

# Executive Summary

## Introduction

1. **This Strategy for Making Development Climate-Resilient in Sub-Saharan Africa** is the World Bank's operational response to climate variability and change on the continent.<sup>1</sup> Grounded in a climate risk review of the Africa Region's Sustainable Development portfolio, it adds the climate change dimension to the Region's development strategy and business plan — the Africa Action Plan (AAP, 2009-2012) — and will be an integral part of the AAP in the future. The AAP and the climate change strategy are a sound and realistic framework for climate-resilient development in Sub-Saharan Africa.
2. **The proposed strategy is based on the premise** that increased climate variability threatens the development gains of African countries, and that these effects need to be anticipated so that development efforts can be made more resilient to climate change.
3. **Climate has always featured prominently in African development**, and people across the continent have been living with and adapting to a high degree of climate variability and its associated risks for many centuries. Yet the accelerated changes in the climate and increasing incidence of climatic disasters (floods, droughts, cyclones) during the last century — and the scientific consensus that Africa is the continent most vulnerable and least able to cope with these changes — have brought these risks into sharper focus, and made the need to address them more urgent.
4. **The major challenge is to identify actions that will support** and/or accelerate ongoing development efforts while making them more resilient to climatic risks. Therefore, the need to link adaptation to development, and to manage development, climate change adaptation, and disaster risk reduction as one integrated agenda — are the core principles of this strategy.

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<sup>1</sup> The Strategy has benefited from extensive internal and external consultations (both formal and informal) with Sub-Saharan African country governments, members of civil society, the private sector, and development partners, African institutions, and a special partnership with African Development Bank (AfDB). Its principles and recommended actions follow the World Bank Group's overall strategy for addressing climate change in developing countries, the *Strategic Framework for Development and Climate Change* (World Bank, 2008f). The SFDC articulates a set of principles for integrating climate change and development challenges, while maintaining economic growth, poverty reduction, and achieving the Millennium Development Goals as priorities.

The SFDC assumes that adapting to climate variability and change is critical to sustaining and furthering development gains; that access to energy and increased energy use are fundamental; and that addressing climate change must not divert resources from core development needs. The SFDC identifies six areas where scaled-up action in client countries will need to be mainstreamed into both country operations — including policy dialogue, lending, and analytical work — and regional and global operations. These action areas are: (i) making adaptation and mitigation a core part of all development efforts; (ii) narrowing the resource gap with innovative instruments for low-cost and grant-based financing; (iii) promoting innovative market mechanisms; (iv) leveraging private financing; (v) speeding the spread of climate-friendly technologies; and (vi) stepping up policy research and capacity building.

## Looming Threat of Climate Change

5. **More than one-half the countries in Sub-Saharan Africa** have made important economic reforms in recent years — improving macroeconomic management, liberalizing markets and trade, and widening the space for private sector activity. Where these reforms have been sustained — and underpinned by civil peace — they have not only raised growth and incomes and reduced poverty, but also enabled countries to increase domestic and foreign investment and expand social and human development programs. Yet despite these gains, Sub-Saharan Africa is home to many of the world’s poorest countries. Average income per capita in real terms is lower than at the end of the 1960s, and life expectancy is lower now than 30 years ago. Incomes, assets, and access to essential services are unequally distributed. One African in four has access to electricity services and one African in five lives in a country severely disrupted by conflict.

6. **Across these emerging opportunities and development challenges looms the shadow of a changing climate**, which, added to the shocks stemming from the current global economic slowdown, will make it increasingly difficult for African governments to balance urgent short-term needs and longer-term development priorities.

### Africa’s heightened vulnerability to climate change

7. **Climate change is a key development issue in Sub-Saharan Africa** because of the region’s special vulnerabilities. These include the continent’s natural fragility (two-thirds of the surface area is desert or dryland), significant and fragile terrestrial and coastal ecosystems, and high exposure to natural disasters (especially droughts and floods), which are forecast to increase and intensify as climate change progresses. Moreover, the region’s livelihoods and economic activities are very much dependent on natural resources and rainfed agriculture, which are highly sensitive to climate variability. While biomass provides 80 percent of the primary domestic energy supply in Africa, rainfed agriculture contributes some 30 percent of GDP and employs about 70 percent of the population, and is the main safety net of the rural poor. Added to this is the spread of malaria — already the biggest killer in Africa — to higher elevations because of rising temperatures, compounding the effects of climate change with an increasing disease burden.

8. **Africa has a very low level of economically developed infrastructure.** There are few water control systems and little water storage capacity, despite relatively abundant resources. The transport, energy, information, and communication systems are also poorly developed, which may hinder adaptation efforts. Further, Africa’s rapidly urbanizing population is vulnerable due to poorly defined property rights, weak land-use planning, and informal settlements, frequently on land subject to erosion or flooding. Finally, armed conflict, terms-of-trade shocks and aid dependence add to the weight of these factors, all of which combine to lower productivity and erode assets (land productivity, livestock, water resources) and capabilities (health, nutrition, and education) — and threaten to keep Africans in a “low human development trap” (UNDP, 2007).

9. **Although subject to many uncertainties**, the impacts of climate change on development in Africa are expected to be diverse and significant, based on climate projections reported in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2007).

While temperature in Africa is likely to increase by 1.5 to 4 °C on average during this century — greater than the global average — predictions of rainfall changes in Africa are generally less consistent than those for temperature, with increases in equatorial Africa, decreases in the Sahel and southern Africa, and more variability in eastern Africa. These changes will be accompanied by an increase in extreme events (floods and droughts) and sea level rise of some 20 to 50 centimeters by 2050, particularly in West Africa (Accra, Ghana; Benin, Togo; Abidjan, Côte d'Ivoire; and the Niger delta).

10. **If nothing is done, the potential impacts of such changes are two-fold:**

- **African economies and communities are likely to be severely impacted** because of projected increases in extreme weather events, reduced crop yields and livestock productivity, drinking water shortages, reduced potential for hydroelectricity, spread of diseases such as malaria, potential migration and social strife, increased cost of infrastructure maintenance and development, and increased pressure on service delivery and fiscal resources.
- **The productivity of the natural resource base is likely to decline** as a result of watershed erosion, loss of soil productivity, loss of woodlands and forests, desertification, coastal erosion, and loss of aquatic and terrestrial biodiversity with consequent effects on agriculture, forestry, and water resource-based economic activities, fisheries, urban and coastal infrastructure, and tourism.

