges. The Niger Basin is already experiencing variability of extreme precipitation and a long-term trend of increasing aridity and decreasing precipitation. There is considerable uncertainty about the implications of climate change for the hydrological cycles in the basin (as in much of West Africa), with some projections suggesting drying conditions and others pointing to wetter ones. This uncertainty underscores the importance of strengthening the capacity of institutions in the Niger Basin to plan water resources investments

TABLE 5.1 Support to the Niger River Basin: At-a-Glance Summary

Activity	Expected outcomes	
• Engage in consultative process to prepare a Climate Resilience Investment Plan • Hold donor roundtables • Perform technical activities related to investment preparation	Fast track (by 2023)	Longer term (by 2026)
	By 2020, $1 billion worth of projects will be operational that will increase the resilience to climate change of up to 3 million people, through improved natural resource management, irrigation, watershed management, and flood protection.	By 2025, $1.5 billion worth of projects will be operational that will increase the resilience to climate change of up to 20 million people, through improved regulation of water flows through multipurpose dams and other infrastructure, natural resource management, irrigation, watershed management, and flood protection.
	The enabling environment for climate-resilient development will be enhanced by improving the institutional set-up at the national and regional levels and strengthening the institutional capacity to predict and plan for hydrologic variability caused by climate change.	The enabling environment for climate-resilient development will be enhanced by continuing improvements to the institutional set-up at the national and regional levels and strengthening the institutional capacity to predict and plan for hydrologic variability caused by climate change.
Main partners	**Resource mobilization**	
Niger Basin Authority, African Development Bank, and CIWA (supporting process)	Fast track (by 2020)	Longer term (additional funds by 2024)
	$1 billion	$1.5 billion

that can deliver the intended development benefits under a wide range of future climates.

Initiatives to Address the Challenges and Enhance Resilience

Between 2002 and 2008, the Niger Basin Authority (NBA) and its member states undertook a Shared Vision process for the sustainable development of the region. Major outcomes included the Niger Basin Water Charter (approved in 2008) and a Sustainable Development Action Plan (SDAP) (approved in 2007). The SDAP calls for the development of socioeconomic infrastructures, the preservation of ecosystems in the basin, capacity building and stakeholder participation, and an $8.2 billion investment program.

Several donors—including AFD, AfDB, GIZ, and the World Bank—support the NBA and its member states. The World Bank has provided financial support of $451.5 million in lending to countries in the basin through the Niger Basin Water Resources Development and Sustainable Ecosystems Management Program ($444 million) and the Niger River Basin Management Project ($7.5 million, under the Cooperation in International Waters in Africa Fund). It is preparing a third operation, the Economic and Environmental Rehabilitation of the Niger River in Mali project ($55 million).

Building on existing and well-established support for cooperative water and natural resources management and development in the basin, the World Bank,

in collaboration with a variety of partners, will support climate-resilient development in the basin through a combination of infrastructure development and institutional strengthening. Specific support will be guided by the CRIP, which is under preparation, under the leadership of the NBA, with the full involvement of the riparian countries. The plan, as adopted by the riparian countries, will be presented at the COP21 meeting, along with initial information on funding pledges.

Expected Outcomes

The CRIP will achieve the following outcomes:

- Improve information to support water management and development decisions by riparian countries, so that they can better predict and harness available water resources in view of increased variability and changing rainfall patterns.
- Identify institutional needs for information sharing, increase the sustainability of water-storage infrastructure, mitigate the impacts of climate variability, generate low-carbon energy, and ensure results and impacts at the grassroots level.
- Develop multipurpose infrastructure for energy, irrigation, transport, and minimum flows.
- Develop run-of-river dams to provide low-carbon energy sources.
- Optimize water storage, in order to improve redistribution and maintain low flows.
- Equip rural poor with small-scale storage options to help withstand water shocks.
- Undertake collective action for erosion control, pollution abatement, fisheries management, and ecosystem conservation.
- Scale up the use of sustainable land management and affordable irrigation solutions to enhance the resilience of millions of people.

Climate-Related Benefits

The main aims of the CRIP are to strengthen the overall resilience of the basin population (through job creation, for example) and to help reduce the climate vulnerability of people and ecosystems to water stress conditions; flooding; deterioration of water quality; degradation of soil, grazing land, and ecosystems; and rising sea level.

Financing Plan

The funding envelope of the CRIP is estimated at $3.1 billion, about $600 million of which has been identified. A rough estimate of investment preparation financing is $50 million. IDA resources can provide the initial

TABLE 5.2 Support to the Niger Basin: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	50	Domestic funds are required as co-funding to IDA credits
IDA	450	$50 million is in the pipeline for the Mali Niger River Economic and Environmental Rehabilitation Project; $400 million has been requested from the Niger Basin COM Chair to complete phase 2 of the Adaptable Program Loan for Water Resources Development and Sustainable Ecosystem Management (APL WRM-SEM)[a]
Private sector	0	Private sector will be targeted for longer-term funding; no private sector funding is expected for the fast track
Climate finance (GCF, GEF, CIF, and so forth)	50	Given the dearth of information and the difficulty of articulating the additionality of interventions, the financing plan assumes that adaptation-specific interventions constitute about 10 percent of total financing needs
Other development finance (bilaterals, multilaterals)	400	ADB, KfW, and other partners financing the Integrated Development and Adaptation to Climate Change Program (PIDACC)
To be determined	50	
Total fast track (resources raised by 2020)	**1,000**	
Longer term (additional resources raised by 2024)	**1,500**	

a. The request was included in the letter from the president of the Niger Basin Council of Ministers to President Kim (November 11, 2014) for Phase 2 of the APL WRM-SEM program. The letter included a proposal for interventions in nine Niger riparian countries as a second phase of APL1 in the amount of $400 million.

foundation for implementing the plan, but other funding sources will need to be tapped (table 5.2). COP21 will give the Niger Basin countries the opportunity to present their climate resilience needs before the international community, including donors of climate funding, in hopes of attracting financing.

Following COP21, investment packages to be submitted to the Green Climate Fund will be defined and donor roundtables organized to identify other sources of funding for the various components of the CRIP. Cofinancing of the first follow-up donor roundtable has already been secured from the Infrastructure Consortium for Africa (ICA).

Given that preinvestment preparedness is underdeveloped, resource mobilization efforts will target both preparation and investment finance. They will seek to leverage resources from both traditional and new sources.

Key Partners

The World Bank will deploy comprehensive resources, including both IDA and other parts of the World Bank Group (IFC advisory and investment, MIGA guarantees) to support the objectives outlined above. The African Development Bank is a key partner in this initiative. Other partners also

include Agence Française de Développement (AFD) and the German development agencies active in supporting the basin. The Bank will also try to involve emerging partners in the sector, including other multilateral institutions, bilateral donors, the Green Climate Fund, and private sector investors.



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5.2 LAKE CHAD BASIN

The World Bank will support climate-resilient development in the Lake Chad Basin through technical work, investment financing, policy dialogue, and resource mobilization. These efforts will be grounded in existing documents, such as the Water Charter and the Five-Year Investment Program, which will be updated, scaled up, and operationalized (table 5.3).

Sectoral Background and Development Challenges

Lake Chad is a large body of water in the Sahel region of Africa, at the southern fringe of the Sahara Desert. It is a very complex hydrosystem from an ecological, social, and political standpoint. Its active hydrological basin spreads over 815,000 square kilometers. Chad, Niger, Nigeria, and Cameroon are the lake's riparian states. The basin is home to about 50 million people, many of them among the poorest in the world.

Over the past 50 years, the Lake Chad area has experienced significant climate, hydrological, ecological, and social changes. The lake's surface, including its marshlands, shrunk significantly, from an average of about 20,000 square kilometers in the 1960s to about 8,000 square kilometers today. As a result, in the early 1970s, the lake transitioned from its original state characterized by one body of open water, to a very different one, dominated by marshlands and of much smaller size.

Throughout the last century, and particularly since the 1970s, fishers, farmers, and herders from different ethnic groups migrated to the lake's shores to exploit its rich natural resources and to flee droughts, famine, and

TABLE 5.3 Support to the Lake Chad Basin: At-a-glance Summary

Activity	Expected outcomes	
• Assess priority development and climate resilience issues in Lake Chad • Prepare a priority action plan, to be endorsed by the Lake Basin Commission • Implement selected priority actions included in the plan	Fast track (by 2023) • Consensus built around Lake Chad assessment, vision, and action plan to reach the vision • Water Charter ratified and operationalization begun • First set of investments ($300 million) to increase the resilience of people and ecosystems around the lake to climate change and other stressors implemented	Longer term (by 2026) • Water Charter operational • Second set of investments ($600 million) to increase the resilience of people and ecosystems around the lake to climate change and other stressors implemented
Main partners	**Resource mobilization**	
Lake Chad Basin Commission and its member states, AFD, European Union, GIZ	Fast track (by 2020) $300 million	Longer term (additional funds by 2024) $500 million

conflicts in other parts of the region. Since the 1980s, armed criminal groups, and more recently, Islamic extremists, have taken refuge around the lake.

These changes have created both opportunities and threats. On the positive side, thanks to migrants' know-how and the fertile land freed up by the lake's shrinkage, the lake area has been able to provide livelihoods to about 2 million settlers around its shore. It has also become a net exporter of food, contributing to the food security of about 15 million people in the lake's hinterlands, including two growing regional metropoles (N'djamena, Chad and Maiduguri, Nigeria).

On the negative side, navigability has been reduced, insecurity is hampering development efforts, and the lake is fragile and vulnerable to deterioration. Access to the lake's natural resources is subject to increasing disputes. Contamination from pesticides is starting to affect fisheries and livestock production. The risk of hydrocarbon contamination is rising as oil exploitation in the region is increasing. The sustainability of current production systems is not guaranteed, and several Ramsar protected wetlands may be at risk.

Despite its socioeconomic and ecological significance and very weak development indicators, the Lake Chad area has attracted relatively little investment from its riparian states or donors. In the face of the additional pressure that climate change exerts on the region's fragile natural resources, there is an urgent need to identify sustainable management options that will meet the development needs of the local population. Key issues to address include the following:

- Is there scope for promoting further transformation of the lake for productive activities, or would doing so undermine the lake's ecosystem services and therefore the livelihoods that depend on them?

- Does water contamination from pesticides and oil exploitation pose a potential threat to the lake?
- Is there scope for expanding irrigation, given the modification of the hydrological cycle that climate change will bring about?
- If drying trends continue, should interbasin transfer from the Congo Basin be considered?
- How much groundwater can be safely used?

The socioeconomic and ecological importance of the lake and the challenges it faces call for policy and investment action at the regional and national levels as well as sustained military action to reestablish peace. The Lake Chad Basin Commission (created in 1964 to sustainably and equitably manage the basin's water resources, preserve its ecosystems, and promote regional integration); the basin states; and donors have key roles to play.

Initiatives to Address the Challenges and Enhance Resilience

In 2012 the Lake Chad Basin Commission developed a water charter that refines and complements the principles of and responsibilities for the integrated, equitable, and shared management of water and other natural resources, in order to achieve the sustainable development of the Lake Chad Basin. Since then all member states except the Central African Republic and Nigeria have ratified the charter, but most of its principles still need to be made operational.

The commission also developed a five-year investment program for 2013–17. Its objective is to reduce poverty and improve the living conditions of the people in the basin by improving natural resource management and associated production systems. The plan calls for spending of about $904 million. It was presented at a donors' roundtable on April 4–5, 2014, in Bologna, Italy, but most of its activities remain unfunded.

The reengagement of the World Bank in support of Lake Chad development was recently approved in the form of a technical assistance, with financial support from the Cooperation for International Waters in Africa (CIWA) catalytic funds. This support will assist riparian countries and the Lake Chad Basin Commission in better understanding the future of the lake and defining a framework for future engagement based on broad consensus. This ongoing technical assistance is intended to provide the strategic foundation for a long-term engagement in the Lake Chad Basin and to guide the preparation of a long-term, multiyear, multicountry program.

Technical assistance includes two components. The first involves strengthening information/knowledge of and building consensus over the challenges facing Lake Chad and their underlying causes (providing answers to some of the questions raised above). The second supports the Lake Chad Basin Commission and its member states in crafting a shared vision for the lake's development based on the assessment developed in phase 1, as well as in

preparing a climate resilience action plan to achieve the vision. It is expected that the following activities will be well advanced, or completed, by the COP21 meeting:

- a donor mapping, as a first step toward identifying the Bank's value added in reengaging and drawing lessons from donors' projects or programs under implementation
- a framework document for the Lake Chad Climate Resilience Action Plan (Chad-Res), including an assessment of the lake's current situation, a long-term development vision for the lake, and priority actions to reach that vision
- consultations around the Chad-Res Framework document, to increase country buy-in and support from the international donor community and coordinate and finance the investments proposed
- endorsement of the Chad-Res Framework document by the commission's ministerial council, before its presentation at COP21.

Expected Outcomes

The following outcomes are expected within three years of the COP21:

- development and adoption of the Operational Action Plan for Climate Resilience in Lake Chad, which will include the findings of technical work on improved understanding of the lake's hydro-system, ecosystems, and productions systems and reflect the consensus built on the challenges facing the lake, their underlying causes, and the actions necessary to address them
- mobilization of resources by development partners to fund the Climate Resilience Action Plan
- implementation of the Climate Resilience Action Plan in two phases (the first through 2020, the second through 2025), to enhance the resilience of Lake Chad populations, production systems, and ecosystems to climate change and other stressors and improve the living conditions of the people living on the shores of Lake Chad.

Climate-Related Benefits

The proposed actions are expected to increase the resilience of the people and ecosystems around the lake to climate change and other stressors and to maintain or even increase the lake's contribution to food security in its hinterlands. More sustainable fishing, agriculture, and cattle-raising practices will make the lake's population less vulnerable to drought or other hazards.

Financing Plan

Table 5.4 describes the financing plan.

TABLE 5.4 Support to the Lake Chad Basin: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	20	
IDA	120	Provisional estimate, subject to validation
Private sector	0	
Climate finance (GCF, GEF, CIF, and so forth)	30	
Other development finance (bilaterals, multilaterals)	40	AFD has pledged about $100 million for implementation of the regional component of the five-year investment plan, $40 million of which is assumed to be for first two years
To be determined	90	Consultations for further financial support are planned with AFD, GIZ, and the European Union
Total fast track (resources raised by 2020)	300	
Longer term (additional resources raised by 2024)	500	The cost of implementing the action plan is still unknown; the financing estimated is based on the five-year investment plan

Key Partners

Key partners include the Lake Chad Basin Commission and its members (including the four riparian countries and the Central African Republic), and technical and financial partners (including AFD, AfDB, the European Union, and GIZ). AFD and the World Bank are supporting the preparation of the assessment, vision, and climate-resilience action plan.



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5.3 ZAMBEZI RIVER BASIN

The World Bank will support climate-resilient development in the Zambezi River Basin through technical work, investment financing, policy dialogue, and resource mobilization (table 5.5). This support will be integrated as part of the Zambezi River Basin Program, which is financed through a series of projects under the multidonor trust fund for Cooperation in International Waters in Africa (CIWA) and the World Bank.

Sectoral Background and Development Challenges

The Zambezi River Basin is one of the most diverse and valuable natural resources in Africa. Its waters are critical to sustainable economic growth and poverty reduction in the region. In addition to meeting the basic needs of more than 30 million people and sustaining a rich and diverse natural environment, the river plays a central role in the economies of the eight riparian countries (Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe). It provides important environmental goods and services to the region and is essential to regional food security and hydropower production.

The river and its tributaries are subject to strong seasonal variation in the hydrological regime. The cycle of floods and droughts has devastating effects on the people and economies of the region, especially the poorest members of the population.

The basin is likely to be severely affected by climate change, as a result of the effects of higher temperatures and decreased rainfall on evaporation and runoff, according to most of the models vetted by the IPCC (2013). In other parts

TABLE 5.5 Support to the Zambezi River Basin Program: At-a-Glance Summary

Activity	Expected outcomes	
• Develop an Integrated Flow and Information Management System • Enhance catchment management and livelihood support • Provide technical and financial support to the implementation of the strategic plan, including to hydropower, irrigation, water transfer, and other strategic infrastructure	Fast track (by 2023) • Integrated flow management system operational • Catchment management strategy in place • Large investments (such as hydropower, water transfers, irrigation), and investments in community infrastructure (such as small water supply schemes, conservation agriculture, check dams, flood protection) prepared	Longer term (by 2026) • Infrastructure investments to improve resilience to climate variability and change through increased energy production, increased irrigation, and improved flood control are in place or in advanced stages of preparation
Main partners	**Resource mobilization**	
Zambezi Watercourse Commission; Joint Operating Technical Committee of Dam Operators (JOTC/ZAMDO); riparian states (Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe); nongovernmental organizations	Fast track (by 2020) $1,117 million	Longer term (additional funds by 2024) $3,600 million

of Africa, great uncertainty persists about the pattern of future changes in precipitation. In contrast, the vast majority of models for the Zambezi River Basin project very significant drying trends, with declines in runoff of 40 percent or more by midcentury.

Sustained economic growth of more than 6 percent a year in many of the riparian states is providing new opportunities and increasing development pressure on the resources of the basin. The combined GDP of the Zambezi River Basin riparian states is estimated at more than $100 billion. Despite this increasing prosperity, poverty is persistent across the basin, and coefficients of inequality in some of the riparian states are among the highest in the world.

The Multi-Sector Investment Opportunity Analysis identified more than $16 billion in investments at the prefeasibility or feasibility stage of preparation. Reflecting the dual nature of the regional economy, new investments in large infrastructure coexist alongside a parallel, subsistence economy that is reliant on environmental services provided by the river.