11. **Therefore, through economic diversification and growth**, and with continuing dependency on the sustainable use of land and water resources, adapting to climate change will need to be a critical element of Africa's development agenda.

**Social and gender dimensions of vulnerability to climate change**

12. **The people most affected by climate change** and who will find it hardest to adapt are those living in poverty, in low-income countries with weak or unstable states. Under these conditions, the physical effects of climate change will considerably increase the negative impacts on livelihoods, and in a vicious circle, increase the risks of mass migration, violent conflict, and further state fragility. Sub-Saharan Africa is particularly vulnerable, not only because of its low income and high incidence of poverty, but also because of the fragility of most of its state structures and the prevalence of violent conflict over the past decades.

13. **The degradation of ecosystems**, including forests and coastal ecosystems that support livelihoods, desertification, and droughts, and the increased frequency and severity of extreme weather events, will increase the fragility of many rural livelihoods and thus intensify human vulnerability. Africa is likely to be affected by greater food insecurity and diminished access to safe water.

14. **Although broad sections of society may face similar levels of exposure** to climate variability, the degree of vulnerability to adverse impacts will be shaped mainly by livelihood opportunities, gender, age, disability, social class, and ethnicity. The poor tend to be most dependent on climate-sensitive sectors or activities such as agriculture, fishing, and forestry, while at the same time they face fewer possibilities to diversify into less climate-sensitive activities. Indigenous peoples, although not as numerous in Sub-Saharan Africa as in other

regions, are especially vulnerable to climate change effects on ecosystems because they depend so heavily on forests and other natural habitats.

15. **From a social development perspective**, history teaches us that focusing on increasing resilience and the adaptation capacity of communities is fundamental and requires an understanding of the impact of climate variability on poverty and vulnerability, and who is affected. Rural women may be particularly affected because they tend to play a greater role in natural resource management and ensuring nutrition. They often grow, process, manage, and market food and other natural resources, and are responsible for managing vegetable gardens and collecting fuel and water. In addition, actions to mitigate climate change must benefit the poor and avoid exacerbating inequalities, thus the importance of building the adaptive capacity and resilience of communities, vulnerable groups, and the institutions that support them. Finally, building adaptation and resiliency must be based on the capacities of affected communities themselves.

## **Objectives and Core Principles of the Strategy**

16. **The World Bank Group's strategy** — *Making Development Climate-Resilient: A World Bank Strategy for Sub-Saharan Africa* — aims to articulate a vision, key messages, priorities, and operational implications of the Bank Group's climate-related work in Sub-Saharan Africa. It is grounded in an assessment of the diverse climatic profile and vulnerabilities of the region, including identified knowledge gaps, expected impacts, work already under way by countries and partners, and key actions to be taken over time.

17. **The strategy is underpinned by four principles:**

- **Disaster risk reduction and climate change adaptation need be managed as a single integrated agenda.** Adapting to climate requires preparing for long-term changes in average climatic conditions. From a development perspective, however, most impacts of climate change, especially in the short to medium term, will materialize through variability and extremes. Because climate disasters are already occurring on a regular basis, risk management provides a more relevant entry point for most development planning and investment decisions than would a long-term scenario for changing average conditions. It would also yield positive economic and social returns in the short run.
- **Adaptation and risk reduction are fundamentally about sound development.** Climate change adds urgency and the need for renewed focus on prioritization, as well as ensuring that adaptation is fully integrated into growth and poverty reduction strategies.
- **Mitigation should go hand-in-hand with adaptation**, but should not be a constraint on Africa's access to energy and economic growth. Given that African countries contribute little to global greenhouse gas (GHG) emissions and that two-thirds of the continent's CO<sub>2</sub> emissions originate with land-use changes, the continent should be able to continue on a growth path through a mix of clean coal, renewable, and energy-efficient technologies, along with sustainable land and water management.
- **Scaling-up financing is necessary to meet Africa's development needs in a climate-constrained environment.** There is clearly a need for additional financing to build capacity,

mainstream climate change considerations into development planning, and climate-proof existing and future investments. The UNFCCC process is expected to produce an agreement on new, additional and predictable funding streams to finance the additional costs of climate resilience and low-carbon growth in developing countries. *For the purposes of the Bank's ongoing development work* in most African countries, the International Development Association (IDA), with its mission of poverty reduction, will continue to be the main platform for funding development through sector operations and will increasingly play a vital role in helping to mainstream climate considerations into core development. In addition, these funding streams will be augmented by new climate investment funding, carbon finance, and other emerging specialized instruments. There will also be greater scope to leverage financing from the private sector using many of these instruments.

18. **World Bank support to Sub-Saharan African countries** will be mainstreamed into country and regional programs along four pillars:

19. **Pillar 1 — Make adaptation and climate risk management a core component of development.** While adapting to climate variability and change will push up the cost of development, for most African countries adaptation is fundamentally about sound, resilient development. Key focus areas include disaster risk reduction; sustainable land, water, and forest management; coastal and urban development; watershed management, increased agricultural productivity; health; and social issues.

20. **Pillar 2 — Take advantage of mitigation opportunities.** Most of the region's mitigation opportunities are linked to more sustainable land and forest management, clean energy use and development (such as geothermal or hydropower), and the creation of sustainable urban transport systems. Some opportunities exist to access carbon finance by reducing emissions from deforestation and forest degradation,<sup>2</sup> and through renewable energy and energy efficiency. If included in future compliance markets, agriculture soil carbon could significantly enhance these opportunities. This will help African countries to commit to the mitigation agenda while furthering development.

21. **Pillar 3 — Focus on knowledge and capacity development.** While there is unequivocal evidence that the climate is changing, there is a great deal of uncertainty about the pace and extent of change and the impacts on different sub-regions and sectors. This uncertainty makes policy decisions more complex, and magnifies the need for Africa to build its knowledge and analytical base, as well as strengthen the capacity of country and regional institutions for weather forecasting, water resources monitoring, land-use information, disaster preparedness, risk management, and planning and coordination.