Initiatives to Address the Challenges and Enhance Resilience

The World Bank is part of a multidonor initiative to support climate-resilient cooperative development in the Zambezi River Basin. The program is guided by an Integrated Water Resources Management (IWRM) Strategy for the

Zambezi River Basin (ZAMSTRAT), which provides a guiding vision, along with prioritized activities and projects. The initial phase of support to the Zambezi River Basin Committee (ZAMCOM) focuses on strengthening four key areas:

- regional cooperation and integration, by supporting ZAMCOM's legal establishment, financial sustainability, delivery of key functions, and establishment of effective partnerships with key institutions throughout the basin
- water resources management, by supporting the public availability of basin-wide data and information, analytical tools for planning for and managing extreme events, and harmonized national transboundary legislation
- water resources development, by supporting a common investment planning framework and advancing investment opportunities with regional benefits
- stakeholder engagement and coordination, by establishing partnerships and effective strategic communications.

The first phase of the program involves assisting in the development of a pipeline of projects and investments that are expected to be implemented in accordance with the strategic plan for the basin being developed with support from CIWA. One investment in the pipeline is the Batoka Gorge hydroelectric scheme, envisaged as a 2,400 MW run-of-river plant upstream of the Kariba Dam. The project is being developed by the Zambezi River Authority, an entity run jointly by Zambia and Zimbabwe.

Expected Outcomes

The potential outcomes envisaged under the program of support over the next 10–15 years are substantial and include the following:

- Poverty will be reduced throughout the basin, as a result of expanded development, and sustainable water resources management.
- Energy security will be enhanced, through $10.7 billion worth of hydropower investments that yield an additional 35,300 GWh a year of firm energy and an additional 60,000 GWh a year of average energy.
- Agricultural production will increase, enhancing regional food security, through an additional 343,000 hectares increasing the amount of irrigation to 775,000 hectares a year (85 percent located in Malawi, Zambia, and Zimbabwe).
- Employment will Increase, particularly in the agricultural sector, with more than 500,000 jobs created.
- Economic resilience will increase and growth benefits will be sustained, through reduced exposure to floods (avoiding average losses on the order of more than $1 billion a year) and adaptive measures to climate change.

- Regional transport costs and travel times will be reduced, through investments in bridges and navigation.
- Water supplies will be secured to meet urban and industrial demand (more than 1,000 million cubic meters of water a year is proposed to be delivered to Botswana, Malawi, Zambia, and Zimbabwe).
- Environmental restoration of the Zambezi Delta and improved fisheries production will be achieved, through the systematic introduction of basin-wide environmental flows in the delta.
- The contributions of tourism and mining to GDP will increase, through integrated, sustainable development.
- Fisheries production will be enhanced, through improved management of water resources.

In the lead-up to COP21 (or shortly thereafter), the design framework for the Zambezi Water Information Management System and a consultative framework for development of the strategic plan for the Zambezi River Basin will be developed.

Within three years of COP21, it is expected that the following outcomes will have been achieved:

- The Zambezi Water Information Management System will be operational, allowing the exchange of data among the eight riparian states.
- A strategic plan will be guiding investments by the riparian states.
- Feasibility studies will have been conducted, financing secured, and construction launched on strategic investments.

Climate-Related Benefits

The climate-related benefits from the development of information management systems and tools, along with the strategic plan, are expected to be substantial. Activities will provide a context for assessing climate resilience and introducing appropriate mitigation and adaptation measures toward more resilient, low-carbon growth trajectories.

The development of low-carbon hydropower resources in the Zambezi River Basin will help balance the regional power mix and provide for low-carbon development and clean energy options. Development of these hydropower resources within the context of the strategic plan will provide a series of climate-resilient investment options; improve adaptation measures related to disaster preparedness and enhanced economic and social resilience; and introduce mitigation measures relating to climate-smart agriculture to improve food security.

Financing Plan

Table 5.6 describes the financing plan.

TABLE 5.6 Support to the Zambezi River Basin Program: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	30	Based on 5 percent of IDA pipeline FY15–18
IDA	120	Water sector support to riparian states
Private sector	225	20 percent potential participation in large hydropower projects
Climate finance (GCF, GEF, CIF, and so forth)	612	GEF ($12 million) and GCF ($600 million) (both figures to be confirmed)
Other development finance (bilaterals, multilaterals)	130	Based on commitments within the context of the Zambezi River Basin Program
To be determined		
Total fast track (resources raised by 2020)	1,117	Includes community investment projects that have been informed by the Zambezi Strategic Plan, followed by advancement of investment preparation, and development of integrated information management system
Longer term (additional resources raised by 2024)	3,600	Provisional estimate of large infrastructure investment, to be confirmed based on feasibility study carried out in accordance with defined strategic plan

Key Partners

The Zambezi River Basin Program is guided by member states within the basin through the ZAMCOM Technical Committee, composed of senior officials and the ZAMCOM Secretariat. The committee provides the reference point for support from international cooperating partners (ICPs).

A consultative forum of ICPs has been established in accordance with the agreed principles of the SADC framework. The Zambezi-ICP Partnership (ZICP) is a strategic advisory body to the ZAMCOM Secretariat that acts as an interface for policy and technical dialogue between the ZAMCOM organs and the ICPs. ZICP has a range of tasks. One of them is to serve as a resource mobilization mechanism by sharing information on funding gaps and providing a forum for open dialogue, networking, and confidence building, in order to create a shared understanding by the ZAMCOM Secretariat, the ICPs, and other stakeholders on strategic issues related to implementation of the Zambezi Strategic Plan.

Active partnerships include the multi-donor trust fund for Cooperation in International Waters in Africa (CIWA), hosted by the World Bank, and bilateral partnerships with AfDB, DANIDA, DFID, GIZ, and SIDA, among others.



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5.4 LAKE VICTORIA BASIN

The World Bank already supports the Lake Victoria Environment Management Program (LVEMP), which promotes various climate-resilient solutions to the environmental challenges in the Lake Victoria Basin. Through the design of a new phase of LVEMP, a climate-resilient development strategy will be drafted as the basis for a model multisector regional adaptation program in an area of critical environmental and social importance (table 5.7).

Sectoral Background and Development Challenges

The Lake Victoria Basin is a major population and poverty center in Africa and a transboundary natural asset of global importance. The area covers about a ninth of the land area of the East African Community but is home to about a third of its population below the poverty line.

The lake supports the world's largest freshwater fishery, with a total annual landed catch value estimated at about $500 million in revenues, about half of which are export revenues. The establishment of the Nile perch fishery in the 1980s and 1990s provided a resource boom that drew in poor and disadvantaged people from neighboring countries. The fishery provides livelihood for 3 million people. Large rural populations are also dependent on the degraded lands in the upper basin, particularly in Burundi, Rwanda, and the Kenya highlands.

The waters of the lake and its catchment area provide 90 percent of Uganda's hydropower; most of the hydropower for Burundi and Rwanda; and the water supply to major urban centers, including Kampala, Kigali, Mwanza and Kisumu.

TABLE 5.7 Support to the Lake Victoria Basin Program: At-a-Glance Summary

Activities	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
• Develop the Lake Victoria Basin climate-resilient development strategy • Support sustainable land and water management, including climate-smart agriculture and sustainable rural energy systems • Protect the ecological infrastructure, including riparian buffer zones, wetlands, forests, water towers, national parks, and fish nursery grounds, and monitor climate-related processes affecting the lake's ecology (for example, water hyacinths and water quality) • Promote resource-efficient production systems and green and resilient livelihoods with the private sector • Improve hydro-met services and strengthen infrastructure resilience, including maritime safety, lake transport infrastructure, and urban storm water management	• Adoption of a formal climate-resilience policy document and a financing roadmap by the Sectoral Council of Ministers for the Lake Victoria Basin • Development and adoption of a basin model and monitoring and evaluation system to guide watershed investments • Implementation of systematic watershed management plans by at least three countries • Creation of a database of key natural assets, including environmental and livelihood services • Creation of a monitoring system of real-time water quality and water hyacinths • Inducement of at least $200 million in private sector investments in resource-efficient production and green supply chains • Improvement of hydro-met forecasting in at least three countries • Establishment of an infrastructure resilience inventory	• At least $500 million of climate-resilience investments made, targeting at least 1 million beneficiaries of sustainable land management and diversified livelihoods in rural areas • Significant reductions in nutrient loading to Lake Victoria • Rehabilitation of key ecological infrastructure in at least three countries • Improvement in resilient infrastructure and response systems to climate and ecological emergencies in at least four countries • Inducement of at least $400 million in private sector investments in resource-efficient production and green supply chains
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
East African Community, including all five constituent governments (Burundi, Kenya, Rwanda, Tanzania, and Uganda); Lake Victoria Basin Commission (LVBC) and Lake Victoria Fisheries Organization (LVFO); Nile Basin Initiative (NBI) and Nile Equatorial Lakes Subsidiary Action Program (NELSAP); DFID, KfW, and other bilateral development agencies; the Nordic Development Fund, the Pilot Program for Climate Resilience, and Cooperation for International Waters in Africa (CIWA); private sector	$550 million	$500 million

The basin is also of biological importance. The largest African Great Lakes—Victoria, Tanganyika, and Malawi—are unique in the number of endemic vertebrate species they support. The Afro-montane forests of the highlands on both sides of the basin support some of the most diverse terrestrial habitats in the world. Protected areas cover 25 percent of the basin's land area and include some of the most iconic parks in Africa, including Serengeti and Virungas.

The Lake Victoria Basin is also a global example of environmental degradation. Introduction of the Nile perch was associated with the mass extinction

of endemic native fish species; perch stocks themselves have now declined to probably less than half of their peak levels, as a result of increased fishing and other environmental stresses.

Environmental degradation within the basin poses increasingly broad threats to livelihoods and welfare. Loss of forest cover and erosion of soils has chronic impacts on land productivity; where gullies destroy land, property, and even lives, the impacts are acute. The flow of sediments and other pollutants into the basin's rivers and ultimately the lake reduces the supply of potable water and causes algal blooms that are unpleasant for lakeshore communities and limit the tourism potential of the region.

One of the most striking indicators of poor ecological health is the rapid colonization of the lake by water hyacinth. Infestations of this invasive floating plant periodically block access to kilometers of lakeshore, preventing use of the lake for transport and fishing and posing serious health and safety risks to local inhabitants.

Initiatives to Address the Challenges and Enhance Resilience

The LVEMP program aims to reduce a range of environmental pressures on the Lake Victoria Basin and improve the welfare of its inhabitants. It supports increased climate resilience in a variety of ways.

LVEMP includes three main components. The first—strengthening institutional capacity for managing shared water and fisheries resources—builds the capacity of the regional, national, and local institutions responsible for coordination, research, management of resources, and enforcement of environmental standards in order to harmonize policy and regulatory standards and undertake ecosystem monitoring and applied research. It includes monitoring water quality and water hyacinth outbreaks and, in the long run, strengthening hydro-met information systems.

The second component—point source pollution control and prevention—focuses on the management of major urban pollution sources from sewage and industrial sources. Improved sanitation, wastewater management, and cleaning of urban drainage channels reduce flood impacts; programs that promote cleaner production by private industries are achieving considerable efficiencies in the use of water and energy resources. This component also includes navigation safety investments that help reduce a frequently fatal climate risk to users of the lake.

The third component—watershed management—is being implemented through community-driven investments in more sustainable land management, rehabilitation of key ecological infrastructure (particularly riparian buffer zones and wetlands), and diversification of sustainable livelihoods. These interventions yield more productive and resilient agriculture and livelihoods for people living within the particularly vulnerable catchments. Downstream they modulate hydrological flows and sedimentation (which increase flood and drought risk) and reduce the nutrient loading into the

lake (which affects fisheries, potable water supplies, and even [through water hyacinth infestation] access to the lake and the hydrological balance).

The current phase of the LVEMP was extended until the end of 2017 in order to allow for preparation of a follow-on investment phase to begin in FY18. In accordance with the Africa Climate Business Plan, the objective is to use this design period to strengthen the climate-resilience components of the next phase and develop an explicit climate resilience strategy for the Lake Victoria Basin as a basis for attracting additional funding. Key initiatives would include the following:

- Development of a Lake Victoria Basin climate-resilient development strategy for eventual adoption by the Sectoral Counsel of Ministers for the Lake Victoria Basin of the EAC. The strategy would be accompanied by a financing roadmap assessing external funding sources.
- Expansion and development of more systematic programs of sustainable land and water management based on erosion and sediment transport models and watershed monitoring and evaluation systems for improved targeting of available resources and prediction and verification of environmental and livelihood impacts to encourage additional investment. In addition to climate-smart agriculture, potential interventions would include sustainable rural energy systems to reduce pressure on forests from unsustainable wood fuels. The LVEMP has been piloting the introduction of biodigesters in cattle-rearing areas as an incentive to increase stall feeding and reduce pressure on forests. Taking this intervention to scale depends on improving its financial returns by reducing installation costs and finding ways to commercialize excess gas. Rwanda provides an example of licensed production of wood fuels from wood lots that could revolutionize charcoal production elsewhere.
- Protection of ecological infrastructure, including riparian buffer zones, wetlands, forests, water towers, national parks, and fish nursery grounds. This effort would start with a comprehensive assessment of ecological assets within the basin, their environmental and livelihood functions, and the pressures they face. It would include development of remote sensing–based monitoring systems for water quality and water hyacinth spread, building on pilot work conducted with the European Space Agency. These ecological processes are influenced by climate factors and may eventually be amenable to hydro-met-linked forecasting rather than just monitoring after the fact.
- Partnering with the private sector to promote green industries. This effort would involve expansion of existing program in resource-efficient production, coupled with new initiatives to promote green supply chains and develop nature-based enterprises in support of watershed management and resilient livelihoods. Given the scale of the sustainability challenges within the basin, it is critical to actively engage the private sector. So far the resource-efficient production project under LVEMP has leveraged about $30 of private sector investment for every $1 of project expenditure.

- Enhancement of hydro-met knowledge and forecasting services for improved disaster response and infrastructure resilience. This effort would include the modelling of potential climate-induced impacts on lake levels to identify climate threats to coastal infrastructure (including new port infrastructure under the Lake Victoria Transport Project) and assess the vulnerabilities of urban and transport infrastructure to flooding. Navigation safety programs are expected to be expanded under the transport project but will require parallel investments in weather forecasting to improve effectiveness.

Climate-Related Benefits

Recent climate change and extremes have had significant impacts on agricultural production within the basin and caused periodic flooding in numerous areas within it. There is considerable uncertainty over the impacts of future climate change within, but the importance of the balance between direct evaporation and precipitation over the lake and rapid water-level changes in the past suggests they could be severe. Because the lake is large enough to act as a regional climate driver, significant impacts to it could have effects throughout large areas of central Africa and the Sahel.

The effects of climate change and environmental stresses are mutually reinforcing. Land degradation and loss of natural habitats increase the impacts of rainfall extremes both upstream (through reduced retention of soil moisture and nutrients) and downstream (through siltation, flooding, and gully formation). The effects of climate change on fisheries are likely to be exacerbated by overfishing and pollution, through stresses on key nursery grounds and changes in the thermocline and nutrient cycles. Inadequate urban waste management increases the risk of and from flooding, through storm drainage channels blocked with refuse and the health risks from polluted floodwaters.

The climate resilience development strategy will provide a model for integrated rural and urban resilience, achieving the following:

- improving the land management and ecological infrastructure of key watersheds and their climate-buffering ability
- enhancing the health and resilience of important fisheries
- promoting the diversification of rural livelihoods
- improving the design of port and lakeshore infrastructure
- increasing the efficiency of use of climate-affected water and energy resources by local industries
- reducing key risk factors to urban flooding
- strengthening emergency response.

Expected Outcomes

The climate-resilient development strategy is expected to substantially increase the volume and coordination of adaptation investments within the basin. Rural resilience interventions could reach 1 million beneficiaries

by 2025, significantly reducing the nutrient loads reaching Lake Victoria and improving a range of key natural assets.

Better information and monitoring systems would allow millions of basin inhabitants to adapt better to climate-related events, including storms and floods as well as induced water quality and water hyacinth events. Assessment of infrastructure vulnerabilities could safeguard new port investments and lead to significant improvements in flood management (for example, improvement and maintenance of storm-water drainage) in urban centers with several million inhabitants.

Financing Plan

Table 5.8 describes the financing plan.

Key Partners

The World Bank will deploy IDA resources through the regional LVEMP program and related operations. Trust fund resources (such as funds from the Nordic Development Fund and CIWA) will augment this support. Pilot Program for Climate Resilience (PPCR) investment planning processes are supporting efforts in Rwanda and Uganda.

The private sector is considered a key source of finance (LVEMP has already leveraged levels of private finance that are comparable to IDA investment).

TABLE 5.8 Support to Lake Victoria Basin Program: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	50	Co-financing of IDA credits
IDA	200	Primarily from the next phase of LVEMP (deliverable in FY18), but additional contributions may be available from the Lake Victoria Transport Project and other rural and urban investment projects
Private sector	200	Relatively modest expenditure on technical assistance on resource-efficient and cleaner production has already leveraged nearly $100 million in private sector investment under the existing LVMEP program; private sector financing is expected to expand significantly as a wider range of industries and interventions is included in the program
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance (bilaterals, multilaterals)	100	AfDB, DFID, KfW, USAID, and other bilateral institutions
Total fast track (resources raised by 2020)	**550**	
Longer term (additional resources raised by 2024)	**500**	

Experience suggests that private sector investments in resource efficiency and more resilient livelihoods will grow to at least $300 million by 2025.

The East African Community, including member governments and technical institutions (particularly the Lake Victoria Basin Commission), is a key counterpart. The Nile Basin Initiative and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) will also be engaged in developing strategies, models, and basin information systems.

A range of development partners currently fund or are interested in supporting related activities within the basin or the African Great Lakes more broadly. They include AfDB, DFID, KfW, SIDA, and the US government. These potential sources of funding, as well as traditional and emerging sources of climate finance, including the GEF and the GCF, will be actively pursued.



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Chapter 6

Fostering Climate-Smart Ocean Economies in Africa

More than 60 percent of the world's economic output takes place near coastlines. The ocean economy in some African countries contributes as much as 27 percent of revenues and a third of export revenues. For example, an estimated $22 billion a year is derived from the coastal and marine resources of the South West Indian Ocean region. Coastal tourism is the largest contributor to GDP in Africa, at more than $11 billion a year.