22. **Pillar 4 — Scale-up financing opportunities.** The actions proposed under this strategy will be funded primarily through IDA's core development finance. In addition to IDA's programmatic financing, incremental financing to build the knowledge base, strengthen

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2. A pilot REDD (Reduce Emissions from Deforestation and Forest Degradation) program through the voluntary market is in place until 2012.

institutions, and climate-proof investments<sup>3</sup> will come from both existing and new institutions. Whilst carbon finance (CF) and Global Environment Facility (GEF) have operating for a number of years, more instruments include: the Adaptation Fund of the United Nations Framework Convention on Climate Change (UNFCCC); the World Bank Group's Climate Investment Funds (Strategic Climate Funds; Clean Technology Fund); and two new Carbon Fund instruments — the Forest Carbon Partnership Facility and the Carbon Partnership Facility. A number of these will help to leverage underlying finance from both public and private sources.

## **Climate Change Affects Resource Sectors That Are Already at Risk**

23. **Climate variability and change will impact land and water resources**, which are already at risk from unsustainable management and lack of adequate development. This will most directly affect agriculture and energy development, which are fundamental to Africa's growth and poverty reduction programs.

### **Land resources**

24. **A majority of the African population is heavily dependent on land resources.** In light of population growth, local development pressure, and climate change, maintaining a healthy natural resource base is a major challenge in rural areas. Food productivity is constrained by insufficient nutrient input, lack of erosion control, and pressure from overgrazing. Increases in agricultural output have come largely through the expansion of cropland into increasingly marginal areas. Forests and woodlands are being cleared despite not being suitable for permanent agriculture.

25. **Lack of effective land management** has resulted in widespread land degradation across the continent, eroding the foundation of rural livelihoods and increasing the threat of food insecurity. Some estimates suggest that about 67 percent of the total area of Sub-Saharan Africa, about 16 million square kilometers, is affected by some form of land degradation, of which about one-fourth is rated severe to very severe.

26. **Land degradation processes may be exacerbated by climate change.** More intense rainfall promotes soil erosion. Increasing temperatures increase evapo-transpiration rates that reduce soil moisture, and in conjunction with shifting rainfall patterns, will affect vegetation patterns and the growing period for crops. Prolonged dry spells and erratic climatic conditions may lead to short-term coping strategies such as deforestation to increase livelihoods. They may help to mitigate the immediate impact of a climatic event, but will prove to be maladaptive in the long term by having adverse consequences for watersheds, biodiversity, and provision of important ecosystem services.

27. **Declining land productivity and ecosystem services** makes rural livelihoods more vulnerable to climatic variations and affect their capacity to recover from climatic shocks such as prolonged dry spells. Forest degradation and other changes in land cover may also increase exposure to floods as water infiltration capacity is reduced and surface run-off is increased.

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3. During the timeframe of the strategy (2010–2012) and beyond, reliance on increasing IDA resources is key, while a number of alternative financing instruments are being discussed, including extending a two percent levy on Clean Development Mechanism (CDM) proceeds to Joint Implementation projects or carbon emission transactions.

28. **Land-use changes and land degradation also contribute** to greenhouse gas emissions and affect local climatic conditions. Emissions from land use, land-use change, and deforestation are the single largest source of emissions in Sub-Saharan Africa. Where land-use changes reduce above-ground organic carbon, soil carbon also usually declines. This decline in organic matter has adverse effects on several physical, chemical, and biological soil properties, which impact land productivity, biodiversity, and ecological functions. Land cover changes can also lead to changes in local climatic conditions due to different surface reflectivity and water transpiration.

### **Water resources**

29. **Water is a vital development component of nearly every sector in Africa**, including urban services and industry, land management, energy, agriculture, environmental services, and fisheries. Lack of a reliable water supply of adequate quality undermines public health, restricts industrial growth, limits energy production from hydropower (and possibly thermal sources as well), constrains agricultural productivity and food production, and threatens and may eliminate important environmental services, including fisheries.

30. **Climate change will manifest itself primarily through changes** in average temperature and precipitation, which are important drivers of the water cycle and hence the seasonal occurrence and volume of water in groundwater aquifers, soils, lakes, rivers and wetlands. This adds a new dimension to the already high variability of precipitation and the water cycle, and presents a huge challenge to water resource development planners and managers who are used to basing their forecasts and designs solely on historical information. In addition to the challenge of finding enough water at the right time for all economic sectors and the environment, most countries also have to struggle with the destructive and sometimes cumulative impacts of water-related natural calamities brought about by climate change.<sup>4</sup>

31. **Water storage is vital to guard against the effects of high climate volatility** and ensure that water is available where and when it is needed. In most of Sub-Saharan Africa, precipitation occurs in just one season lasting four to six months, and the seasonal and inter-annual variation in the timing and volume of precipitation is high. Africa (excluding South Africa) has the world's lowest surface water storage capacity, at about 43 cubic meters per person per year, compared to a water storage capacity in North America of 6,150 cubic meters per person per year.

32. **Though Africa is endowed with a generous supply of water resources**, most of its river basins cross country borders, highlighting the importance of effective institutions that help to ensure shared benefits from cooperation. Africa has estimated annual renewable surface water resources of about 4,590 billion cubic meters per year, three-quarters of which are concentrated in eight large transboundary river basins: Congo, Niger, Ogadugne (Gabon), Zambezi, Nile, Sanga, Chari-Lagone, and Volta. There are a total of 63 transboundary river basins which account for 90 percent of Africa's surface water resources and cover 64 percent of its surface area. In addition to rivers, there are more than 160 lakes larger than 27 square kilometers, primarily in the equatorial region and the East Africa highlands.

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4. For example, floods in Mozambique caused average growth to drop from 7.5 percent per year between 1994 and 2003 to 1.5 percent in 2000. Kenya suffered an 11 and 16 percent drop in GDP due to the El Niño floods and the La Niña drought between 1997 and 2000

33. **The very large investments required** to develop multi-purpose and single-purpose water resource infrastructure will necessarily require a more thorough analysis of the returns to investment that explicitly account for hydrologic risk. The need to give greater consideration to these risks has important implications for the way the cost-effectiveness of early investments in water resource infrastructure are assessed. Without taking such risks into consideration, current low-yielding agricultural practices, combined with the high investments for irrigation water, partly justify the severe inadequacy in irrigation investment in most of Africa.

34. **Future development efforts will have to include unlocking hydropower**, water supply, irrigation, flood and drought management, navigation, environmental, and other economically and socially important water uses. The close connection between the urgent need to increase access to modern energy, and rewards from GHG mitigation through clean energy, gives Africa the opportunity to adopt a multi-purpose water resource development approach involving complementary water security infrastructure to manage hydrological variability. Such variability includes storage, containment, ecological balances, water conservation, flood management, drought mitigation, hydropower development, and water for industry, domestic use, navigation, and irrigation.

35. **This multi-purpose and integrated approach** — which follows directly from the unitary character of water resources — has the clear potential not only to help countries build economic resilience to climate change, but more importantly, to diversify their economies through sustainable intensification of agriculture based on irrigation, and develop and/or deepen new economic activities made possible by a larger and more stable supply of electricity. Multi-purpose water resource development has the potential to offer significant benefits to the countries of Africa, provided that appropriate water governance institutions are established to manage the complex dynamics of multi-country development.

## **Agriculture**

36. **The recent food crisis has highlighted the important fact** that climate change may become a threat multiplier, and thus the need for policy makers to move the agricultural agenda forward quickly and decisively. Compared to other World Bank regions, agriculture in Sub-Saharan Africa has the lowest productivity, and climate change (through warming, changes in rainfall, increased flooding, extreme heat events, pests, and loss of irrigation water) could have severe consequences for agricultural production. Crop failures and livestock deaths are already imposing significant economic losses and are undermining food security. These impacts are likely to become more severe as global warming continues.

37. **Neglect of the agriculture sector has contributed** to unfavorable socioeconomic and ecological conditions for the rural poor, leaving them particularly vulnerable to climate variability and change. The agricultural productivity of smallholder farmers is affected by severe degradation of the natural resource base and low water availability, which are being exacerbated by climate change. Agriculture is mainly rainfed, with only 7 percent of the cultivated area under irrigation. Of particular concern for the region are soil erosion and nutrient depletion. About 75 percent of Africa's farmland is affected by severe mining of soil nutrients, and without carbon fertilization, agricultural output would be reduced by an estimated average of 28 percent in Africa.

38. **Under-investment in the sector is one important cause of poor agricultural performance.** The vast majority of Africa's 200 million rural poor has very little access to new technologies, advisory services, input and output markets, credit, water and sanitation, and roads. Public spending on agriculture is particularly low, amounting to only 4 percent of agricultural GDP in agriculture-based economies, compared with 10 percent in successful transforming countries in 1980 (at the beginning of their transition period). Per capita growth of the agricultural population — which is a crude measure for agricultural income — is only 0.9 percent, less than one-half that of any other region.

39. **The agriculture sector has features that make it a unique instrument** for sustainable development, including providing mitigation benefits on a potentially massive scale. With 82 percent of Africa's population living in rural areas, the agriculture sector is fundamental for economic growth, poverty reduction, and environmental sustainability in the region, as highlighted by the World Development Report (2008g). Since agriculture will continue to be a major part of many African economies for a long time, the right kinds of investments, including expanded irrigation, could lead to productivity gains that improve the lives of a large percentage of the rural population. In addition, for the vast majority of the land —which is rainfed — mixed crop-livestock and conservation farming focused on sustainable land, soil moisture, and biomass management technologies, could help boost productivity and sequester significant amounts of carbon in soils, thus contributing to mitigating greenhouse gases and potentially providing additional financial resources to small farmers.

### **Energy resources**

40. **The lack of access to electricity, or its unreliable supply,** is a major impediment to growth and competitiveness of African economies, particularly exports. Only 24 percent of Africa's population has access to even basic electricity supply. Underlying the low level of access are exceptionally low levels of installed generation capacity, of which 60 percent is in South Africa alone. Twenty-eight countries are or have been affected by the energy crisis in the past two years, and the mismatch between demand and available supply is growing. With more than 550 million Africans without access to electricity, energy demand is expected to soar in the future, as is energy production — which could exacerbate the effects of climate change.

41. **Climate change presents additional challenges to the energy sector,** which has already been hit hard by high oil prices. More erratic rainfall has severely affected the power generation of hydropower dams in both eastern Africa (Ethiopia, Tanzania and Uganda) and western (Ghana, Cameroon) Africa, forcing these countries to spend their limited resources to add emergency generation capacity, most of which relies on coal- or fuel-based systems, thus aggravating greenhouse gas emissions.

42. **Africa has large, unexplored potential for hydro, solar, and wind power** and other new renewable resources. Of its huge hydroelectric power potential, only 7 percent is currently utilized, compared, for example, to more than 30 percent in Latin America. While wind and solar power potential are being assessed across the continent, a geothermal potential of 7,000 megawatts has been estimated mainly in the Rift Valley in eastern Africa. The African Ministerial Conference on Hydropower and Sustainable Development agreed in 2007 on an ambitious plan of action for developing the huge untapped hydropower potential on the

continent. Nonetheless Africa's development imperative means that all available sources of energy will be needed, including thermal power installations and, in some cases coal.

43. **Africa has an unprecedented opportunity to benefit from GHG mitigation.** By choosing a cleaner development pathway through low-carbon alternatives to meet its future energy needs, African countries can receive support from carbon finance schemes and the Clean Development Mechanism (CDM) of the Kyoto Protocol. For the 44 African countries and 22 technologies that have been approved by the CDM Executive Board, there is an estimated technical potential of more than 3,200 low-carbon energy projects.

44. **If fully implemented, this pool of potential projects could provide** more than 170 gigawatts of additional power generation capacity, more than twice the continent's current installed capacity, and avoid GHG emissions totaling about 740 million tonnes of carbon dioxide equivalent per year. A conservative estimate of the total capital cost for these potential low-carbon energy projects is about \$150 billion. To unlock this potential would require both CDM reforms and important regulatory reforms, such as allowing the sale of renewable energy to national electricity grids, most of which are managed in monopolistic arrangements, as well as the collection and transport of renewable energy and the dissemination of clean energy technologies, among others.