In recognition of the importance of oceans, in 2015 world leaders adopted the Sustainable Development Goal (SDG) 14 at the UN General Assembly ("Conserve and sustainably use the oceans, seas and marine resources").

Given the interconnectedness between climate change (SDG 13) and the blue economy, the proposal presented here seeks to foster climate-smart ocean economies in Africa.

In 2014 African heads of state and governments pledged to embrace and develop the blue economy concept as a vital part of the future development to be outlined in the African Union's Agenda 2063. In 2015 the Indian Ocean Rim Association adopted the Mauritius Blue Economy Declaration, which recognizes the interconnectivity of fisheries, infrastructure, energy, and seabed mining.[1]

Table 6.1 describes proposed support to climate-smart ocean economies.

TABLE 6.1 Support to Climate-Smart Ocean Economies: At-a-Glance Summary

Activities	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
• Provide technical assistance and reimbursable advisory services, including the following: • a flagship report on climate change and fisheries in Africa, to inform continent-wide management of fisheries • national investment plans for climate-resilient fisheries and coastal livelihoods for the poor (these plans would be country led and implemented by existing national projects) • a flagship report on climate change and the blue economy in Africa, to inform the development of national ocean economy strategies • national climate-smart blue economy investment plans • knowledge exchange among practitioners • Provide investment project finance and fund program-for-results (PforR) operations in support of pilot fisheries, and climate-resilient livelihood projects	• Regional commissions monitor two fisheries, incorporating climate variations into the scientific evidence governing fishery management • Five coastal fishery communities develop alternative livelihood/jobs streams • Four countries present national climate-smart blue economy development plans to parliament	• Regional commissions monitor four fisheries, incorporating climate variations into the scientific evidence governing fishery management • Ten coastal fishery communities develop alternative livelihood/jobs streams • Eight countries present national climate-smart blue economy development plans to parliament
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
• Governments of blue economy countries (Mauritius and the Seychelles) and additional countries that ask to participate • West Africa Regional Fisheries Program (WARFP): Governments of Cabo Verde, Ghana, Guinea, Guinea Bissau, Liberia, Mauritania, Senegal, and Sierra Leone • Countries that are part of the South West Indian Ocean Fisheries Program (SWIOFish) and countries that share waters with Africa or are part of the Africa small islands states group (Comoros, Kenya, Madagascar, the Maldives, Mauritius, Mozambique, São Tomé and Príncipe, the Seychelles, Somalia, South Africa, Tanzania, and Yemen)	$220 million	$280 million

Sectoral Background and Development Challenges

Over the coming decades and centuries, the health of the ocean will come under increasing stress as a result of rising seawater temperature, ocean acidification, and ocean deoxygenation. Coral bleaching, caused by rising ocean temperatures, is already affecting vast areas of tropical coral reefs, which harbor 25 percent of marine biodiversity.

Small island developing states have long been aware of these issues. These challenges are now affecting all of Africa's coastal states and Africa overall, as fish are a continental asset.

Fisheries are directly susceptible to the effects of climate change. Ocean acidification and changes in ocean circulation directly affect the productivity of the ocean and the incomes coastal communities derive from ocean resources. Much of the ocean resource is already degraded; climate change increases the vulnerability of the ocean ecosystem and the communities that depend on it.

The authorities and communities lack information on how to change the way they operate in response to climate change, making it difficult or impossible for them to internalize climate resilience and adaptation into their ocean-dependent economic sectors. The World Bank will support studies that fill the gap in knowledge and enhance investments to improve the resilience of fishing communities based on sustainable fisheries management. "Blue carbon" sinks, such as mangrove forests, seagrass beds, and other vegetated ocean habitats, can sequester up to five times the carbon absorbed by tropical forests, for example. Planning and accounting for these services ought to be central to development planning and risk reduction.

Initiatives to Address the Challenges and Enhance Resilience

The World Bank is providing Mauritius with technical support via the nonlending Building the Ocean Economy in Mauritius project. This support covers bunkering, shipping/sea port–related activities, fisheries and aquaculture, private sector development, renewable ocean energy, education, and marine finance. The goal is to spur growth and sustainable development, create jobs, increase regional cooperation, and build resilience in the face of climate change. A series of diagnostics and policy notes is being prepared, which will serve as a foundation for knowledge exchange with other countries.

The Seychelles' new Ministry of Finance, Trade and the Blue Economy is pursuing its blue economy objectives by focusing on fisheries, aquaculture, and blue bonds. Through the Paris Club, the Seychelles will exchange $82 million worth of debt for funds to turn 30 percent of its 1.4 million square kilometer Exclusive Economic Zone (EEZ) into marine protected areas, half of which will be no-take zones. It will also develop marine spatial planning for the EEZ and the extended continental shelf.

The ocean off the coast of West Africa offers some of the richest fishing grounds in the world. The West Africa Regional Fisheries Program (WARFP) is helping the countries of the West Africa Regional Fisheries Commission restore and recapture their ocean wealth though a long-term, three-phase approach that involves (a) developing a foundation for managing fisheries and fighting illegal, unreported, and unregulated fishing to prepare for effective management of national fisheries; (b) supporting governance reform, regional integration, and revenue augmentation by investing in the enabling environment; and (c) supporting private sector–led sustainable growth. The program currently includes Cabo Verde, Ghana, Guinea, Guinea Bissau, Liberia, Mauritania, Senegal, and Sierra Leone. Activities that increase the resilience of fishing communities need to be strengthened in each WARFP country.

In the Indian Ocean, from Yemen to South Africa and from Comoros to Maldives, the Southwest Indian Ocean Fisheries Governance and Shared Growth (SWIOFish) program assists countries in managing one of the globe's most important areas for fisheries and marine biodiversity. The objective is to improve the management effectiveness of selected priority fisheries at the regional, national, and community level. The project is designed to contribute to the World Bank Group's corporate goals of ending extreme poverty and promoting shared prosperity in a sustainable fashion. It recognizes the importance of fisheries as a key contributor to food security and nutrition, the safety net, and job creation for the rural coastal populations of the southwest Indian Ocean, which include some of among the poorest and most vulnerable people in the world to climate change. The project provides support for (a) enhancing regional collaboration among South West Indian Ocean Fisheries Commission (SWIOFC) countries; (b) improving the policies, strategies, institutions, and legal frameworks necessary to improve the performance of priority fisheries, regional marine environmental health, and resilience to climate change; and (c) increasing value addition and diversifying fishers' livelihoods to reduce poverty and pressure on the region's fisheries, improving the regional business climate, enabling private sector productivity and investment, and supporting public investments critical to a viable private sector.

Several African coastal countries have initiatives in the pipeline, are benefiting from existing initiatives, or are learning from regional initiatives on the ocean economy. Two examples are the Global Program for Fisheries (PROFISH)[2] and the Areas beyond National Jurisdiction Program (ABNJ).[3]

Expected Outcomes

On the analytical side, the expected outcomes concern adoption of the evidence of climate change into the ways in which fisheries and the ocean economy are managed. Fisheries monitored by regional commissions will include climate variations in the scientific evidence governing fishery management, and national climate-smart blue economy development plans will be presented to parliaments.

On the investment side, the following outcomes are expected:

- Coastal fishery communities will develop alternative livelihood/jobs streams.
- Coastal habitats, including blue carbon and other coastal assets, will be managed by identifying a portfolio of investable projects, while ensuring that local shareholders have a voice in dialogue around the blue economy.
- Investment in climate-smart infrastructure will be made.

Climate-Related Benefits

Climate-related benefits relate mostly to adaptation. Countries adopting a climate-smart approach to the ocean economy, particularly in fisheries, are expected to become more resilient to changes, because healthier marine resource are more resilient to environmental changes and healthier marine resources generate more revenue, which in turn creates employment. Countries that manage their fisheries at higher abundance levels and with a better understanding of the changing patterns of fish stocks will become more food secure. Countries adopting climate-smart ocean economy will adapt better to the negative effects of climate change on specific coastal populations.

Financing Plan

Table 6.2 describes the financing plan.

TABLE 6.2 Support to Climate-smart Ocean Economies: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	20	National contributions and cofinancing
IDA	20	IDA countries participating in the West Africa Regional Fisheries Program (WARFP) and the Southwest Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish)
IBRD	10	IBRD countries participating in WARFP and SWIOFish
Private sector	0	
Climate Finance (GCF, GEF, CIF, and so forth)	35	Estimation based on existing Bank projects financed by GEF
Other development finance (bilaterals, multilaterals)	20	
To be determined	115	
Total fast track (resources raised by 2020)	**220**	Assumes interest of donors, including demand from developing countries for IDA support, in providing funding to projects with potential for Africa-wide scale-up
Longer term (additional resources raised by 2024)	**280**	

Key Partners

The World Bank has been working with many partners to increase investment in sustainable fisheries and healthy oceans. They include the member countries of the West Africa Sub-Regional Fisheries Commission (CSRP), the South West Indian Ocean Fisheries Commission (SWIOFC), and the Indian Ocean Commission (IOC); associated states, such as São Tomé and Príncipe, in the frame of the African small island developing states group; and the Indian Ocean Rim Association.

Notes

1. See http://www.iora.net/media/158070/mauritius_blue_economy_declaration.pdf.
2. Created in 2005, PROFISH is a multidonor trust fund managed by the World Bank to support governance reforms for sustainable fisheries. It works with a range of partners, including the Food and Agriculture Organization (FAO), the Organisation for Economic Co-operation and Development (OECD), WorldFish, development organizations, and the private sector.
3. ABNJ aims to improve the sustainable management of fisheries and the conservation of biodiversity around the globe. Partners include the Global Environment Facility, the FAO, the United Nations Environment Programme (UNEP), and the Global Ocean Forum.



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Chapter 7

Developing Climate-Smart Cities

The World Bank will support climate- and disaster-resilient development in selected Sub-Saharan African cities through policy dialogue, technical work, and investment financing (table 7.1). These efforts will be grounded in technical assistance to develop local climate- and disaster-resilience action plans. Bank resources will finance capacity building; resilient infrastructure, buildings, and services; and partnerships and city networking for knowledge sharing. It will also provide technical and financial support to develop climate-friendly urban transport solutions, such as bus rapid transit, which can both help improve urban mobility and reduce greenhouse gas emissions.

TABLE 7.1 Support to Climate-Smart Cities: At-a-Glance Summary

Activity	Expected outcomes	
• Provide $50 million in technical assistance for 30 cities • Invest $2 billion to support climate- and disaster- resilient development in 30 cities	Fast track (by 2023) • Capacity building and planning for climate resilience and low-carbon development completed in 20 cities • Investment in resilience-building activities ongoing in 4 cities and initiated in 5 others	Longer term (by 2026) • Capacity building and planning for climate resilience and low-carbon development completed in 10 cities • Investment in resilience-building activities ongoing in 11 cities
Main partners	**Resource mobilization**	
• International partners: AFD, AfDB, C40, Cities Alliance, Global Facility for Disaster Reduction and Recovery (GFDRR), GEF, GIZ, International Council for Local Environmental Initiatives (ICLEI), Resilient Cities initiative, Rockefeller Foundation • Partners within Sub-Saharan Africa: African Water Association (AfWA), African Union Commission (AUC), regional economic communities (RECs), United Cities and Local Government of Africa (UCLGA)	Fast track (by 2020) $1,025 million	Longer term (additional funds by 2024) $1,025 million

Sectoral Background and Development Challenges

Africa's urban transformation from a largely rural population to a predominantly urban one by 2030 presents massive challenges and huge opportunities. If managed well, cities will continue to be engines of growth, stimulating opportunities in a safe and inclusive way.

Successful growth will require putting climate and disaster risk mitigation and adaptation agenda at the heart of the development debate. Integrating lower-carbon technologies upstream in the planning process, particularly for long-lived infrastructure, provides opportunities to reap economic, health, air quality, and climate benefits while supporting more sustainable development patterns.

Not taking timely action will lead to increased climatic and disaster impacts. A majority of the World's 325 million extremely poor people are projected to be living in Sub-Saharan Africa by 2030 (ODI 2013). Among the 11 countries at greatest risk of disaster-induced poverty by 2030, 8 (the Democratic Republic of the Congo, Ethiopia, Kenya, Madagascar, Nigeria, South Sudan, Sudan, and Uganda) are in Sub-Saharan Africa.

The urban poor are particularly vulnerable to disaster impacts, because they often live in highly exposed or at-risk areas (wetlands, floodplains, landfills, garbage dumps, rocky areas). Because Africa is the fastest-urbanizing continent in the world, with an average urban growth rate of 3.4 percent, the consequences of climate change on cities—especially the poor people who live in them—will be enormous.

Initiatives to Address the Challenges and Enhance Resilience

Three major support areas are proposed:

- strengthening planning and capacity building in high-risk cities, using the City Strength Diagnostic, a qualitative, rapid diagnostic process that uses a combination of guided interviews, exercises, and review of existing studies to determine sectoral and cross-cutting recommendations, and other risk assessment, planning, and financing tools
- investing in resilient infrastructure (upgrading transport infrastructure and critical buildings, encouraging climate-resilient land use, improving solid waste management, and adopting integrated watershed management)
- forging partnerships and city networks for knowledge sharing (30 cities will be selected for support, with phasing as indicated in table 7.2).

The selection of cities will be made on the basis of size and population growth, disaster and climate risk, and demand (table 7.3):

- *Population size and growth*: The focus will be on megacities (cities with more than 10 million people), large cities (cities with 1–5 million people), and medium-size cities (cities with 500,000–1 million people) that are growing at more than 3 percent rate a year.

TABLE 7.2 Number of Cities to be Supported by Proposed Program for Creating Climate-Smart Cities

Timing	Technical assistance	Investment in resilience
Existing programs	5	4
Fast track (outcomes by 2023)	15	5
Longer term (outcomes achieved by 2026)	10	11
Beyond 2026	0	10
Total	30	30

Note: Table shows estimated number of cities to be supported. Actual number will depend on funding available, risk, and demand.

TABLE 7.3 Typology of African Cities

Category	Number in 2010	Projected number in 2025
Megacities (>10 million people) and very large cities (5–10 million people)	2	9
Large cities (1–5 million people)	40	71
Medium-size cities (500,000–1 million people)	44	71

- *Disaster and climate risk*: Cities will be selected on the basis of the severity of the hazard exposure and climatic impact.
- *Demand from the city*: Willingness and support from the city is crucial for sustained and effective engagement. World Bank presence in the country will also be factored in.

Six initiatives to support resilience planning are already under way:

- Urban resilience planning is being conducted and the City Strength Diagnostic used in Addis Ababa and selected secondary cities in Ethiopia.
- Urban poverty and resilience studies are being conducted in Antananarivo, Madagascar and Maputo, Mozambique.
- Flood resilience planning is being done in greater Accra.
- Climate change and disaster risk management multisectoral investment plans are being developed as a part of IDA's policy commitment to provide an opportunity to support urban resilience planning in cities in Burkina Faso, Cameroon, Ghana, Malawi, Mali, and Senegal.
- The GEF sustainable cities program is in effect in Senegal.
- The creditworthiness academy (described below) is engaged in more than 90 municipalities in Kenya, Tanzania, and Uganda.

Four investment projects are ongoing, and one is being planned:

- The $90 million Senegal Storm Water and Climate Change Adaptation project, focusing on flood prevention and preparedness, is underway in Dakar.
- The $75 million Dar es Salaam Metropolitan Development Project, focused on strengthening institutional and urban management systems, is ongoing in Tanzania.
- The $200 million Ibadan Urban Flood Mitigation Project, focused on flood risk mitigation, is ongoing in Nigeria.
- The $85 million Cities and Climate Change project, focused on flood risk mitigation and preparedness, is ongoing in several cities of Mozambique.
- The $50 million Resilient Cities project is being planned in Sierra Leone to support post-Ebola resilience building.

New initiatives include technical assistance of $50 million for 30 cities as well as $2 billion of investments in 20 cities over the fast-track and longer-term phases of the business plan. Funding for additional investments will be made available to 10 cities after 2026.

Technical assistance will help selected cities conduct baseline analyses of development challenges, including municipal financing, intergovernmental fiscal transfers, and scenario analyses that will help identify the most sustainable cost-effective technology and policy interventions in each city. These data-driven studies will support the development of climate- and disaster-resilience action plans and lead to the preparation of investment proposals capable of delivering climate- and disaster-resilient development. A portion of the technical assistance will focus on capacity building, helping cities build both the human resource pool and the institutional environment

they need to craft and implement climate and disaster plans. Key areas of planning that will be supported include the following:

- building vulnerability awareness, by improving the understanding of disaster and climate risk by measuring financial risk and fiscal implications and assessing physical risk, governance, and systems
- strengthening emergency management and response planning, by improving channels, facilities, equipment, and protocols to ensure smooth deployment under high-risk circumstances and creating a web-based open data-sharing platform to capture postdisaster decisions, interactions, and changes over time
- identifying resilience-building investments, including investments that improve fiscal health and land use, services, and infrastructure planning. Potential risk-reduction measures include enforcement of resilient public infrastructure, permitting, and construction; risk-informed infrastructure investments; and risk transfer and management strategies, such as climate and disaster reserve funds, disaster- and climate-linked social protection facilities, public asset catastrophe risk pools, and private property catastrophe risk pools.

Technical assistance will build on the following tools, which are already being used:

- *City Strength Diagnostic*: This tool brings together multiple line ministries, departments, and agencies with academic institutions to identify opportunities to increase the social, financial, and physical resilience to disaster and climate risk through hard (infrastructure) and soft (policy) measures and integrate systems-oriented solutions into national and local development planning.
- *City Creditworthiness Initiative*: This tool, which helps cities access financing, has become an integral part of the World Bank's sustainable urban development strategy. It provides local authorities with comprehensive, hands-on, long-term support that helps them (a) increase their creditworthiness by strengthening their financial performance; (b) develop an enabling legal, regulatory, institutional, and policy framework for responsible subnational borrowing through reforms at the national level; (c) improve the "demand" side of financing by developing sound, climate-smart projects that foster green growth; and (d) improve the "supply" side of financing by engaging with private sector investors. The initiative comprises two primary components, credit worthiness academies and creditworthiness implementation programs. City creditworthiness academies are hands-on learning programs that teach city leaders the fundamentals of creditworthiness and municipal finance. They serve as the launching point for city creditworthiness implementation programs.
- *Low-carbon planning to mitigate carbon emissions and achieve compact urban form*: Climate Actions for Urban Sustainability (CURB) is a new

scenario planning tool supporting low-carbon planning in cities. Developed jointly by the World Bank, C40, AECOM, and Bloomberg Philanthropies, it supports the development of more compact and energy-efficient development (reduced sprawl), which could reduce greenhouse gas emissions by 39 percent.