## **Priority Areas of World Bank Support**

45. **In addition to incorporating climate change in the policy dialogue,** the World Bank will focus its actions along the four pillars of the strategy. Most of the proposed actions are not new but build on — and add a climate risk management perspective to — the development work already ongoing in various sectors through the implementation of the Africa Action Plan.

### **Policy dialogue**

46. **The main focus of the Bank's approach is mainstreaming climate change** policy and action in the Poverty Reduction Strategies (PRS), Country Assistance/Partnership Strategies (CAS/CPS), and key sector strategies (e.g., agriculture, forestry, water, energy, health, and infrastructure), to ensure that country programs and budgets reflect climate risks. This will be done systematically and timed with country updates of Poverty Reduction Strategies and development plans, as well as the Bank's own country strategies and sector programs.<sup>5</sup>

### **Adaptation and mitigation opportunities**

47. **Mainstreaming climate change analytical work and investments** into IDA/IBRD-financed sector operations will focus on a number of areas where the Bank is already implementing significant programs. The Strategy provides entry points and opportunities to incorporate actions aimed at strengthening resiliency to climate risk and enhancing the mitigation benefits of development programs, through provision of information, piloting, and innovating, as well as providing expertise and resources to add value to ongoing operations. The following is an indicative — but not exhaustive — list of such actions.

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<sup>5</sup> Policy dialogue is already underway in several countries, including Ethiopia, Kenya, Mozambique, Zambia, Malawi, Cameroon, Ghana, Burkina Faso, Niger, Nigeria, and Senegal.

48. **Sustainable agriculture and watershed management.** Overall, the focus will be on investing in research and advisory services to develop and disseminate adaptation options, and scaling-up investments that build resiliency. At a country level, particularly in West Africa and the Sahel, Horn of Africa/East Africa, and Southern Africa, priority will be given to promoting and scaling-up investments in land and watershed management, test piloting new crop varieties, expanding conservation farming, piloting and expanding irrigation technology options, developing and enhancing early warning and risk sharing mechanisms, and supporting community-driven programs. In addition, the strategy will support analytical work and pilot investments that enhance carbon sequestration in agricultural soils, and help collect technical and economic information to help build the capacity of African countries.

49. **Water resources management and disaster risk reduction.** Building on the region's overall focus on river basin management (in the Nile, Niger, Zambezi, Congo, and Senegal river basins, as well as Lake Chad and Lake Victoria), scaling-up infrastructure includes multi-purpose storage and improving water-use efficiency. The strategy will call for support across the region to build the capacity to manage hydrologic risk through institutional strengthening, information and knowledge development (including historical and projected climate information, hydro-meteorological data acquisition and management tools, and support to basin organizations and water utilities for climate risk assessment and strategic planning). Moreover, building on work already underway on disaster risk management, especially in priority areas (including West Africa, Horn of Africa/East Africa, and eastern Southern Africa), the strategy calls for particular focus on droughts and floods and will require a combination of analytical work and investments in hazard risk and vulnerability assessments, policy and institutional capacity building, and updating and using infrastructure norms and standards in new operations.

50. **Urban development.** While the main entry point will be developing and utilizing land-use planning and flood and drainage risk mapping in planning urban services, priority areas include rapidly growing urban and peri-urban areas in West, East, and Southern Africa. Future Bank operations in these areas could have an added focus on assessing long-term water supply and reliability, strengthening urban services management through development and use of flood drainage risk mapping, and investing in shifting municipal services infrastructure away from risk zones, and redesign of infrastructure to mitigate flood and drainage problems.

51. **Coastal zones and fisheries.** The main focus is on supporting countries in West, East, and southern eastern Africa to manage coastal areas for sea level rise and sustainable fisheries. Specific initiatives include vulnerability assessments of coastal urban areas and infrastructure investments to sea level rise, flooding, and coastal erosion. Moreover, the strategy will support strengthening capacity for fisheries management, monitoring and evaluation of climate change effects on specific fisheries, and fishing communities.

52. **Forestry and biodiversity conservation.** The strategy supports work already underway in sustainable forest management and conservation of critical/fragile terrestrial and aquatic ecosystems in several countries of the Congo Basin and Southern Africa. In addition, a program to support generating carbon revenues from Reduced Emissions from Deforestation and forest Degradation (REDD) in seven countries is also being implemented.

53. **Health.** The main focus will be on raising awareness, information sharing among health and climate agencies, and promoting investment in vector control and surveillance programs — in areas where disease vectors could increase — with a special focus on malaria in West Africa and the Horn of Africa. In addition, access to water supply and sanitation, and improving health and nutrition programs across the regions will have significant adaptation benefits.

54. **Social and gender issues.** Across Sub-Saharan Africa, the strategy calls for ensuring that responses to climate change are gender-sensitive and support community-based programs that factor in local adaptation to climate change. It would also ensure that the poor and those living in low-income areas, weak and fragile states, and in flood and drought-prone areas, are not left behind. Some analytical work — focused on costing adaptation options through local institutions, and vulnerability assessment with particular attention to migration, youth issues, and indigenous peoples — is already underway in some parts of West and East Africa. New analytical work will be undertaken to identify operational approaches for mainstreaming gender in climate-change-related programs, with a particular focus on natural resource and watershed management and community-driven programs.

55. **Energy access.** The overall focus is on supporting the Africa Action Plan program of investments in energy development and access, using a mix of clean coal technology, renewable energy (especially hydropower), and energy efficiency. Because of pervasive and widespread use, solid biomass (wood fuel, charcoal, and crop residue) will continue to be an important source of energy in Africa over the next 30 years, while biofuels will see some moderate increase. While promoting low carbon growth in middle income countries (e.g., South Africa and Botswana), elsewhere, the focus is on expanding generation capacity and regional trade (through the East, West, and Southern Africa Power Pools), investing in geothermal (in East Africa), promoting gas flaring reduction (in West Africa), and supporting off-grid renewable energy in several other countries.

56. **Transport.** In addition to a region-wide recommendation for the strategy to review and revise transport standards to account for a shift in the frequency and magnitude of extreme events such as floods, investments in urban transport projects in several major African cities (e.g., Lagos, Accra) already include measures to reduce GHG emissions, and also support public transport, improved safety, and reduced exposure to air pollutants.

### **Special focus on knowledge and capacity development**

57. **There are significant deficits in knowledge and capacity** to address the problems of climate change. Capacity development is a long-term challenge that is embedded in essentially all development initiatives by the Bank and other development partners. Climate change adds a layer of complexity to existing capacity development challenges, and requires integration and coordination among sectors. The strategy identifies three groups of activities not necessarily mutually exclusive. The first is aimed at building the knowledge base and capacity within the Bank; the second targets building the capacity of Bank clients through technical assistance and analytical work; and the third aims to build capacity through sector-specific investment operations.

58. **The Bank is planning a number of regional initiatives** to help generate the knowledge necessary for operational design and client support.<sup>6</sup> Among these are two major new initiatives:

59. **Development of a climate information portal.** This initiative involves augmenting ongoing programs with data collection, case studies, and operational toolkits to help identify solutions that can be piloted through country and regional operations. A core element of the portal involves setting up a database (accessible to client countries and other stakeholders) that includes historical and projected climate information, hydrology, land use, and prediction models appropriate for Africa. Also included are several types of case studies, including: (i) adaptation in agriculture and watershed management; (ii) water resources management and the implications of climate change for hydropower development and management (e.g., operational implications of future hydrologic risk, and analysis of the efficiency of rehabilitation versus building new infrastructure); and (iii) impacts of sea level rise.

60. **Development of an analytical capacity on economic issues related to climate variability and change.** A number of pilot economic studies will be initiated — in Ethiopia, South Africa, Mozambique, Ghana, and Sudan — to test and develop methodologies and obtain estimates of the economic impacts of climate variability and change that are useful for policy work, and the costs and benefits of adaptation. These studies will also feed into other regional and global economic assessments managed by the Bank's global climate change and Global Facility for Disaster Reduction and Recovery (GFDRR) teams. Additional work will identify economically viable carbon finance opportunities (including carbon sequestration in agricultural soils) using existing CDM-related instruments or new initiatives. Finally, new work will be initiated on climate-proofing and carbon footprints in the Bank investment portfolio in Africa through two specific activities: (i) screening the Africa Region portfolio for development projects in key sectors in each country for climate risk to identify measures that can improve climate resiliency and adaptation to climate change; and (ii) developing methodologies to estimate the carbon footprint and shadow price of carbon in Bank operations. This information will be useful to estimate the additional costs of mainstreaming adaptation/carbon resource management (CRM) and/or mitigation opportunities into the Region's project portfolio and pipeline.

#### STRENGTHENING THE CAPACITY OF BANK CLIENTS TO MANAGE CLIMATE RISK

61. **The Bank is planning a number of regional and country-based initiatives** to provide technical assistance and help build a knowledge base in client countries. Some of these initiatives include:

62. **At a national level, a capacity building program for climate risk management** is needed at all levels — not just among a few technical specialists in a central government agency, but also within regular sector agencies, local government, the private sector, and non-governmental partners. In most cases, the key is not so much to identify the information, but to apply it in an appropriate way to reduce risk. The initial focus will be on economic and hydro-

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6. While aimed at building internal institutional capacity, information and knowledge generated under this group of activities will also be made available to Bank clients and partners. Moreover, it is important to note that while initially capacity building within the Bank is necessary, over time, an assessment will be done regarding the comparative advantage of the Bank and various other international and regional institutions to maintain climate-related data and modeling capacity.

meteorological planning, and energy agencies in several countries, including Ghana, Mozambique, Ethiopia, Kenya, Madagascar, Malawi, Niger, and Zambia.<sup>7</sup>

63. **In areas identified as hot-spots from a disaster risk perspective**, the Bank will support the development of National Program Frameworks for Disaster Risk Management and Climate Risk Management. These programs — already underway in Ghana, Mozambique, and Ethiopia — will benefit from funding under the Hyogo Framework for Action,<sup>8</sup> and will focus on the these areas: policy, institutional capacity and consensus building; disaster risk assessment; vulnerability assessment, monitoring, and early warning; knowledge and capacity enhancement for DRM; reducing underlying risk factors and integration across sectors, and disaster preparedness and recovery.

64. **At a regional level, the Bank will collaborate** with the World Meteorological Organization (WMO) to strengthen regional climate and hydrologic institutions. WMO will work with national meteorological institutions and the Climate Predictions and Applications Center of the Intergovernmental Authority on Development in East Africa (ICPAC) to strengthen local and regional capacities to assemble climate information and assess the validity of regional climate modeling methods to inform the design of adaptation and climate risk reduction strategies. In consideration of practical applications, the project will emphasize the dialogue between information providers and users. Other regional organizations that could benefit from such an initiative include the climate observatory OSS (Observatoire du Sahara et du Sahel), ACMAD (African Centre of Meteorological Applications for Development), and the SADC drought monitoring center.

65. **Support for Climate for Development in Africa Program**, (ClimDev-Africa), which is a joint initiative of the African Union Commission (AUC), the United Nations Economic Commission for Africa (UNECA), and the African Development Bank. This will be done through sharing climate information from the Bank Climate Portal, analytical tools and studies, as well as collaboration on joint workshops and training, and coordination at the country level.

#### CAPACITY BUILDING IN INVESTMENT OPERATIONS WITH CRM COMPONENTS

66. **Capacity building involve support to project and country teams** in identifying country-level adaptation activities either as components or stand-alone investment operations in key sectors, in close collaboration with key development partners (DFID, EU, AfDB, JICA, UN agencies, etc.). While this initiative will be progressively rolled out through the project pipeline over time, some of the operations already under way or at an advanced planning stage include:

- **Adaptation to Climate Change in Arid Lands Project in Kenya** will mainstream climate risk management within the ongoing Arid Lands Management Project.
- **Zambezi Valley Market-led Smallholder Development Project in Mozambique** factors climate change in planning and implementation of new approaches to improve the livelihoods of small farmers.