- *City climate planner certification*: This tool (under design by the Bank, in collaboration with other international institutions) will seek to build local capacity through training programs. Certification will focus on local emissions inventories, the foundation of low-carbon action plans.

In parallel, the Bank will provide technical and financial support to develop climate-friendly urban transport solutions, such as bus rapid transit (BRT), which can both help improve urban mobility and reduce greenhouse gas emissions (box 7.1).

BOX 7.1 Developing Bus Rapid Transport Systems in Lagos

With an estimated 25 million people, Lagos, Nigeria is one of the largest and fastest-growing megacities in the world. Before development of the bus rapid transport (BRT) solution, city public transport was limited to 75,000 unreliable, expensive, and polluting mini-buses (*danfo*) and shared taxis (*kabu-kabu*), which together made 16 million trips daily. The poor half of the population spent a fifth of its disposable income on transport. A typical journey from the main residential areas to Lagos Island took two hours.

The World Bank–financed Lagos Urban Transport Project identified bus services as a key component of a plan to overhaul the transport system. BRT is a roadway-based rapid transit system that looks and behaves like a subway but offers high-capacity rapid transit services on dedicated lanes in city streets rather than underground. In March 2008, this 22-kilometer project connecting Lagos mainland with the island became the first dedicated bus route in Sub-Saharan Africa. The BRT runs 16-hours a day, using 220 buses to move more than 200,000 passengers daily. In its first two years of operation, it moved more than 120 million passengers. The World Bank provided technical advice and a $100 million IDA credit.

As a result of the project, journey time was reduced by an average of 25 minutes from one end of the route to the other, and transit fares fell by more than half. The BRT carries 25 percent of all passenger traffic along the corridor while accounting for just 4 percent of vehicles. It generated 2,000 jobs for drivers, bus conductors, inspectors, mechanics, and ticket sellers and another 10,000 indirect jobs to operate formal and informal park-and-ride facilities and mini-fast-food services.

In addition to these social benefits, the BRT project has reduced CO_2 emissions by 13 percent and greenhouse gas emissions by 20 percent. Wait time has been cut from 45 to 10 minutes, reducing the exposure of passengers to pollution, thereby reducing the incidence and severity of respiratory diseases.

Expected Outcomes

Programs are expected to yield benefits related to efficient urban form, strengthen the tax base and increase access to municipal bonds, and improve cities' capacity for integrated risk management, including management of natural and human hazards. Specific benefits include (a) enhanced adaptation and mitigation planning and implementation capacity of local city governments and key stakeholders; (b) more resilient buildings, infrastructure, and services, particularly optimized transport services; (c) better preparedness for hazards, such as floods, water scarcity, and sea-level rise, including better emergency response capacity; and (d) heightened awareness and greater public involvement in resilient planning and implementation.

Climate-Related Benefits

The proposed activities will benefit 20–25 of the Sub-Saharan African cities at greatest risk from climate change, home to some 62 million people. Major climate benefits include the following:

- *Adaptation to climate change*: Planning for and adapting to climate and disaster impacts as well as disaster preparedness, long-term cost savings from the deployment of early warning and response systems to better respond to emergencies, more robust technology and infrastructure that is better capable of withstanding climate-related and disaster risks, and improved public health from the strengthening of local health systems to ensure that they are better able to address climate-related risks
- *Mitigation of climate change*: Low-carbon development; long-term cost savings from the deployment of more energy-efficient technologies; reduced transport-related energy use; improved air quality, from the use of cleaner fuels and more efficient technology; improved urban environment, from the use of more efficient solid and liquid waste management systems; and greater social inclusion, through the creation of more comprehensive, accessible and cleaner public transportation networks.

Financing Plan

Table 7.4 describes the financing plan.

TABLE 7.4 Support to Climate-Smart Cities: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	20	Estimated based on 5 percent of IDA funds
IDA	550	Estimated based on potential operations in FY17, including potential projects with focus on urban resilience in Ethiopian cities; Antananarivo, Madagascar; Accra, Ghana; and cities in Liberia and Sierra Leone
Private sector	0	
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance	0	
To be determined	455	Funding required for fast track
Total fast track (resources raised by 2020)	1,025	
Longer term (additional resources raised by 2024)	1,025	

Key Partners

Key international partners include the AFD, the AfDB, C40, the Cities Alliance, the Global Facility for Disaster Reduction and Recovery (GFDRR), the GEF, GIZ, the International Council for Local Environmental Initiatives (ICLEI), the Resilient cities Initiative, the Rockefeller Foundation, and UN Habitat.

Partners within Sub-Saharan Africa include the African Water Association (AfWA), African Union Commission (AUC), regional economic communities (RECs), United Cities and Local Government of Africa (UCLGA).



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Chapter 8

Strengthening the Climate Resilience of Coastal Zones in West Africa

The Bank will help increase the resilience of coastal assets in West Africa to climate and other natural hazards through a mix of technical assistance and investments that will seek to preserve and rehabilitate the natural coastal resources essential for livelihoods; spur economic development and increase social welfare; and support the sustainable development of key growth sectors, such as fisheries, tourism, and industry. The regional dimension of coastal degradation calls for both national and regional dialogue, at the policy and the technical level. Table 8.1 summarizes the proposed interventions.

TABLE 8.1 Support to Addressing Coastal Erosion in West Africa: At-a-Glance Summary

Activity	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
• Provide technical assistance in the following areas: • national and regional policy dialogue, stakeholder engagement, assessment of cost of coastal degradation, data and knowledge generation for adaptive coastal management, and decision-making tools • preparation of climate-resilient coastal development and investment plans • identification and provision of sustainable livelihoods alternatives to the continued degradation of coastal areas, including control of sand mining • Invest in hard and green infrastructure: • Hard infrastructure: Where required, construct transportation networks, piers, artificial reefs, groins, and other erosion and flooding management infrastructure; transportation networks • Green infrastructure: Preserve and expand areas with green or natural infrastructure (mangroves, sand dunes, vegetation, coastal aggregates, coastal forest, lagoons and coastal swamps, water plants, and so forth) that provide services that manage coastal erosion and flooding	• Measures in place to reduce rate of erosion in 30 percent of identified coastal erosion hotspots[a] and flood risks for 30 percent of the population in priority flooding areas[b] • Environmentally sustainable livelihood alternatives implemented to benefit 50 deprived and/or vulnerable coastal communities • Decision-Support Coastal Information Monitoring System in place in all participating countries[c]	• Measures in place to reduce rate of erosion in at least 70 percent of coastal erosion hotspots and flood risks for at least 70 percent of the population in priority flooding areas • Integrated and resilient coastal management governance schemes in place in participating countries

Main partners	Resource mobilization	
	Fast track (by 2020)	Longer term (additional funds by 2024)
Dialogue is underway with a number of partners, including WAEMU, NDF, GIZ, the French government, USAID, and IUCN	$450 million, including $150 million for technical assistance	$550 million, including $150 million for technical assistance

a. Hotspots are defined as areas with high erosion rates that threaten priority economic or livelihood assets.
b. Investments may include construction of storm water canals and drainage systems; management of all types of waste-causing degradation of natural and economic assets for livelihoods, public health, and tourism; and installation of disaster-risk management systems.
c. Technical assistance may include making data available for decision making, clarifying institutional roles required in translating biophysical trends into budgets and actions, and preparing national or subnational Integrated Coastal Zone Management Plans.

Sectoral Background and Development Challenges

The West African coastal area is one of the most rapidly urbanizing areas in the world. It is home to major industries, including tourism, agro-industry, and off-shore petroleum exploration and production, as well as city and seaside residences. About 56 percent of the GDP of West African coastal states originates in coastal areas.[1] About 31 percent of West Africa's population and 51 percent of its urban population live along the coastline.

Two major climate-related issues threaten the sustainability of West Africa's coastal areas: erosion and flooding. Countries face severe shoreline losses, as

a result of coastal erosion, which is expected to worsen with sea-level rise. People's livelihoods and health are at risk as a result of floods caused by severe weather events and poor infrastructure and planning.

Human activity and climate change cause shoreline recession. The artificial stabilization of the shoreline; the deterioration of natural formations, such as mangroves; the construction of major infrastructure that interrupts sediment flow; the extraction of materials; and the multiplication of dams deprive these fragile coastal areas of important sediment deposits. Lack of coordination of anti-erosion solutions at the local, national, and international levels compounds the problem. The poorest and most marginalized populations are most vulnerable to erosion, which is likely to intensify in the future.

A combination of factors causes coastal flooding. Rapid and often unplanned urbanization and settlement on floodplains and other risk-prone areas cause significant conversion of the natural landscape that once protected against erosion and flooding. Lack of waste collection services increases vulnerability to flooding, as waste, in particular plastic, ends up clogging urban drainage canals and coastal lagoons. Excessive solid waste becomes a health hazard in urban neighborhoods and unplanned settlements and slums.

Climate change scenarios for West Africa suggest an increase in the frequency and intensity of tidal waves and storm surge, which will exacerbate coastal erosion. They suggest that a sea-level rise of one meter would cause the loss of 18,000 square kilometers of land, exacerbating damage to infrastructure and displacing populations.

Coastal zone pressures also affect the ability of regional fisheries to maintain healthy fish stocks and remain relatively unattended. Coastal habitats serving as refuges and nurseries are being degraded, as a result of mangrove harvesting, petroleum refining, land-based marine pollution, and other factors.

Roads are particularly vulnerable to erosion and flooding. Without action, the costs to road users of climate-related incidents is estimated to increase by up to 30 percent by 2050. In Ghana the estimated cost of adapting the road network is up to $1.1 billion (in 2009 net present value terms). Increased maintenance costs greatly exceed the costs of changing road designs (World Bank 2010c). Upstream diagnostics to identify critical vulnerabilities in the road network can ensure that technical solutions are built into network design.

With the support of the World Bank, several countries are developing methodologies to assess the vulnerability of road systems (box 8.1). The Bank will explore whether such instruments could be used in the Sub-Saharan African countries that are most exposed to coastal erosion and flooding.

Initiatives to Address the Challenges and Enhance Resilience

In 2007 the West African Economic and Monetary Union (WAEMU) launched and implemented a regional program to fight coastal erosion. The program sponsored a regional shoreline monitoring study and the drawing

BOX 8.1 Increasing the Resilience of the Road System in Morocco

Morocco is facing extreme climate events that appear to have increased in frequency and intensity over the past decade. Since 2009 the cost to repair roads affected by extreme climate events has been about $400 million, $300 million of which was taken from the road maintenance budget. Intense rainfall led to large-scale mudslides, as well as flooding and road erosion. The Rabat-Casablanca motorway was severally eroded, and many poor rural communities were temporarily isolated from access to commercial and urban centers.

In 2010 the Moroccan authorities requested support from the World Bank to study the adaptation of the transport sector to climate change. Four road sections were selected for study. A risk assessment was performed for each road to identify critical points and propose engineering solutions to increase the resilience of the roads to extreme climate events. Solutions focused on improving the hydrological and geotechnical conditions of the roads and identifying technical solutions for more resilient pavement. A simplified guide was prepared for the Road Directorate, including technical norms for building, rehabilitating, and maintaining road infrastructure.

up of a management scheme for West Africa's coastal areas. This work was prepared by the International Union for Conservation of Nature (IUCN). The 2011 Dakar conference of West African environment ministers from 11 countries adopted the IUCN management scheme for West Africa,[2] which provides a thorough diagnosis of coastal areas and a detailed review of risks.[3]

As part of the IDA17 Replenishment, the Bank committed to scale up support to IDA countries to develop and implement country-led multisectoral plans and investments for managing climate and disaster risk in development in at least 25 additional countries. For 5 of the 15 countries selected in Africa (Benin, Côte d'Ivoire, Mauritania, São Tomé and Principle, and Togo), coastal erosion was identified as a priority area to be addressed by the multisector plans.

In 2014 the Bank started the West Africa Coastal Areas (WACA) Program, in partnership with WAEMU and the Nordic Development Fund (NDF). The program offers technical assistance in response to countries' demand to combat coastal erosion and flooding. It includes three axes of intervention, in support of regional coastal shoreline monitoring and management, national integrated coastal zone management planning, and preparation of specific multisectoral investment plans.

The program will complement other initiatives, such as the West Africa Regional Fisheries Program (WARFP), which is addressing issues such as illegal fishing, overfishing, and sector governance issues. Investment plans include hard infrastructure and green infrastructure. Hard infrastructure includes construction of transportation networks, piers, artificial reefs, groins, and erosion and flooding preventive infrastructure. Green infrastructure involves increasing and preserving areas with green or natural infrastructure (mangroves, sand dunes, vegetation, coastal aggregates, coastal forest, lagoons

and coastal swamps, water plants, and so forth) that prevent coastal erosion and flooding.

Expected Outcomes

Fast-track expected outcomes (to be achieved by 2023) include the following:

- Rates of erosion will be reduced in 30 percent of identified coastal erosion hotspots.
- Flood risks will be reduced for 30 percent of the population in priority flooding areas.
- Decision-Support Coastal information Monitoring Systems will be in place in all participating countries.

Climate-Related Benefits

Through monitoring and actions to preserve mangroves, climate-resilient and low-carbon management of coastal areas in West Africa will ensure the conservation of many species specific to this type of environment. Such management may also reduce the impacts of sedimentation on biodiversity.

Management of liquid and solid waste is necessary to maintain a healthy and productive coastal environment, to benefit biodiversity habitat, ecosystem functions, and reproduction of fishery resources. Removal of solid waste that is clogging drainage systems will prevent severe flooding. Investments in climate-resilient infrastructure is expected to increase the socio-economic resilience of coastal communities and nations.

Financing Plan

Table 8.2 describes the financing plan.

Key Partners

Key partners are defined here as institutions that have indicated interest in exploring participating in the WACA Program. They include the WAEMU, a key convening organization in West Africa. NDF provided the seed funding to initiate critical technical assistance in four countries, based on country demand. The French government has indicated interest in exploring options for collaboration. USAID has an ongoing program in Ghana that is aligned with WACA objectives and has the potential to be scaled up regionally. In addition to the support of countries under the WACA Program, the proposed actions are supported by GIZ, under the Africa Climate Investment Readiness Partnership. It is expected that the IUCN will be interested in participating as well.

TABLE 8.2 Support to Addressing Coastal Erosion in West Africa: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	60	Given the seriousness of the situation in some countries, domestic resources are expected to be mobilized, as co-financing of investments by development organizations.
IDA	150	Interventions will be multisectoral and mainstreamed in other Global Practice operations, such as Urban, Transport, Tourism, Trade, and Competitiveness.
Private sector	0	The private sector is not expected to contribute, at least not during the fast-track phase.
Climate finance (GCF, GEF, CIF, and so forth)	90	GEF financed a regional technical assistance program on the Gulf of Guinea ecosystem (under the International Waters Focal Area), which produced country-specific investment plans. The GEF Secretariat indicated preliminary interest in financing a follow-up investment program. The estimated amount depends on the level of co-financing.
Other development finance (bilaterals, multilaterals)	150	WAEMU led an operation that developed the regional coastal management scheme; it is now mobilizing resources to implement the scheme, including via ministerial dialogue on climate change with ministers of finance, agriculture, and environment. Ongoing discussions with the French government, USIAD, and the West African Development Bank could lead to the mobilization of additional resources.
To be determined		
Total fast track (resources raised by 2020)	450	
Longer term (additional resources raised by 2024)	550	

Notes

1. Coastal areas are defined as the area between 50 meters below mean sea level and 50 meters above the high-tide level or extending landward to a distance 100 kilometers from shore (United Nations Millennium Ecosystem Assessment).
2. Déclaration des ministres en charge de l'environnement et de l'érosion côtière à Dakar, Sénégal, mai 2011.
3. https://www.iucn.org/fr/propos/union/secretariat/bureaux/paco/programmes/programme_marin_et_cotier__maco/projets/thematique__amenagement_integre_du_littoral_/erosion_cotiere_et_schema_damenagement_du_littoral_ouest_africain/.



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Chapter 9

Boosting Social Protection

The Bank will support the expansion and strengthening of social protection system as a way to increase the resilience of vulnerable groups to climate variability and change. Support will focus on a set priority countries in the Sahel and other parts of the sub-continent. Table 9.1 describes the proposed programs.