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7. In particular, an initiative already under way in Madagascar works with national champions and institutions by linking them with international centers of excellence, and will be replicated in several other countries.

8. International Strategy for Disaster Reduction (ISDR): Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.

- **Agriculture Development Program Support Project (ADP-SP) in Malawi** focuses on food security and sustainable agricultural growth. As part of the ADP-SP, the Bank is implementing a pioneering weather-index insurance scheme aimed at buffering small-scale farmers against productive losses associated with climate variability. This effort is complemented by a macro weather insurance scheme that helps to transfer risk of severe national droughts to international markets and provide the government with timely funding if a contractually specified catastrophic rain deficit occurs during the cropping season. The project also finances capacity building in commodity risk management.
- **Productive Safety Net Program (PSNP) in Ethiopia**, for the chronically food insecure, focuses on consumption smoothing, asset protection, and the creation of community assets through a public works program and direct support. A new drought risk management tool (Livelihoods, Early Assessment and Protection, LEAP) will help predict and mobilize funding ahead of a drought.
- **Niger River Water Resources Development Project (WRDP)** will include climate adaptation activities in key sectors — infrastructure, agriculture including irrigation, environment, and energy — that can be implemented by the riparian countries as part of their investment plans.

### **Expanding access to financing**

67. **The proliferation of different funds and initiatives is creating confusion** and a potential for duplicate efforts. The Bank will help its client countries to obtain adequate information and access these funds. Over the longer term, the Bank will encourage the development of coherent and integrated funding mechanisms for Africa around IDA, consistent with the climate change arrangements that will eventually emerge after 2012.

68. **In addition, because funding levels in the short and medium term** are still inadequate, and most new funds are designed for piloting and learning (e.g., the Pilot Program for Climate Resilience), the Bank will continue to advocate for increases in international funding to support disaster and climate risk management in Africa in the context of regular investment operations, thus ensuring that international money can be programmed for effective risk reduction in the short and long terms.

69. **The actions proposed under this Strategy** will be funded primarily through IDA's core development finance. IDA will also be used as a platform to leverage financing from the private sector, and other multilateral and bilateral donors, UN agencies, and new multilateral climate financing. Considerable effort will be expanded to ensure that African countries have the opportunity to access additional financing from a variety of emerging financing sources, which can be broadly classified into two groups — development-based and market-based.

### **DEVELOPMENT-TARGETED FINANCING**

70. **This category includes the World Bank's new Climate Investment Funds (CIFs)**, including: (i) the Clean Technology Fund (CTF) targeted at high-emitting developing countries; and (ii) the Strategic Climate Funds (SCFs), which include the Pilot Program for Climate Resilience (PPCR), the Forest Investment Fund (FIF), and the Scaling-up Renewable Energy Program for Low-Income Countries (SREP). Three African countries have been selected to participate in the PPCR, (Niger, Zambia and Mozambique) and two are likely to participate in

the CTF (South Africa and Nigeria). The operational modalities of the FIF and SREP are still being finalized. In addition, other funding sources are also being set up, including the GEF Trust Fund and its Special Priority on Climate Change; the Special Climate Change Fund and the Least Developed Countries Fund under the UNFCCC; the Adaptation Fund under the Kyoto Protocol, UNDP's Adaptation Program for Africa, ClimDev, and other bilateral initiatives.

71. **On the disaster risk reduction side**, the Global Facility for Disaster Reduction and Recovery (GFDRR) is a new and rapidly expanding vehicle for funding disaster risk reduction and recovery efforts. The GFDRR includes a mechanism for accelerated recovery, the Standby Recovery Financing Facility (SRFF), which aims to mainstream disaster risk reduction and climate change in post-disaster operations.

72. **Given the significant overlap between disaster risk management** and adaptation, the strategy calls for close coordination among financing sources in such a way as to allow disaster risk reduction investments to be financed under adaptation funds, while ensuring that disaster risk reduction programs funded under the GFDRR pay appropriate attention to changes in climate risks. Close cooperation among the various agencies managing these funds will be needed to develop guiding principles, both in headquarters and at the country level. This approach will be piloted in Madagascar, Mozambique, and Malawi, and will be extended to Ethiopia, Kenya, Senegal, Niger, and Mali.

73. **Finally, financing targeted at scaling-up sustainable land management** will be provided through TerrAfrica, a multi-stakeholder platform focused on scaling-up and harmonizing sustainable land management (SLM) investments through coalition building, knowledge generation, and country-specific investments and activities. An important part of the funding under TerrAfrica is through the GEF Strategic Investment Program (SIP) on SLM. This approach is complemented by a range of World Bank projects that blend IDA investments and GEF grant financing for activities focused on climate change, including large project components focused on SLM issues.

74. **Carbon finance.** Carbon finance increases the bankability of projects by adding an additional revenue stream that reduces the risks of commercial lending or grant financing, and thus provides a means to leverage new private and public investment into projects that reduce greenhouse gas emissions, thereby mitigating climate change while contributing to sustainable development. Therefore, in addition to small specialized Carbon Finance Funds (most of which have been in existence over the past 10 years), and while the challenges of the CDM and the negotiations around a long-term framework for the post-2012 period are worked out by the international community, the World Bank added two new instruments — the Forest Carbon Partnership Facility (FCPF) and the Carbon Partnership Facility (CPF) to help pilot positive incentive mechanisms:

75. **The Forest Carbon Partnership Facility has been designed** to set the stage for a large-scale system of incentives to reduce deforestation and forest degradation (REDD). It will assist developing countries in their REDD efforts by adding value to standing forests. The FCPF, approved by the World Bank Board of Executive Directors in 2007, is already operational and has received expressions of interest from 17 African countries.

76. **The Carbon Partnership Facility is designed** to develop emission reductions and support their purchase over long periods after 2012, using a programmatic approach. Its objective and business model are based on the need to prepare large-scale, potentially risky investments with long lead times, which require durable partnerships between buyers and sellers, and which use a programmatic rather than individual project approaches.

#### CARBON FINANCE AND THE CLEAN DEVELOPMENT MECHANISM

77. **The Strategy will help position African countries** to tap into the expanding carbon market in the context of the CDM and through new instruments. Current carbon finance mechanisms have not delivered the needed resources to Africa. At the end of 2008, out of 2,700 CDM projects already under validation worldwide, only 12 are in Sub-Saharan African countries (excluding South Africa).