TABLE 9.1 Support to Social Protection Programs: At-a-Glance Summary

Activity	Expected outcomes	
	Fast track (by 2023)	Longer term (by 2026)
• Support activities that reduce sensitivity to climate-related shocks (soil conservation, watershed management, development of irrigation channels, water conservation, better cropping, enclosures, better food storage facilities, rain water capture) • Create registry systems and targeting of people who are at risk because of climate-related events • Put into place early warning systems • Provide training on climate-friendly livelihood activities and disaster risk management and risk insurance • Implement green public works (soil conservation, watershed management, development of irrigation channels, water conservation, better cropping, enclosures, better food storage facilities, rain water capture) • Provide livelihood support, including by encouraging savings and disaster risk insurance, building household assets, preventing asset erosion as a result of drought through alternative sources of income, supplementing savings and income with grants to support investments in livelihoods, and reducing risk exposure	• Increase in the number of direct project beneficiaries and the share of female beneficiaries across all countries • Increase in the percent of households with asset value above critical threshold • Increase in the percent of households eating at least three meals a day • Increase in the percent of people engaging in diversified, climate-beneficial livelihoods (off-farm and on-farm) • Knowledge products for adaptive social protection and direct support to development of social protection strategies (incorporating climate change adaptation and disaster risk management) that inform and improve government policy/strategy • Provision of just-in-time technical assistance and capacity building for adaptive social protection that improves design and implementation capacity for adaptive social protection programs and systems • Knowledge products and just-in-time technical assistance for adaptive social protection that leads to development of innovative approaches	• Increase in resilience among poor households across the Sahel region, as the number of people covered by adaptive social protection programs rises • Registration of and access to safety net support by all at-risk people • Improvement in delivery of cash transfers and other safety net programs • Improvement in international collaboration on early warnings
Main partners	**Resource mobilization**	
	Fast track (by 2020)	Longer term (additional funds by 2024)
• Ministries of finance and economic planning, social protection, labor, environment, agriculture, water, urban planning • DFID, Canadian Foreign Affairs and Development, ECHO, European Commission, European Union, FAO, Irish Aid, JICA, SIDA, UNDP, UNICEF, UNHCR, USAID, WFP, NGOs	$480 million	$960 million

Sectoral Background and Development Challenges

The impacts of climate change and natural disasters will disproportionately affect the poor. Limited savings and access to finance inhibit poor households' ability to respond to and recover from disasters and to make the investments necessary to adapt to climate change. Poor households may be compelled to employ

harmful coping strategies, such as taking out high-interest loans they cannot repay, selling productive assets for immediate liquidity, and removing children from school so that they can provide additional household income. All of these actions can have a lasting and scarring effect on the affected individuals, households, and society. They threaten to undo years of hard-won development gains.

Vulnerabilities among the poor to the impacts of climate change are especially high in many parts of Africa. Across most of the region, increases in agricultural productivity have been the primary driver of poverty reduction. Forecasted climate change impacts highlight sharp reductions in agricultural yields in the face of erratic precipitation and increases in the number and severity of extreme weather events, including floods and droughts. The poor often live in locations that are more exposed and vulnerable to the impacts of disasters and climate change. When severe flooding hit Malawi in 2014, for example, the worst-affected regions had headcount poverty rates of nearly twice the national average.

Social protection can significantly increase the resilience of poor and vulnerable households by responding to disasters and building resilience at the household level so that households are better equipped for risk and better able to respond to disaster and adapt to climate change. Formal social protection instruments, although growing in coverage across the region, tend to be small, fragmented, and largely donor driven, however (although there are some notable exceptions). At the same time, the more widely used traditional coping mechanisms with which poor households manage shocks—assistance from the family or the community in times of need—are often overwhelmed by covariate climate-related shocks and are not sufficient to meet the challenge of adaptation. Consequently, humanitarian relief is the most prevalent form of assistance for poor populations in many African countries. This relief is unpredictable, does not address underlying vulnerabilities, and often reaches beneficiaries only after a lengthy appeal process, by which time the worst impacts of negative coping have often already been experienced.

In the face of climate change and increased climate-related shocks, it is important to increase the scale and scope of social protection systems across Africa. Social protection systems are being built in a number of countries, including Ethiopia, Kenya, Tanzania, and Rwanda. The World Bank has been a major partner in most of these efforts, providing strategic and design advice, technical assistance, and financing and distilling and brokering knowledge on these programs. Increasingly, these social protection programs are being explicitly linked to the challenge of climate change and designed with flexibility, scalability, and adaptive capacity.

Initiatives to Address the Challenges and Enhance Resilience

Adaptive social protection (ASP) is a new integrated approach that can help countries address the challenges of adaptation and climate/disaster risk management. ASP programs are flexible social protection programs that can

protect poor households from climate and other shocks before they occur (through predictable transfers, the building of community assets, and other programs that help vulnerable people cope) and scale up to respond to extreme events when they hit. ASP programs are implemented in a way that avoids having an adverse impact on the environment or creating perverse incentives and thus resulting in maladaptation.

An ASP system may include the following features:

- safety nets programs that can be easily scaled up to respond to climate-related shocks (the main instruments for responding to shocks include conditional and unconditional cash transfers for the poorest people and for people affected by shocks and public work programs, which can support the development of climate-resilient infrastructure in vulnerable areas)
- complementary activities, such as training on basic skills and livelihood diversification, sanitary and health practices, and nutrition awareness programs, to strengthen the human capital and resilience of the poor.
- linkages to early warning and climate information systems, which can be used for targeting and planning purposes and for helping design effective emergency response and adaptation programs.
- other formal and informal insurance or risk-financing mechanisms that may complement and support social protections systems to build long-term resilience.
- targeting mechanisms that help identify the people most vulnerable to natural hazards and climate change–related risks, so that information can target the people most at risk of being hit by these types of shocks and quickly scale up a program once disaster hits.
- other building blocks that form part of the development of comprehensive adaptive social protection systems, including management information systems, payment systems, and monitoring and evaluation.

Expected Outcomes

The expected outcome of this component of the business plan is an increase in the number of people covered by ASP programs across Sub-Saharan Africa. Intermediate outcomes include the following:

- *Government policy/strategy informed*: Government policy/strategy will be informed through the delivery of knowledge products for ASP and direct support to the development of social protection strategies (incorporating climate change adaptation and disaster risk management).
- *Client capacity increased*: The design and implementation capacity of ASP programs and systems will be strengthened through provision of just-in-time technical assistance and capacity building.
- *Knowledge deepened*: The exchange and dissemination of best-practice examples of ASP initiatives with clients will be facilitated through a

regional platform for knowledge exchange and the dissemination of success stories and lessons learned.

- *Innovative approaches and solutions generated:* New innovative approaches will be developed through support to knowledge creation and just-in-time technical assistance for ASP.

Climate-Related Benefits

ASP initiatives have the potential to directly increase resilience and promote adaptation at the household level through three channels (box 9.1 exemplifies the case of Ethiopia):

- the scale-up of operations after a shock hits, in order to deliver assistance to affected poor households in a timely and predictable manner
- public works initiatives that can help address drivers of vulnerability and promote adaptation to climate change through projects that target water insecurity, soil erosion, and carbon capture
- a permanent program for the poorest that helps build resilience and thus reduces the need for emergency response.

BOX 9.1 Responding to Crises and Building Resilience in Ethiopia

Ethiopia's ASP system channels funding from national and global partners into a set of programs that allows it to scale up in response to severe droughts, such as the one that hit the Horn of Africa in 2011. A combination of initiatives, including temporary employment and cash assistance, prevented many poor, food-insecure families from starving. Ethiopia was the only affected country that did not see an increase in its poverty rate as a result of the drought.

In addition to responding to crises, Ethiopia's Productive Safety Net Program (PSNP) delivers public works that have allowed poor communities to directly engage in the process of adapting to climate change. More than 60 percent of the program's public works subprojects target soil and water conservation, strengthening both livelihoods and resilience to the impacts of variable rainfall. PSNP projects have helped construct infrastructure that increases water retention, with positive spillover effects for livelihoods. PSNP participants have constructed 600,000 kilometers of soil and stone bunds, which enhance water retention and reduce soil and water run-off. Small-scale irrigation from water sources developed by the PSNP has helped 4–12 percent of households expand livestock holdings, increasing incomes by 4–25 percent. PSNP soil erosion and water conservation projects have led to significant and visible increases in wood and herbaceous vegetation cover and a broader diversity of plant species, regreening previously desolate areas.

TABLE 9.2 Support to Social Protection Programs: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	
IDA	365	Financing subject to country prioritization from IDA17 or IDA18 allocations
Climate finance (GCF, GEF, CIF, and so forth)	45	Financing from GCF has been applied for
Other development finance (bilaterals, multilaterals)	70	Support from the Sahel Adaptive Social Protection Program
Private sector	NA	
To be determined	NA	
Total fast track (resources raised by 2020)	**480**	
Longer term (additional resources raised by 2024)	**960**	

Financing Plan

Table 9.2 describes the financing plan.

Key Partners

Key partners include the ministries of economic planning and development, finance, social protection, labor, environment, and agriculture; directorates of disaster risk management; the Canada Department of Foreign Affairs, Trade and Development, DANIDA, DFID, ECHO, the European Union, the European Commission, FAO, JICA, Irish Aid, the Netherlands, SIDA, UNCHR, UNDP, UNICEF, USAID, the WFP; and NGOs.



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Chapter 10

Addressing Drivers of Migration

Climate change will have profound effects on migration flows in Africa, through its influence on a range of the phenomenon's economic, social, and political drivers. The World Bank will support a set of strategic activities focused on understanding and addressing the multiple drivers of migration and their complex, interactive effects (table 10.1).

TABLE 10.1 Support to Addressing Drivers of Migration: At-a-Glance Summary

Activity	Expected outcomes	
• Develop strategic operations or components in ongoing operations in the Lake Chad Basin and the Horn of Africa • Build the evidence base and establishing a knowledge partnership • Pilot and promote innovation on mixed migration (complex population movements, including refugees, asylum seekers, economic migrants, and people displaced by natural disasters or climate change)	Fast track (by 2023) • Government policies and strategies related to climate change adaptation and migration are informed through creation of key knowledge products, operational innovations, and knowledge exchanges • Knowledge generation, exchange, and application is facilitated among global and local partners related to critical topics	Longer term (by 2026) • Design and implementation capacity for addressing mixed migration and strengthening resilience at the local level is strengthened through the provision of just-in-time technical assistance and capacity building • New innovative approaches are developed through support to knowledge creation and just-in-time technical assistance for addressing the drivers and impacts of migration
Main partners	**Resource mobilization**	
• Ministries of finance and social welfare • Lake Chad Basin Commission • AFD, CAPP2, Centre de Recherches Internationales (Sciences Po), CIWA, Feinstein International Center, GFDRR, GPFD, the International Commission on Irrigation and Drainage (ICID), IOM, Institute of Research for Development, KNOMAD, Royal Geographical Society, Stockholm International Water Institute, UNEP, UNESCO, UNHCR, United Kingdom and partners associated with the UK Government Office for Science Project on Migration and Global Environmental Change, UNOCHA	Fast track (by 2020) $616 million	Longer term (additional funds by 2024) $970 million

Sectoral Background and Development Challenges

Environmental change has always been a driver of human mobility. However, there is growing evidence that climate change, climate-induced events, and environmental factors are likely to play an increasingly important role in influencing migration, both within developing regions and from developing to developed regions. Climate change is expected to affect all forms of migration in Africa–internal and cross-border, short and long distance, temporary and permanent, voluntary and forced—with negative impacts on millions of poor people in Africa. In affected areas, it could undermine and reverse much of the development progress that has been achieved in the last two decades. The International Panel on Climate Change (IPCC) states that African societies must prepare for inevitable changes in the climate during the next few decades and that climate change will amplify existing stresses on water availability and agriculture and affect public health.

BOX 10.1 Drought, Migration, and the Seeds of Conflict

A mix of droughts, governance failure, and conflict led to massive displacements in Somalia in 2011. A long-term trend in increasing aridity and poor water management has significantly reduced Lake Chad, reducing its area from 25,000 square kilometers in the early 1970s to approximately 2,500 square kilometers today. The shrinking of the lake has impaired fishery livelihoods in the area, forcing communities to migrate to other areas, where they compete with hosting communities for already scarce resources. Climate change has increased the intensity and frequency of seasonal flooding, severely affecting large areas in southern Nigeria and northern Cameroon, leading to the short- and long-term displacement of thousands of people and the resettlement of communities.

Livelihoods-driven migration leads to disputes and conflicts between displaced population and host communities, fueling existing localized conflicts and creating conditions for disputes across borders. These disputes have spawned instability that has allowed movements like Boko Haram to take root.

Numerous studies, including the *World Development Report 2011: Conflict, Security, and Development*, have also suggested that climate change and environmental degradation can contribute to increased social tension. Environmental stresses are "threat multipliers"—factors that interact with other risk drivers and sources of vulnerability. A number of studies conclude that environmentally induced scarcity of resources, in combination with socioeconomic, political, institutional, and societal vulnerabilities, can exacerbate fragility in states and societies, creating conditions conducive for conflict and large-scale migration.

Several regional and national assessments on forced displacement and mixed migration in Africa (box 10.1) document how extreme events such as drought and floods have profound negative impacts on livelihood opportunities and productivity, which in turn feed into drivers for instability, conflict, and forced and economic displacement, deepening conditions of poverty and vulnerability.

Environmental change will affect the nature of migration and migration flows, both now and in the future, through its influence on a range of economic, social, and political drivers that themselves affect migration. The need to understand and address the multiple drivers of migration and their complex, interactive effects is urgent.

Initiatives to Address the Challenges and Enhance Resilience

Addressing these challenges calls for diagnostics and targeted knowledge exchange to inform the design of responsive programming and dialogue with country clients and leverage new and additional sources of finance to

support resilience building at the local, national, and regional levels through appropriate policy, institutional, and investment responses. The Global Practice team working on Social, Urban Rural and Resilience (GSURR) in the Africa Region will work with key internal and external partners to deliver innovative joint operations to strengthen social and economic resilience in rural and urban spaces to address the drivers and impacts of migration and provide durable solutions. In the fast-track phase, the team will focus on two regions with urgent needs—the Lake Chad Basin and the Horn of Africa—to enhance developing and ongoing operations, undertake strategic analytical pieces to build an evidence base, inform further project design, and pilot innovative approaches that can be scaled up in the longer term. Strategies and operations developed will be scaled out to other subregions, such as the Great Lakes Region, as demand grows and resources are mobilized.

The AFR GSURR team will pilot innovations to enhance ongoing operations and provide proof of concept of approaches to be scaled up in the longer term. Six pilot projects are planned:

1. *Building resilient communities in the Lake Chad Basin*. In partnership with AFD, and based on ongoing analytical work, the Bank will pilot a project covering communities in Chad, Cameroon, Nigeria, and Niger that will aim to strengthen the environmental and social resilience of communities around the lake to mitigate the drivers and impacts of migration. The project will pay particular attention to boosting the productivity of these communities in a socially inclusive manner. Strategies of spatial integration and development will be tested to enhance the economic resilience of the region through sustainable practices.
2. *Understanding the effect of behavioral change on water use in urban areas*. This pilot will use innovative behavioral approaches to improve the use and management of water resources in urban areas that depend on the Lake Chad tributaries in order to mitigate adverse impacts on the hydrology of the lake.
3. *Building a community-driven early warning system in Ibadan*. This pilot will support a community-led subcomponent within the Ibadan Urban Flood Management Project to engage at-risk communities in mapping and understanding flood risk and developing an early warning system for flood events.
4. *Promoting community-driven environmental management in Mbale*. This activity will support community-led land management and agricultural practices to mitigate landslides along the slopes of Mt. Elgon, in Mbale, in eastern Uganda. During discussion of the scope of the regional displacement operation, the Ministry of Finance was keen on the Bank looking at displacement as a result of landslides in the area, where there have been reports of deaths, property destruction, and relocations over the past three years.
5. *Promoting participatory scenario development for policy making*. Effective policy interventions to support adaptation must incorporate

diversity in their design—diversity of socioeconomic and climatic contexts, variations in institutional arrangements, and differences in the locally available resources that structure current adaptation practices. This activity will build on existing methodologies to inform climate adaptation policies.

6. *Building community-driven resilience and adaptive social protection*. The Ethiopia Productive Safety Net Program (PSNP) is widely seen as demonstrating the potential of a social protection program to build individual, household, and community-level resilience in the face of climate change-related stresses (see box 9.1). The Niger Pilot Program for Climate Resilience (PPCR) also models elements of an adaptive social protection focus. The Zambia PPCR embodies a demand-driven approach to supporting community-based adaptation. Expansion of the PPCR to a second round of countries (Ethiopia, The Gambia, Madagascar, Malawi, Rwanda, and Uganda) provides opportunities to scale up adaptive social protection and community-based adaptation in ways that complement durable solutions to conflict- and climate-related mixed migration and forced displacement. The AFR GSURR team will work in partnership with the Social Protection and Labor Global Practice and the community-driven development community to ensure that the social dimensions of resilience are addressed and communities are empowered to better manage risk.

It is expected that the pilots will be scaled up into additional operations.

Two new operations are under development:

- The Regional IDA Operations on Development Response to Displacement and Borderlands and Lagging Regions in the Horn of Africa ($450 million planning and design phase) aims to improve access to social services, expand economic opportunities, and enhance environmental management for host and forcibly displaced households in targeted areas of Djibouti, Ethiopia and Uganda. It includes three investment components: social and economic infrastructure and services, sustainable environmental management, and a livelihoods program. The operation seeks to stabilize border areas in selected Horn of Africa countries through social and institutional development and the promotion of economic activities.
- The Resilience and Cohesion of Displaced Persons & Border Communities in the Great Lakes Region ($100 million) project aims to improve livelihoods and socioeconomic infrastructure for refugees, internally displaced persons, returnees, and host communities in the Democratic Republic of Congo, Tanzania, and Zambia. It will also strengthen the systems of participating government agencies to deliver development programs to these populations.

There is a critical need to address data gaps and develop a better understanding of the push and pull factors behind mixed migration, identify its

impacts, and craft durable solutions to inform investments. Some areas of focus include the following:

1. *Linkages between hydrological changes, climate change, resource degradation, livelihoods, and migration in the Lake Chad Basin*. This study will analyze water resources and ecosystem services in the Lake Chad Basin; the livelihoods depending on those resources; and the relationships between changes in resource availability, degradation of existing resources, livelihoods, and forced displacement and conflicts in the region. It will examine migration patterns from other rural areas into communities surrounding the lake and migration to urban areas in the vicinity of the lake. The analysis will identify specific areas of intervention that would enhance the resilience of communities around the lake and mitigate drivers and impacts of migration.
2. *Impact of urbanization and water management of the Lake Chad tributaries*. This assessment will identify the linkages between rapid urbanization in western and central Africa and its implications for water resources management of the Lake Chad tributaries. It will examine the pressures that rural-urban migration places on food production and water access and identify critical entry points in the urbanization process to mitigate adverse impacts and ensure that the lake continues to be a sustainable source of livelihoods.
3. *Resilient communities in the Lake Chad Basin*. This study will focus on understanding the autonomous adaptation and risk management strategies that poor and marginalized groups have developed over centuries in response to climate variability and environmental change. It will also examine ways to address the increasing tensions between pastoralists and agriculturalists as a result of growing tensions related to water access. It will identify potential interventions to enhance community resilience to conflict related to water management and agricultural activities in the basin.
4. *Knowledge partnership on mixed migration innovation*. This initiative will exploit the Bank Group's convening power to leverage and build on cutting-edge work on mixed migration. Extensive work under the UK Foresight Project on Migration and Global Environmental Change is being followed up by a new project of the Royal Geographical Society on "trapped populations" in countries including Somaliland and Zimbabwe. The Centre de Recherches Internationales (CERI) of Sciences Po Paris is leading an extensive knowledge network that already works closely with the Nansen Initiative. The AFR GSURR team is linked in internationally with GSDRC's Applied Knowledge Services and internally in with the Bank Group–facilitated Global Knowledge Partnership on Migration and Development (KNOMAD), a global hub of knowledge and policy expertise on migration and development issues. KNOMAD brings together a wide range of relevant institutions, academics, and practitioners. Other internal partners within the Bank include the Social Protection and Labor (SPL) Global Practice in Africa, the Global Program on Forced Displacement, GFDRR, and urban development specialists within GSURR.