78. **The Bank will scale-up efforts to systematically identify** viable CDM opportunities (and opportunities for the post-2012 funds) across Africa's energy sector, as well as in relation to biomass (e.g., bagasse, forest and forest industry residues, agriculture and agro-industrial residues). The Bank will support projects in rural electrification (Ethiopia), electricity transmission and distribution (Ethiopia, Kenya, Nigeria), energy efficiency (Kenya, Ghana, Senegal), hydropower (Nigeria), waste-to-energy (Nigeria, Swaziland), agroforestry (Ethiopia, Congo), and carbon finance (Uganda, Rwanda).

79. **Constrained financing is another major barrier to scaling-up** clean energy development in Africa. While carbon finance can bring an additional revenue stream to clean energy projects, it cannot provide the much needed up-front financing. The Bank will adopt a sector-wide approach to scale-up financing in the energy sector, and will do more to integrate carbon finance into its mainstream business in the future.

#### INSURANCE

80. **Risk transfer can help to mitigate some of the most severe impacts** of natural hazards due to climate change. At the national level, the government may use risk insurance to supplement its own contingency funds by transferring some of the risk to international financial markets. At the local level, there are encouraging pilots on index-based weather index insurance, which can help local farmers cope with climate variability and enhance investment opportunities.

81. **International financing may help to jump start** (or, in case of clearly rising climate risks, even subsidize) insurance mechanisms. The Caribbean Catastrophe Risk Insurance Facility is an example of such multinational pooling of risks, with reinsurance for damages above the capacity of the common pool. In addition to exploring the possibility of setting up such a stand-alone facility for Africa, the Bank will continue to support the piloting and rolling out of country-based risk insurance schemes, either as part of social protection programs, as in Ethiopia; as part of rural development and agriculture support programs, as in Malawi; or in the form of index-based crop insurance products for small farmers, as are under development in Senegal.

## Important Role of Partnerships

82. **With the adoption of this Strategy**, the Bank is well positioned to work with African institutions and other partners to support the efforts of vulnerable countries to incorporate climate risk management measures into their economic growth and poverty reduction programs. The Bank Group will strengthen existing partnerships and forge new ones, using its global, multi-sector knowledge base; its financial resources and convening power; and its private sector arms, IFC and MIGA, all to address the cross-cutting nature of the problems and challenges associated with climate variability and change.

83. **Building on the feedback received during the joint World Bank-AfDB** climate change strategy consultations in May-June 2008, the following key partnership-building actions will help speed up implementation and the efficient use of resources:

- Build on the work already undertaken by countries, especially through the National Adaptation Plans of Action (NAPAs), and other emerging disaster and/or climate change strategies.
- Engage the economic and finance ministries, and help countries access both existing financial resources (e.g., GEF, CDM); and new resources (e.g., Climate Investment Fund [CIF];<sup>9</sup> Arab Funds [AFs]).
- Support regional initiatives such as CLIM-DEV, and regional climate centers (ACMAD, SADC's Drought Monitoring Center, etc.).
- Joint implementation and joint/parallel financing, with the African Development Bank, of portfolio screenings for climate risk; training programs for staff and clients; and programming missions to roll out the implementation of the Pilot Program for Climate Resilience (PPCR).
- Close coordination with the African Union Commission, NEPAD, and regional economic communities (e.g., ECOWAS, COMESA, and SADC).
- Close coordination and leveraging resources with UK/DFID, EC (notably through the LIMELETTE process), Japan/JICA (notably through the TICAD process), UN agencies (e.g., UNDP, UNEP, WFP, UNECA, and WMO), the Arab Funds, and other partners and stakeholders.
- Build on the TerrAfrica multi-stakeholder platform on scaling-up sustainable land management.

## Monitoring Results

84. **While a framework for tracking climate resiliency over time** will be developed as part of the implementation of the strategy, in consultation with client countries and development partners, the main focus over the next three fiscal years (2010 to 2012) is on the following short-

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9. The Climate Investment Funds are being established by the World Bank jointly with the regional development banks (African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, and Inter-American Development Bank) to promote international cooperation on climate change and support progress toward a future climate change regime.

term to medium-term results, which will be monitored through sector operations and an annual report on the implementation of the regional climate strategy:

- Implementation of enabling activities and actions at country level, including: (i) five countries with climate change mainstreamed into PRSPs and/or CASs; and (ii) five countries with disaster preparedness programs.
- Preparation and dissemination of analytical work, including at least three flagship regional sector studies (water resources, land management, and transport), and six country case studies (vulnerability assessment, economics of climate change, cost of impact and adaptation options, hydrologic risk).
- Introduction of adaptation measures and technical assistance activities into the investment portfolio, starting with the water, agriculture, and energy sectors (six projects with explicit climate change adaptation component or sub-components and associated incremental cost).
- Utilization of carbon finance and pilot climate finance opportunities including: (i) CDM projects in at least five new countries; (ii) at least seven countries start implementing FCPF programs; (iii) at least three countries start implementing PPCR programs; and (iv) at least one country starts implementing a CTF program.
- Outreach activities (with clients and partners), including: (i) at least two regional workshops per fiscal year, (ii) preparation and dissemination of at least 10 country climate briefs and dissemination notes.
- Set-up of a regional coordination mechanism for mainstreaming climate change into sector operations, and for monitoring the implementation of the strategy.
- Regional training of staff and client countries (some 150 regional staff and 150 partners in client countries trained (in collaboration with the World Bank Institute).

## **Incremental Resources to Support Implementation**

85. **Implementation of the Strategy will through the country programs and will require strengthening multi-sector** coordination within the regions and with other units in the Bank, additional capacity for monitoring and reporting, as well hiring/training additional Bank staff. Moreover, scaling-up implementation will require mobilizing trust fund resources for technical assistance and project preparation support. In addition to an enhanced administrative Bank budget over FY10-12, significant resources will be mobilized from various trust funds and work will be initiated on setting up a new trust fund dedicated to supporting technical assistance to clients and implementation support for project preparation.