Expected Outcomes

The expected outcome of these activities is to gain a better understanding of the drivers and impacts of mixed migration, in order to facilitate the development of government policies and investments support planned, facilitated migration as an effective adaptation strategy. Intermediate outcomes include the following:

1. *Evidence base deepened and applied*: Activities will facilitate the generation, exchange, and application of knowledge among global and local partners related to critical topics, including the understanding of autonomous risk management strategies of poor communities, the relationships and linkages between different push and pull factors driving migration, and good-practice examples of how to address adverse impacts while promoting planned, facilitated migration as an effective adaptation strategy.
2. *Government policy/strategy informed*: The creation of key knowledge products, operational innovations, and knowledge exchanges will inform government policies and strategies related to climate change adaptation and migration.
3. *Client capacity increased*: Provision of just-in-time technical assistance and capacity building will strengthen the design and implementation capacity for addressing mixed migration and strengthening resilience at the local level.
4. *Innovative approaches and solutions generated*: Support to knowledge creation and just-in-time technical assistance for addressing the drivers and impacts of migration will help develop new innovative approaches to migration.

Climate-Related Benefits

The proposed activities have the potential to directly increase social and economic resilience and promote adaptation at the household and community levels. They will do so by understanding and supporting autonomous adaptation and risk management strategies of affected groups, empowering affected groups to drive a risk management agenda in support of their development goals, and linking poor communities to necessary information and resources, such as social protection systems and alternative livelihood opportunities. Community-level work to increase resilience and diversify livelihood sources could also be designed to target water insecurity and soil erosion and promote increased carbon capture.

Financing Plan

Table 10.2 describes the financing plan.

TABLE 10.2 Support to Addressing Drivers of Migration: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	Domestic resources might be mobilized in later stages of implementation, as co-financing to other development organizations
IDA	600	Subject to country prioritization from IDA17 or IDA18 allocations
Private sector	0	The private sector is not expected to contribute, at least not during the fast-track phrase
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance (bilaterals, multilaterals)	16	AFD, CIWA, GFDRR Inclusive Community Resilience program, KNOMAD
To be determined	0	
Total fast track (resources raised by 2020)	**616**	
Longer term (additional resources raised by 2024)	**970**	

Key Partners

Key partners include the ministries of finance and social welfare, AFD, the Climate Action Partnership, CERI (Sciences Po Paris), CIWA, the Feinstein International Center, GFDRR, GPFD, the IOM, the Institute of Research for Development, the International Commission on Irrigation and Drainage (ICID), KNOMAD, the Lake Chad Basin Commission, the Royal Geographical Society, the Stockholm International Water Institute, UNEP, UNESCO, UNHCR, UNOCHA, and the United Kingdom and partners associated with the UK Government Office for Science Project on Migration and Global Environmental Change.

PART C

POWERING RESILIENCE

Some 600 million people and 10 million small and medium-size enterprises in Sub-Saharan Africa still do not have a connection to the electric grid. In many countries, power systems are small and poorly maintained by utilities that often operate at a deficit. As a result, many energy users on and off the grid rely on fossil energy sources for lightning or heating. These sources are more expensive and produce significantly fewer productivity gains for consumers than modern energy sources.

In response, the Bank has committed to the objectives of the Sustainable Energy for All initiative by 2030. These objectives include providing universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix.

Low-carbon energy sources offer mitigation benefits associated with increasing the share of renewable energy across the region while also providing the power needed to tackle the access challenge and improve resilience. By investing both on and off the grid, crowding in private sector investment, and leveraging mainstream and emerging technologies in the renewable space, the World Bank can contribute to improving one of the key drivers of security, productivity, job creation, and poverty reduction. Such investments will require increased concessional financing for ancillary infrastructure (roads, water availability, deep grid investments, and so forth).

On-grid generation investments, which center on solar photovoltaic (PV), hydropower, and geothermal, should be calibrated to optimize additional transmission and distribution needs as well as the regional interconnections that play an increasingly important role in overcoming the problems associated with small domestic market size and improving reliability. Large-scale

renewable generation investment could also include concentrated solar power (CSP) and wind as regional markets take off. Off-grid investments can leverage small distributed generation systems, such as solar portable lanterns and solar home systems, as well as mini-grids that may blend fossil fuel with solar PV generation. Given the size of the investment required and the important role to be played by the private sector, leveraging the comparative advantages of the different parts of the World Bank Group—including IFC advisory and investment services and MIGA insurance to attract private sector participation—will be critical.



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Chapter 11

Increasing the Use of Solar Power

The World Bank will support the uptake of solar power through technical work, financing, policy dialogue and resource mobilization. These efforts will be grounded in the development of utility scale solar PV projects as well as the acceleration of modern energy service provision in off-grid areas through solar home systems and solar portable lanterns (table 11.1).

TABLE 11.1 Support to Solar Power: At-a-Glance Summary

Activity	Expected outcomes	
• Engage in sector dialogue and policy support, including of regulation, taxation, and subsidies • Provide technical assistance, including planning, resource mapping, transaction structuring, and grid integration • Provide guarantee packages and lending for public investment, public-private partnerships, and debt facilities	Fast track (by 2023) • 1 GW of grid-connected solar PV available • 5 million off-grid consumers have access to modern energy services	Longer term (by 2026) • 2 GW of grid-connected solar PV available • 55 million off-grid consumers have access to modern energy services
Main partners	**Resource mobilization**	
Governments, private sector developers, climate finance partners, such as Climate Investment Funds and Green Climate Fund	Fast track (by 2020) $3,240 million	Longer term (additional funds by 2024) $4,760 million

Sectoral Background and Development Challenges

Sub-Saharan Africa is home to some of the highest insolation rates in the world. Recent decreases in the cost of solar PV technology create an opportunity for countries to diversify their energy mixes without increasing carbon emissions. Countries are starting to recognize ways of leveraging this abundant resource. They are beginning to employ planning techniques to determine where and when to deploy utility-scale solar PV plants, off-grid solar PV solutions, and solar or hybridized mini-grids.

Despite its growing list of benefits, solar PV accounts for less than 0.5 percent of the electricity generated across Sub-Saharan Africa, however. The vast majority of generation is concentrated in South Africa.

Initiatives to Address the Challenges and Enhance Resilience

As costs continue to fall, utility-scale solar systems are becoming an increasingly attractive technology as part of a least-cost energy mix. Many countries in Africa rely on thermal generation using liquid fuels at a cost of $20–$30/kWh. Recent competitive tenders for solar PV have demonstrated increasing price competitiveness. In Uganda the GET FiT process reduced independent power producer (IPP) tariffs to $0.17/kWh in 2014; in South Africa tariffs under the Renewable Energy IPP Program fell to $0.065/kWh in 2015. Solar PV can also be deployed more quickly than other technologies and rolled out in a modular/distributed fashion.

Despite these advantages, grid-scale solar PV remains unfamiliar to many utilities, and examples of competitive selection for solar IPPs are scarce. Africa has a notional pipeline of more than 5 GW of solar PV projects, but most projects are unsolicited, expensive, and unbankable. In response, the World Bank is rolling out Scaling Solar, an initiative to rapidly expand private

investment in utility-scale solar PV projects, by combining standardized bankable project documents, advisory services, stapled financing from IFC, and stapled credit enhancement from the World Bank and MIGA.

Recent reductions in the price of solar system components and the introduction of pay-as-you-go business models have made solar lanterns and solar home systems more accessible, spurring market growth in excess of 100 percent a year. Modern solar PV solutions are vastly superior to traditional alternatives and have established themselves as a key transitional solution for rural households.

An increasing but still small number of higher-density rural communities are benefiting from energy access from hybridized solar/diesel mini-grids. Mini-grids have typically been diesel powered, but the dramatic reduction in the cost of PV panels and new storage solutions have made retrofitted or newly built solar-powered mini-grids increasingly attractive.

Although interest has ballooned in recent years, most client governments in the region still lack tangible plans for developing solar PV. Along with subsidy reform and other sectorwide interventions, a sharper focus on renewable energy policy is key to creating attractive investment opportunities. The package proposed in this business plan combines sector dialogue, technical assistance, and financing as part of a widening effort to move from unsolicited bids to proactive planning and transparent, competitive tendering processes.

Technical assistance and transaction advisory can help overcome the lack of familiarity and institutional capacity still common with solar PV. It can help governments identify priority projects and address technical concerns about variability and dispatchability. Such support can be combined with transaction advisory services provided under the Scaling Solar initiative, a one-stop-shop developed by the World Bank Group to support rapid, transparent, and competitive tender processes. The approach integrates due diligence, standardized documentation, and stapled financing in way that is designed to maximize pool of qualified developers and minimize costs.

Because of the high investment costs of solar PV in both grid-connected and off-grid segments, reducing the cost of capital and providing liquidity is key to driving down prices. International financing institutions can help by providing working capital facilities for importers/distributors of quality-verified pico-PV products and solar home systems; when relevant, grants or low-cost financing to kick-start markets and reward first movers; and stapled financing and/or guarantees for public private partnerships for utility-scale solar PV plants, including guarantees to mitigate off-taker payment risk.

Implementation of the proposed approach would involve the following activities:

- identifying priority countries based on upstream resource mapping and analysis of power supply and demand trends on a case-by-case basis (the focus is likely to be on high-insolation regions, such as the Sahel, and landlocked countries that rely heavily on thermal power generation)
- reviewing and optimizing legislative and regulatory frameworks to facilitate the deployment of solar PV through both public and private entities

- identifying priority on-grid projects, through technical studies on grid integration and reinforcement, location analysis, and advanced control systems
- facilitating access to working capital for solar PV companies.

Expected Outcomes

Outcomes of the fast-track phase of the proposed package include the development of 1 GW of grid-connected solar energy projects and the provision of 5 million off-grid consumers with modern energy services by 2023. Over the longer term (by 2026), the plan would develop 5 GW of grid-connected solar energy projects and provide 55 million off-grid consumers with modern energy services.

Climate-Related Benefits

Solar energy has enormous potential to mitigate climate change, with marginal abatement costs that can now reach zero (or, in some situations, create profits). It provides an opportunity to replace kerosene, diesel, and unsustainable use of wood, with major health and environmental benefits.

Financing Plan

Investment required to achieve the plan's overall targets is estimated at $8 billion, including $3.2 billion in the fast-track phase (table 11.2). To achieve the fast-track phase financing targets by 2020, resources (including partner funding and private sector investment) will need to be identified by 2017.

TABLE 11.2 Support to Solar Power: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	50–90	
IDA	500–1,000	IDA investment may include guarantee instruments, public solar PV investment, technical assistance, deep-grid investment, and other infrastructure, to be determined based on site selection. Guarantee packages reflect a one-quarter IDA exposure ratio.
Private sector	1,770–2,270	Financing is likely to include IFC equity/debt investment.
Climate finance (GCF, GEF, CIF, and so forth)	200–400	
Other development finance (bilaterals, multilaterals)	75–125	Bilateral financing may include capital investment or associated deep-grid investment.
To be determined	0	
Total fast track (resources raised by 2020)	**3,240**	Extrapolated from FY16–FY18 IDA pipeline.
Longer term (additional resources raised by 2024)	**4,760**	Assumes substantial ramp-up to achieve 3 GW by 2026.

Key Partners

The World Bank Group will deploy its comprehensive resources, including IDA/IBRD instruments, and leverage IFC advisory and investment and MIGA financing to support the objectives outlined above. It will collaborate with traditional and emerging partners, including governments, the private sector, and climate finance investors.



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Chapter 12

Increasing the Use of Hydropower

The World Bank will continue to support the development of hydropower resources through technical work, financing, policy dialogue and resource mobilization. These efforts will be grounded in the development of large hydropower generation capacity as well as water regulation to ensure year-round production and create further downstream hydropower development opportunities (table 12.1).

TABLE 12.1 Support to Hydropower: At-a-Glance Summary

Activity	Expected outcomes	
• Develop Lom Pangar (30 MW and regulating dam), Nachtigal (420 MW), and Souapiti (515 MW and regulating dam), which are under preparation or implementation • Provide technical assistance and financing for feasibility studies on downstream projects	Fast track (by 2023) • 420 MW of reliable, clean, low-cost hydropower developed in West Africa	Longer term (by 2026) • 545 MW of reliable, clean, low-cost hydropower developed in West Africa • Downstream river flows regulated to increase all-year production and facilitate future projects
Main partners	**Resource mobilization**	
Governments, other development finance institutions, and private sector	Fast track (by 2020) $1,208 million	Longer term (additional funds by 2024) $792 million

Sectoral Background and Development Challenges

Hydropower is a clean, large-scale, and affordable source of renewable energy that has the potential to play a major role in addressing Africa's power supply crisis. Hydropower currently provides 24 percent of Sub-Saharan Africa's power needs, and there is potential to increase this share to 40 percent over the coming years.

Some 50 GW of hydropower could be developed immediately, at costs of $0.01–0.08/kWh. This prices make hydropower the lowest-cost, largest-scale renewable energy resource currently available to the region—with potential for transformative, growth-inducing developmental impacts.

Hydropower is a valuable complement to other forms of renewable energy, because it provides a base load and can store surplus generation during off-peak periods. It contributes to mitigating climate change mitigation (by reducing carbon emissions compared to thermal generation) and adaptation (by providing storage capacity).

Initiatives to Address the Challenges and Enhance Resilience

Cameroon has the third-largest hydropower development potential in Sub-Saharan Africa, estimated at more than 12,000 MW, with the Sanaga River Basin providing nearly half the untapped potential. Total installed electricity generation capacity from all sources in Cameroon is currently only about 1,000 MW, however. Of the 6 GW hydropower potential in the Sanaga River Basin, 4.2 GW is suitable for large-scale development.

The estimated hydropower potential of the Konkouré River Basin, in Guinea, is 2.4 GW—about 40 percent of the country's 6 GW hydropower potential. Two main projects have been implemented: the Garafiri project (75 MW), commissioned in 1999, and the Kaleta project (240 MW), commissioned in 2015.

Further development of the basin will require additional regulation of the river to reduce the seasonality of flows and increase all-season capacity downstream.

An important step in developing Cameroon's largely unexploited hydropower potential will be the commissioning of a regulating dam at the Lom Pangar site in 2017. This dam will increase the guaranteed all-season hydropower capacity on the Sanaga River by about 40 percent, immediately adding 120 MW at existing downstream hydropower plants, which will also generate electricity in the dry season. The Lom Pangar dam will allow for further downstream development of large-scale hydropower plants by ensuring firm all-season water flows.

Fast-track support would help construct the 420 MW Nachtigal hydropower project, conduct feasibility and bankability studies, and bid out other hydropower sites in the Sanaga Basin. The Nachtigal project is being developed by a consortium consisting of Electricité de France (EDF), IFC, the government of Cameroon, and Rio Tinto Alcan, at an estimated cost of $1 billion. Nachtigal is expected to be commissioned in 2020. Support would also include technical assistance for the development of future selected hydro sites.

The Souapiti Dam, on the Konkouré River, in northern Guinea, is of strategic importance, because it regulates the Konkouré Basin and because Souapiti is one of the best hydropower production sites in West Africa, with potential generation capacity of more than 500 MW. The program would focus on supporting the development of the Souapiti project, which is estimated to cost $1–$1.5 billion. The *West African Power Pool* (WAPP) Secretariat has commissioned a study to update existing feasibility studies and conduct a financial and economic assessment of the project to determine the optimum bankable option for development under a public-private partnership (PPP) structure. The study will include an assessment of domestic demand (including by the mining industry) as well as the potential for export, thanks to new regional interconnections (such as the Gambia River Development Organization and the Côte d'Ivoire-Liberia-Sierra Leone and Guinea Electricity Networks Interconnection Project [CLSG]) currently under implementation. Environmental and social studies are also ongoing. Next steps will include advisory services to support the structuring of a PPP and the selection of a private developer through competitive tendering.

Expected Outcomes

Outcomes for the proposed package by 2026 include the development of 1 GW of hydropower capacity and the downstream regulation of river flows in two of West Africa's largest river basins for further development.

Climate-Related Benefits

Hydropower is a renewable, efficient, and reliable source of energy that does not directly emit greenhouse gases or other air pollutants and that can be scheduled to produce power as needed, depending on water availability.

TABLE 12.2 Support to Hydropower: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	68	
IDA	85	Includes investment and guarantee packages; guarantee packages reflect a one-quarter IDA exposure ratio.
Private sector	605	Financing is likely to include IFC equity/debt investment.
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance (bilaterals, multilaterals)	450	Includes multilateral investors identified in current PPP structures.
To be determined	0	
Total fast track (resources raised by 2020)	1,208	
Longer term (additional resources raised by 2024)	792	Assumes development of the Nachtigal and Souapiti hydropower projects.

Although it does cause indirect greenhouse gas emissions, mainly during the construction and flooding of the reservoirs, the greenhouse gas emissions factor (4–18 grams of CO_2e per kilowatt-hour) is 36–167 times lower than factor for electricity generation from fossil fuels.

Financing Plan

Total financing for the development of 1,000 MW of hydropower is expected to reach $2 billion (table 12.2), including $1.2 billion for the fast-track phase.

Key Partners

Implementation for the initiatives will be carried out in close collaboration with the governments of Cameroon and Guinea, as well as with the entities to which power is eventually sold.



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Chapter 13

Increasing the Use of Geothermal Power

The World Bank will support the uptake of geothermal power through technical work, financing, policy dialogue and resource mobilization. These efforts will be grounded in the upstream development of targeted geothermal sites to attract private sector capital for downstream development and open up the sector across the East Africa subregion (table 13.1).

TABLE 13.1 Support to Geothermal Energy: At-a-glance Summary

Activity	Expected outcomes	
• Develop Aluto geothermal site (70 MW) underway; other sites under exploration • Provide technical assistance for sector development • Provide lending for public investment in exploration and development, public-private partnerships for downstream development	Fast track (by 2023) • 150 MW of geothermal generation capacity developed • Downstream private sector investment leveraged through concessional financing for exploration	Longer term (by 2026) • 350 MW of geothermal generation capacity developed • Geothermal sector established across the East African Community • Downstream private sector investment leveraged through concessional financing for exploration
Main partners	**Resource mobilization**	
Governments, multilateral and bilateral development partners, private sector	Fast track (by 2020) $950 million	Longer term (additional funds by 2024) $1,850 million

Sectoral Background and Development Challenges

Africa has significant potential for geothermal development; East Africa alone can potentially harness 14,000 MW of geothermal energy, but only 1.5 percent (209 MW) has been developed. Ethiopia and are already operating geothermal plants, and other countries are considering geothermal sites for development. The high risk of exploratory drilling is a major obstacle to the scale-up of geothermal energy; considerable upstream public investment is required before downstream development by the private sector.

Initiatives to Address the Challenges and Enhance Resilience

The World Bank Group has played a central role in reducing the risk and supporting the development of geothermal globally. It provided $2.2 billion for geothermal development between 1977 and 2015, by far the largest amount of any multilateral development bank. It has provided concessional loans and guarantees in support of geothermal exploration drilling in Djibouti, Ethiopia, and Kenya. MIGA issued an $88.3 million guarantee to Ormat Holding Corp. to cover a $98.1 million equity investment in OrPower 4 in Kenya.

The Bank Group's program for geothermal development generally includes the following support:

- *Policy support*. The Bank provides technical assistance to help client governments craft appropriate regulatory and institutional frameworks and price electricity.
- *Surface exploration*. The Bank can support surface exploration to identify the potential for drilling.

- *Mitigation of drilling risk*. Through concessional finance and guarantees, the Bank Group mitigates the high risk of drilling for resource (steam) identification.
- *Engagement of commercial investment*. IFC and MIGA work directly with the private sector to support private sector investment.

The Bank Group launched the Global Geothermal Development Plan (GGDP) in 2013 to bring together donors and multilateral lenders to coordinate financing for specific geothermal projects.

Expected Outcomes

Outcomes for the proposed package include the development of 500 MW of geothermal capacity and the opening up of the geothermal sector across the East Africa Community for further investment by 2026.

Climate-Related Benefits

Geothermal power generation does not involve fossil combustion and emits only minimal amounts of greenhouse gas. Abatement of greenhouse gas depends on the current and projected power mix in a country: The climate benefit is maximized when geothermal energy displaces inefficient (and often expensive) fossil fuel–based thermal generation (making geothermal development particularly desirable in land-locked and resource-constrained countries). In addition to leaving a minimal environmental footprint, geothermal power generation is highly resilient to the effects of climate change.

Financing Plan

Investment required to achieve the targeted 500 MW of geothermal capacity development is estimated at $2.8 billion (table 13.2). The Bank can provide diverse and unique financial solutions, including long-term concessional financing for exploration and upstream studies, guarantee packages to mitigate investor risk, Scaling up Renewable Energy in Low Income Countries Program (SREP) funding for pilot renewable energy projects, and technical assistance. The World Bank Group can also leverage IFC competitive financing products, which can crowd in private sector investment.

Key Partners

Implementation of the initiative will be carried out in close collaboration with the governments of Djibouti, Ethiopia, Kenya, and Tanzania, as well as the private sector for downstream development. Support will also be sought from partners in the Global Geothermal Development Plan.

TABLE 13.2 Support to Geothermal Energy: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	50–100	
IDA	400–600	Includes investment and guarantee packages; guarantee packages reflect a one-quarter IDA exposure ratio.
Private sector	175–275	Financing likely to include IFC equity/debt investment.
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance (bilaterals, multilaterals)	10–200	May also be obtained under climate financing.
To be determined	0	
Total fast track (resources raised by 2020)	**950**	
Longer term (additional resources raised by 2024)	**1,850**	Scale-up to 500 MW assumes step-change in client uptake.

PART D

Enabling Resilience

To enable countries to increase their resilience to the effects of climate change, the Africa Climate Business Plan proposes strengthening Africa's hydro-meteorological programs and establishing an Africa Climate-Resilient Investment Facility. These two initiatives will strengthen the data and knowledge base for integrating climate variability and change in a variety of decision-making processes at the local, national, and regional scales.



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Chapter 14

Strengthening Africa's Hydro-Meteorological Program

This World Bank will support the enhancement of climate- and disaster-resilience capacity in targeted Sub-Saharan countries, by strengthening their hydro-meteorological (hydro-met), end-user (including early warning), and knowledge and advisory services and link national systems with regional and global counterparts.

The program aims to strengthen national meteorological and hydrological services (NHMS) by providing the investment, technical assistance, and capacity building needed for integrated modernization (table 14.1). It is designed as a framework program to modernize NMHS and their regional affiliates. The program will reduce community vulnerability by focusing on

TABLE 14.1 Support to the Hydro-Met Program: At-a-Glance summary

Activity	Expected outcomes	
• Strengthen national meteorological and hydrological services (NMHS), by improving their ability to deliver services, building their capacity, and supporting policy-institutional reforms • Modernize regional NMHS centers, including by fostering cooperation with national institutions • Integrate national, regional, and global systems and knowledge and advisory services	Fast track (by 2023) • Modernization programs will be effective in 15 countries and 4 regional centers • Technical assistance and modernization activities will commence for NMHS in 10 countries and 2 regional centers • First benefits from impact-based forecasts will be realized in Mozambique • Up to 10 NMHS will have improved access to global products and services	Longer term (by 2026) • Timely and reliable forecasts will be made at the local, regional, and national levels • Weather, climate, and hydrological services will be improved • International and cross-border collaboration, including on early warnings, will be improved
Main partners	**Resource mobilization**	
National governments, the African Union Commission, regional economic communities, hydro-met agencies, and bilateral and multilateral partners, including development banks	Fast track (by 2020) $270 million	Longer term (additional funds by 2024) $280 million

the transformation of "last-mile" community early warning systems, helping ensure that these systems have the absorptive capacity, communication means, and dissemination outreach to efficiently relay systematic and reliable information to end-users.

Sectoral Background and Development Challenges

Floods and droughts cause heavy losses of livelihood and life in Africa. In 2012, for example, Madagascar and Nigeria each are estimated to have lost more than 1 percent of GDP from flooding and cyclones, with losses totaling $8 billion. Africa is set to experience more frequent adverse weather events, including droughts, floods, and heat waves. Accurate hydro-met data, forecasts, and early warnings are key to informed and timely decisions that reduce loss of life and assets and protect development gains.

Improved hydro-met services can help build resilience in Africa's urban agglomerations. If development gains are not protected against climate risks, a vicious cycle of urban poverty, inequality, and fragility could be triggered, retarding growth and development.

Improving hydro-met services is integral to sustainable growth in Sub-Saharan Africa. The services provided by NMHS are a "public good," because of their cross-cutting, diffuse, and non-rival benefits. The cost-benefit ratio of investing in hydro-met services is between 1: 3 and 1: 15, according to the World Meteorological Organization (WMO).

Only 10 NMHS in Africa provide adequate forecast and warning services. According to a 2014 WMO survey, 54 percent of surface stations and 71 percent of upper air weather stations in Africa do not report data.

NMHS report to different ministries in different countries, and there is no universal protocol for data and information sharing. Lack of investment in human capital has reduced capacity. The challenge is to invest in new systems, train people to operate them, sustain operations and maintenance regimes, and generate information that meets end-users' needs.

Funding is insufficient and fragmented—and too little of it goes to the system architecture and sustainability aspects of NMHS; meeting operations and maintenance costs remains a challenge (World Bank 2013). A comprehensive approach to strengthening hydro-met with equal emphasis on infrastructure, capacity, and policy is wanting. Coordination, sustainability, and last-mile connectivity are major challenges. The financing and scope of modernization must be substantial and adopt a systems approach in order to be transformative. Last-mile service, which should include impact-based forecast and warning services, is key for realizing climate resilience benefits for both citizens and core government ministries (WMO 2015). Governments need new capabilities in operations and maintenance, technology, human resources, and policy, which will require larger operating budgets.

Initiatives to Address the Challenges and Enhance Resilience

Several development partners are providing technical assistance to hydro-met services. National meteorological services from many countries have been providing support to African counterparts, often coupled with bilateral aid.

ClimDev-Africa—a joint initiative of the African Development Bank, the African Union Commission, and the United Nations Economic Commission for Africa (UNECA)—was set up in 2009 to improve weather and climate services in Africa. It aims to fill information gaps and improve the analytical base for informing weather and climate policies, build observational infrastructure across Africa, support climate resilience and low-carbon development, and understand the economic impacts of climate change. Its main focus is on regional organizations; national-level investments are small (usually less than $2 million). The World Bank has supported strengthening NMHS in Africa through programs on agriculture, water resources management, and early warning systems. The Pilot Program for Climate Resilience (PPCR) is an opportunity to scale up systematic investments in three countries (Mozambique, Niger, and Zambia). Large-scale watershed management and basin-wide programs in Malawi and Nigeria provide opportunities for systemwide support.

The Integrated African Strategy on Meteorology for 2013–2017—developed by the African Union Conference of Ministers Responsible for Meteorology (AMCOMET), in collaboration with the WMO, the African Union Commission, member states, and others—highlights the challenges posed by weather-related hazards to economic development. The strategy calls for regional cooperation and the upgrading of observation networks; increases in the capacity to receive, share, and transmit observed data; more timely and accurate weather and climate forecasts and warning services; and improved

decision support tools. It does not quantify the investment needs for the modernization of hydro-met services at the national and regional levels.

Investment needs for systemwide modernization of hydro-met services in Africa are substantial: A conservative estimate of high priority investments in all developing countries is $1.5–$2 billion (World Bank 2013b), with more than half of investment needs in Africa. A 2012 regional assessment by the Southern Africa Development Community (SADC) calls for investing $120 million in SADC countries. Its estimate of needs, particularly for capacity building, training, and implementation support, are conservative.

In June 2015, the World Bank, the WMO, and the African Development Bank launched the Africa Hydro-Met Program: Strengthening Climate and Disaster Resilience in Sub-Saharan Africa, which aims to strengthen 15 NHMS and 4 regional centers in its initial phase, at a cost of $600 million. The program is designed as an inclusive framework program to modernize NMHS and their regional affiliates. It offers a collaborative platform for development partners to collaborate and scale up their support while keeping African governments in the lead. Its objective is to strengthen the ability of NMHS in Africa to provide timely, accurate, and actionable weather, climate, and hydrological forecasts and warnings and to contribute to climate resilience, economic development, and disaster risk management. The program seeks to leverage partnerships and foster interagency coordination. It is aligned with the Global Framework for Climate Services (GFCS) and the Integrated African Strategy on Meteorology. It champions better hydro-met services as a public good and calls for scaling up investment financing from development partners and operational financing from host governments.

The program includes three main components:

- strengthening NMHS, including by improving their ability to deliver service, building their capacity, and promoting policy and institutional reforms
- modernizing regional centers, including by fostering cooperation with national institutions
- integrating national, regional, and global systems and knowledge and advisory services.

Expected Outcomes

Expected outcomes include the following:

- timely and reliable forecasts at the local, regional, and national levels
- improved delivery of weather, climate, and hydrological services
- better international collaboration, including on early warnings.

By the COP21 meeting, impact-based forecasting will have been introduced in Mozambique; the modernization program for the Ethiopian National Meteorological agency and the Hydrology and Water Quality Directorate will have been prepared; and ongoing works in Kenya, Malawi, Uganda, and Zambia under the PPCR will be proceeding.

Within two to three years after COP21, technical assistance and modernization activities will commence for NMHS in 10 countries and 2 regional centers; first benefits from impact-based forecasts will be realized in Mozambique; and up to 10 NMHS will have improved access to global products and services, subject to resource availability. Within two to four years after COP21, modernization programs will be in effect in 15 countries and 4 regional centers, with anticipated completion by 2023, subject to resource availability.

Climate-Related Benefits

Key sectors—including agriculture, energy, water, health, and transport—directly benefit from hydro-met services. Agriculture, which is largely rainfed in Africa, accounts for 60 percent of employment and 40 percent of exports. The Comprehensive African Agricultural Development Program (CAADP), first endorsed by African governments in 2003, stresses improved water management and climate-smart agriculture, both of which depend on good and timely hydro-met information. Energy is key to poverty reduction and economic development. Hydro-power, a substantial current source of energy in Sub-Saharan Africa today, also depends on hydro-met data for optimal performance.

A 2010 World Bank study highlights the economic costs of lack of electricity and argues for a renewed emphasis on hydroelectricity. Efficient water resources management would bring multiple benefits, ranging from irrigated agriculture, hydroelectricity, water supply, watershed management, to erosion control, and so forth. Transport and connectivity boost growth. Only a third of Africa's rural inhabitants live within 2 kilometers of all-weather roads. Africa has 60 percent of the world's malaria cases and 80 percent of its deaths. Effective hydro-met services and data support effective planning of targeted interventions aimed at improvements in all these sectors.

The proposed activities would yield direct benefits for the citizens of all participating countries by improving their climate resilience. In addition to providing weather, climate, and hydrological forecasts and warnings, NMHS are also expected to inform climate adaptation and mitigation activities.

Phase I of the hydro-met program would benefit more than 100 million people in 15 Sub-Saharan African countries and 4 regional organizations by building the technical, human, and financial capacity for providing forecasts and warnings, in order to enhance resilience to climate and disaster risks and augment the capacity to adapt to climate variability and change. Major climate resilience benefits would include the reduction of climate and disaster risks and impacts; improved disaster preparedness; enhanced resilience of social and productive infrastructure, resulting in improved public health, food security, nutrition, water management, energy security, transport and communications, trade and competitiveness, employment generation, governance, and state-building.

TABLE 14.2 Support to the Hydro-Met Program: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	Operations and maintenance costs to be internalized by governments not calculated
IDA	108	Subject to country prioritization from IDA 17 or IDA 18 allocations
Private sector	0	Revenue stream from sale of hydro-met products in long term not calculated
Climate finance (GCF, GEF, CIF, and so forth)	135	Preference is for grant financing from GCF (initiative provides a public good)
Other development finance (bilaterals, multilaterals)	27	Grant support envisaged for technical assistance and capacity-building components
To be determined	0	
Total fast track (resources raised by 2020)	270	
Longer term (additional resources raised by 2024)	280	

Financing Plan

Table 14.2 describes the financing plan.

Key Partners

The main partners will be national governments and regional organizations in Sub-Saharan Africa, including the African Union Commission and the regional economic communities. The World Bank, the WMO, and the African Development Bank will proactively seek the strategic partnership of international, regional, and bilateral development partners and technical institutions, including hydro-met agencies. They will also reach out to civil society, the private sector, and academia, in Sub-Saharan Africa and globally, to build a world-class network of knowledge, solutions, and resources.

Financing partnerships for the program will leverage resources from the World Bank and the African Development Bank (including the ClimDev initiative), soft financing from multilateral and bilateral development partners, and climate financing funds. The possibility of establishing a new multidonor trust fund will be explored in order to maximize the synergy and collaboration of all partners.



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Chapter 15

Establishing an Africa Climate-Resilient Investment Facility

Project planning and design for climate-resilient investment is likely to be most effective if conducted in Africa, by Africans, from within established institutions on the continent. For this reason, the World Bank, in collaboration with the African Union Commission, the United Nations Economic Commission for Africa (UNECA), and other partners in Africa, proposes establishing an Africa Climate-Resilient Development Facility. The facility would increase the capacity of African policy makers to integrate climate

TABLE 15.1 Support to the Africa Climate-Resilient Investment Facility: At-a-Glance Summary

Activity	Expected outcomes	
• Create an open data and knowledge platform • Develop guidelines for climate-resilient investment planning • Compile good practices in the operation of climate vulnerable infrastructure • Plan and implement awareness-raising activities • Provide on-demand advisory services to project developers	Fast track (by 2023) • Open data and knowledge platform covering climate projections, biophysical models, and economic models accessible on-line • First set of 5–10 guidelines issued for climate-resilient investment at the policy, sector, and project levels • First set of 5–10 good practices in management of climate-vulnerable infrastructure compiled • On-demand advisory services provided to developers of 20–30 projects • Up to 10 training workshops held	Longer term (by 2026) • Second set of 5–10 guidelines issued for climate-resilient investment at the policy, sector, and project levels • Second set of 5–10 good practices in management of climate-vulnerable infrastructures compiled • On-demand advisory services provided to developers of an additional 30–50 projects • Up to 20 training workshops held
Main partners	**Resource mobilization**	
UNECA; AUC; river basin organizations; power pools; regional economic communities; regional climate centers; technical centers of excellence in Africa on climate modeling, infrastructure planning, and related issues; donors (AFD, DFID, EU, GIZ, NDF)	Fast track (by 2020) $50 million	Longer term (additional funds by 2024) $100 million

change considerations into the planning, design, and operation of investment in relevant sectors (table 15.1).

Sectoral Background and Development Challenges

Proper integration of climate change in the planning and design of infrastructure investments can significantly reduce the risk posed by climate to the physical and economic performance of hydropower and irrigation investments, according to *Enhancing the Climate Resilience of Africa's Infrastructure (ECRAI)*, conducted by the World Bank in collaboration with UNECA (Cervigni and others 2015). The study emphasizes the importance of identifying adaptation solutions that balance the risk of inaction (ignoring climate change) against the risk of wrong action (that is, ignoring the uncertainty surrounding future climate outcomes and committing to a single climate scenario).

Integration of climate risks in the planning of climate-sensitive investments requires a change in mindset toward an integrated framework approach that brings together climate information, climate impact assessment, and decision making for investment. Such a paradigm shift requires credible climate information used with appropriate modeling tools,

supported by dedicated institutions to better inform policy and development planning.

Initiatives to Address the Challenges and Enhance Resilience

The Africa Climate-Resilient Development Facility is intended to facilitate this paradigm shift. It would take the results and methods developed in *Enhancing the Climate Resilience of Africa's Infrastructure* forward and enable their application to scale in Africa. The objective of the initiative would be to strengthen the capacity of African institutions (including national governments, river basin organizations, regional economic communities, and power pools) to plan, design, and implement investments in selected sectors, in order to increase their resilience to climate change. An Africa-based center of technical competence and excellence would help governments, planners, and developers in Africa integrate climate change in project planning and design. It would attract climate finance from the Green Climate Fund and other sources.

To quickly gain high-level political acceptance, the core of the facility would be anchored at the Africa Climate Policy Center in Addis Ababa, which operates under the umbrella of the ClimDev-Africa program. Certain activities would be undertaken in collaboration with, or outsourced to, a small number of regional centers of excellence in western, eastern, central, and southern Africa. The facility would operate through a small number of full-time experts and a roster of external consultants to be mobilized on a task-specific basis.

The facility would be set up over a period of about 9–12 months. During this phase, a detailed business plan would be crafted, a core team recruited, a roster of external experts created, and the partner regional centers of excellence selected. Initial reach-out, liaison, and coordination with key organizations in climate change resilience in Africa would also take place.

Once operational, the facility would carry out its activities in a sequenced way, including a pilot stage of 18 months and a consolidation stage of 24 months and beyond. Activities to be carried out would include the following:

- Creation of an open data and knowledge platform of key data and reference material that project developers need in order to incorporate climate risk into project design and execution of corresponding data clearinghouse functions.
- Development of guidelines at the policy, sector, and project levels integrating climate risks in key climate sensitive sectors (water, energy, transport). These guidelines would take into account the challenges specific to Africa in terms of climate data and climate change projections for the continent.
- Provision of on-demand advisory services to project developers, including on preparation of terms of references for prefeasibility and feasibility

studies and review and quality assurance of technical reports from consultants.

- Preparation of reports on innovative options to support adaptation to climate change in project planning or design. Examples of this incubator function include (a) assessment of the use of insurance instruments as an additional modality to mitigate the risk that climate-sensitive infrastructure may not always be able to generate intended benefits (in the hydropower and irrigation subsectors, for instance) and (b) exploration of the role of adaptive management in the design of infrastructure projects, whereby instead of committing upfront to a single design option, project developers could choose to adapt the design over time in response to new information on the significance of climate risks.
- Organization of awareness and training courses in targeted countries in Africa on methods for climate resilient investment planning and design (including those tested in the ECRAI analysis). The focus would be on how to integrate climate risk analysis in the project cycle of long-lived investments (in energy and transportation, for example). In energy, the process would involve starting from the upstream stages of planning at the river basin and power-pool levels and drawing on prefeasibility studies of individual investments. Training would reach different levels of policy makers and practitioners, from regional economic communities to country ministries and river basin organizations.
- Convening of seminars and conferences to share and disseminate knowledge.

During the start-up/design phase, the possibility will be explored of combining the technical/advisory services on climate-smart investment planning and design with financial assistance to cover the additional costs the project designer may incur to include climate vulnerability and climate resilience assessments in feasibility studies and other preparation activities. The proposed facility would focus on technical services but might facilitate access to financing through other channels (such as the World Bank Global Infrastructure Facility [GIF]).

Expected Outcomes

Results indicators include the following:

- technical guidelines for investment planning and design under climate uncertainty developed, reviewed by peer reviewers and stakeholders, and adopted by project developers
- open data and knowledge platform for use in climate-resilient project design made available on-line and hosted and maintained by African organizations
- capacity of project developers in the use of methodologies for managing climate risks in the planning and design of projects in selected sectors strengthened

- advisory services delivered to project developers at selected junctures of project design (for example, prefeasibility and feasibility studies).

These outputs would strengthen the capacity of African organizations to plan and design investment projects in a climate-resilient way.

Climate-Related Benefits

To exemplify the kind of climate-related benefits, it is useful to refer to the ECRAI study. It finds that under drying climate scenarios, failure to integrate climate change in the planning and design of power and water infrastructure could entail losses of hydropower revenues of 5–60 percent (depending on the basin). It also finds that consumer expenditure for energy could increase by up to three times the baseline values. Under wet climate scenarios, business-as-usual infrastructure development could lead to forgone revenues of 15–130 percent of the baseline (assuming that greater precipitation is not used to expand the production of hydropower).

By strengthening the capacity of African institutions to integrate climate change in project planning and design, the proposed initiative would reduce the risk of suboptimal performance of long-lived investments. Doing so would increase the resilience not only of the projects analyzed but also of the communities and countries that depend on the services delivered by those projects for their social and economic development.

Financing Plan

Table 15.2 describes the financing plan.

TABLE 15.2 Support to the Africa Climate-Resilient Investment Facility: Resource Mobilization Plan

Source	Amount ($ million)	Notes
Domestic sources	0	
IDA	0	
Private sector	0	
Climate finance (GCF, GEF, CIF, and so forth)	0	
Other development finance (bilaterals, multilaterals)	6	Figure includes trust funds already mobilized and additional support pledged in principle by the NDF
To be determined	44	Discussions with AFD, DFID, EU, and GIZ are ongoing; the possibility of mobilizing resources through the GIF is also being discussed
Total fast track (resources raised by 2020)	50	
Longer term (additional resources raised by 2024)	100	

Key Partners

The Africa Union Commission (through the Commissioner for Infrastructure and Energy) and UNECA asked the World Bank to team with them to establish the facility. It is envisaged that the partnership will be broadened to include other organizations, including regional economic communities, river basin organizations, power pools, and regional climate centers. Within the financing community, the NDF has expressed interest in supporting the initiative; discussions are underway with AFD, DFID, the European Union, and GIZ.

PART E

Making It Happen

The Africa Climate Business Plan envisages mobilizing and deploying some $16 billion of fast-track financing and $21 billion in longer-term support. This part of the business plan outlines the financing plan, presents the results framework, and describes the organizational arrangements that would allow the World Bank and its many partners to implement the plan.

Chapter 16

Financing Plan

The financing plan estimates the resources required to implement the Africa Climate Business Plan (in both the fast-track and longer-term phases, table 16.1) and identifies possible sources of funding for the fast-track phase (table 16.2). The activities included in the plan are "in the pipeline": they have not yet been approved by the governing bodies of the financiers (although in several cases project preparation is nearing completion).

The following caveats and clarifications are in order with respect to possible financing sources:

- International Development Association (IDA): IDA is the part of the World Bank Group that helps the world's poorest countries by providing highly concessional loans (called "credits") and grants for programs that boost economic growth, reduce inequalities, and improve people's living conditions. IDA resources included in this business plan represent

TABLE 16.1 Funding Required to Implement the Africa Climate Business Plan
($ million)

Component	Fast track	Longer term
I. Strengthening Resilience	10,363	13,490
A. Natural Capital		
Climate-smart agriculture	3,000	2,000
Climate-resilient landscapes	1,605	1,605
Integrated watershed management (Niger, Chad, Zambezi, Lake Victoria)	2,967	6,100
Climate-smart Africa Ocean Economies	220	280
B. Physical Capital		
Climate smart cities	1,025	1,025
Building coastal resilience (West Africa)	450	550
C. Human and Social Capital		
Social Protection	480	960
Addressing migration drivers	616	970
II. Powering Resilience	5,398	7,402
Solar	3,240	4,760
Hydropower	1,208	792
Geothermal	950	1,850
III. Enabling Resilience	320	380
Africa hydro-met program	270	280
Africa Climate Resilient Investment facility	50	100
Grand Total	16,081	21,272

TABLE 16.2 **Financing Sources for the Fast-track Phase of the Africa Climate Business Plan, 2016–20**
($ million)

Component	IDA	Climate finance (GCF, GEF, CIF, and other sources)	Other development finance (bilateral, multilaterals)	Private sector	Domestic sources	To be determined	Total
I. Strengthening Resilience	4,240	1,792	1,246	665	490	1,930	10,363
Natural Capital							
Climate-smart agriculture	1,300	100	320	240	240	800	3,000
Climate-resilient landscapes	355	830	0	0	0	420	1,605
Integrated watershed management (Niger, Chad, Zambezi, Lake Victoria)	890	692	670	425	150	140	2,967
Climate-smart ocean economies	30	35	20	0	20	115	220
Physical Capital							
Climate-smart cities	550	0	0	0	20	455	1,025
Coastal resilience (West Africa)	150	90	150	0	60	0	450
Human and social capital							
Social protection	365	45	70	0	0	0	480
Migration drivers	600	0	16	0	0	0	616
II. Powering Resilience	1,335	300	700	2,850	213	0	5,398
Solar	750	300	100	2,020	70		3,240
Hydropower	85	0	450	605	68	0	1,208
Geothermal	500	0	150	225	75	0	950
III. Enabling Resilience	108	135	33	0	0	44	320
Africa hydro-met program	108	135	27	0	0	0	270
Africa Climate Resilient Investment facility	0	0	6	0	0	44	50
Total	5,683	2,227	1,979	3,515	703	1,974	16,081

estimates by Bank staff (based on historical trends, project pipelines, and ongoing dialogue with governments in client countries) of IDA funding needs that could contribute to the plan's financing. In several cases these resources could be part of larger envelopes of IDA financing (envelopes that include the financing of other development activities related to those included in the plan but of which only the part included in the plan will generate co-benefits in terms of climate adaptation or low-carbon development).

Resource mobilization for the fast-track part of the plan spans two IDA cycles: IDA17 (which ends June 30, 2017) and IDA18 (which will run from July 1, 2017 to June 30, 2020). Activities that would start in the earlier years of the plan would be considered for financing under IDA17; estimates of financing in the outer years of the plan refer to activities to be considered for support by IDA18 and are more tentative. The plan is fully consistent with the recently announced World Bank Group goal to increase the share of financing with climate co-benefits by one-third by 2020. That increase will be achieved through better integration of climate considerations into project planning and design. The additional technical work during project preparation needed to achieve such integration could be co-financed by dedicated resources mobilized by donors and partners.

- Climate finance: Funding estimates under this rubric comprise various instruments, including the Climate Investment Funds (in particular the Forest Investment Program [FIP]), the Global Environment Facility (GEF), the Forest Carbon Partnership Facility (including both the readiness and the carbon finance mechanisms), the Green Climate Fund (GCF), and other initiatives, such as the Central African Forest Initiative (CAFI). Estimates are based on consultations with staff of each financing institution (on eligibility, strategic fit, and so forth). Some GCF projects (such as the hydro-met project) have already been submitted to the GCF Secretariat; others are in preparation.
- Other development finance (bilateral and multilateral institutions): Figures included in this category are based on technical consultations with the staffs of a variety of financing partners of the World Bank, including the AfDB, the West African Development Bank (BOAD), and bilateral partners (including AFD, DFID, GIZ, and NDF). These consultations range from preliminary to advanced, but in general there is a reasonable expectation that a substantial portion of the funding identified will materialize.
- Private sector: Estimates of private sector financing reflect the potential of projects to generate streams of revenues adequate to remunerate private investors. Private sector participation is expected mainly in the energy sector and to some extent in agriculture.
- Domestic sources: Estimates of domestic financing are based on the record of government counterpart financing across World Bank projects.
- To be determined: "To be determined" is an estimate of the residual gap that needs to be filled in order to fully finance the projects included in

the plan. It is expected that this document will serve as a platform to help close this gap, by mobilizing additional interest and support from both existing and new partners with an interest in promoting climate-resilient, low-carbon development in Africa (such as China and the Arab funds).

Chapter 17

Results Framework

The Africa Climate Business Plan is expected to mobilize resources and increase resilience to climate variability and change (table 17.1). The plan's contribution to resource mobilization will be measured by two indicators. The first is the share of resources mobilized at various stages of implementation. The targets are for 25 percent of funding to be mobilized by June 2017 (end of IDA17), 50 percent by December 2018 (mid-term of IDA18), and 75 percent by June 2020 (end of IDA18).

The plan is also expected to have catalytic/leveraging effect on climate finance for Africa beyond the activities included in the plan, which do not exhaust the universe of development activities with climate co-benefits. The plan could help promote the uptake of initiatives beyond the sectors or geographical areas included in the plan, through positive spillover or imitation effects. A second indicator of resource mobilization is therefore the share of IDA commitments to Sub-Saharan Africa with climate co-benefits, an indicator the World Bank has been monitoring since 2011. The target is to increase this share from a baseline of 17 percent (the average across all sectors for FY11–FY15) to 22 percent over the period FY16–FY20. The increase would help the World Bank Group meet its recent commitment to increase climate finance.

TABLE 17.1 Results Framework for the Africa Climate Business Plan
(percent)

			Target				
Outcome area	Indicator	Baseline	By June 2017	By December 2018	By June 2020	Overall FY16–FY20	By June 2023
Resource mobilization	Share of business plan financing envelope mobilized	0	25	50	75	n.a.	n.a.
	Share of cumulative IDA commitments to Sub-Saharan Africa with climate co-benefits	17	No target	No target	No target	22	n.a.
Promoting resilience (delivery of results planned for components of the business plan)	Share of total number of component-level indicators for which targets have been achieved	0	No target	No target	No target	No target	75

The second area of the results framework is the increase in Africa's resilience to climate variability and change. A wide range of outcome indicators has been proposed for each of the plan's components. The proposed aggregate target is for at least 75 percent of these indicators to be met by June 2023 (the end of IDA19). The lower-than-100 percent target reflects the fact that the goals of the Africa Climate Business Plan are ambitious.

Chapter 18

Organizational Arrangements

Two levels of organizational arrangements are proposed for rolling out the plan. At the external level, to ensure an adequate framework for successful implementation of the plan, the Bank will continue to systematically integrate climate change considerations into country and sector dialogue, in accordance with commitments made as part of the IDA17 replenishment. This effort includes addressing climate change in Systematic Country Diagnostics (SCDs) and integrating climate considerations in Country Partnership Framework (CPFs) the main components in the Bank's new approach to country engagement (box 18.1). These processes will also help identify the instruments that could best achieve the results envisaged by the plan (policy lending, investment lending, technical assistance, programs for results, guarantees, and so forth).

To nurture and expand partnerships for implementing the plan, the Bank will convene working-level meetings with organizations collaborating on specific components on an as-needed basis. It could also organize high-level conferences with a wide range of stakeholders. The first such meeting could take place in the early stages of implementation, in order to spur efforts on both fundraising and action on the ground. The second could take place toward the end of the implementation period (in late 2018, for example). It would be aimed at considering prospects for extending/scaling up the plan in order to achieve its longer-term goals.

Briefing during the World Bank Annual and Spring Meetings would be organized on an as-needed basis. A dedicated page on the website of the World Bank Africa Region will be created and maintained to ensure broad dissemination of work carried out under the plan.

BOX 18.1 The World Bank Group's Approach to Country Engagement

In 2014 the World Bank Group adopted a new approach to country engagement. Known as the Country Partnership Framework (CPF), the new approach aims to make the country-driven model more systematic, evidence based, selective, and focused on the goals of ending extreme poverty and increasing shared prosperity in a sustainable manner. It guides the Bank Group's support to each member country.

A Systematic Country Diagnostic (SCD) informs each new country partnership. The diagnostic identifies the most important challenges and opportunities at the country level for reaching the corporate goals. Consultations with a range of stakeholders informs the SCD process, from diagnostic through completion.

TABLE 18.1 World Bank Global Practice Responsible for Each Component of the Africa Climate Business Plan

Component	Global Practice
Climate-smart agriculture	Agriculture
East Africa climate-resilient landscapes	Environment and Natural Resources
Forested landscapes	Environment and Natural Resources
Niger Basin	Water (in collaboration with Environment and Natural Resources)
Lake Chad	Water (in collaboration with Environment and Natural Resources)
Zambezi	Water
Lake Victoria	Environment and Natural Resources
Climate-smart Africa ocean economies	Environment and Natural Resources
Climate-smart cities	Social, Urban, and Rural Development
Coastal resilience (West Africa)	Environment and Natural Resources
Solar	Energy and Extractives
Hydropower	Energy and Extractives
Geothermal	Energy and Extractives
Migration drivers	Social, Urban, and Rural Development
Social protection	Social, Urban, and Rural Development
Africa hydro-met program	Social, Urban, and Rural Development
Africa Climate Resilient Investment Facility	Environment and Natural Resources

Within the Bank, implementation of each component of the plan will be led by a Global Practices (GP) collaborating with other units within the Bank as needed (table 18.1). Adequate resources will be secured through the annual Work Program Agreement process, based on consultation and dialogue among the GPs and the relevant Country Management Units.

To facilitate the monitoring of progress, a small technical team, led by the Regional Coordinator for Climate Change and working under the oversight of the Practice Manager for Environment and Natural Resources, will work with the GP teams to prepare semiannual progress reports on implementation. The Senior Regional Advisor for Africa will convene semiannual meetings of the GP Senior Directors to review implementation reports; provide strategic direction to the technical work; discuss partnerships, external outreach, and dissemination; and provide inputs to the IDA17 completion report and the IDA18 midterm report. If necessary, there could also be periodic meetings at the level of Practice Managers, chaired by the Senior Regional Advisor, to review progress and ensure synergies across GPs in implementation of the plan.

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