African Development Bank

Come Rain or Shine

Integrating Climate Risk Management into African Development Bank Operations

Maarten van Aalst, Molly Hellmuth and Daniele Ponzi

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Executive summary

Climate change and African development

Climate change is real and is happening now, with further changes inevitable. While mitigation of greenhouse gas emissions is crucial to limit long-term climate change, most of the changes projected for the coming decades cannot be avoided. Therefore, in the short to medium term, adaptation is the only option to manage the impacts of climate change and maximize development outcomes.

Africa is especially vulnerable to climate change. Agriculture and food security, water resources, public health, coastal infrastructure and resources, and peace on the continent are all under increasing threat. Current climate variability and weather extremes – such as floods, droughts and storms – already severely affect economic performance. And the poor are paying the highest price, because their livelihoods are most affected, and they have fewer resources to help them adapt.

Climate change also has implications for the African Development Bank (AfDB). The risks from a changing climate threaten the AfDB's mission of achieving sustainable poverty alleviation and economic development in Africa, through impacts on regional member countries' economic performance. They also pose a direct threat to the AfDB's own investment portfolio.

Climate risk management

Many of the most effective measures to adapt to future climate change coincide with those that reduce vulnerability to current climate risks. This principle lies behind *climate risk management*, which integrates management of current climate variability and extremes with adaptation to climate change. Climate risk management offers immediate benefits to economic development in Africa, as well as longer-term security in the face of a changing climate. The systematic integration of climate risk management into operations is receiving increasing attention in various development agencies and development banks. Risk screening tools are being developed, and there is a growing body of projects implemented by these agencies and banks, as well as the private sector, that explicitly include climate risk management.

The AfDB is building experience and partnerships for addressing climate risks, most notably through the Climate Information for Development – Africa (ClimDev Africa) programme and the Climate Adaptation for Rural Livelihoods and Agriculture (CARLA) project in Malawi. The AfDB is working with the African Union and the United Nations Economic Commission for Africa to implement the ClimDev programme, which aims to improve the availability and use of climate information and services in support of sustainable development and achievement of the Millennium Development Goals (MDGs). CARLA is a Global Environment Facility (GEF)-funded project which aims to 'climate-proof' a smallholders' crop production and marketing project.

A Climate Risk Management Strategy for the African Development Bank

The AfDB is developing a Climate Risk Management Strategy to guide further efforts in this area. The Strategy will address two key gaps in current AfDB work. First of all, it will help AfDB operations integrate the concept that the future climate will be different from the past, which changes investment

Climate change: Challenges and opportunities for Africa

Africa faces a number of special challenges that make it more vulnerable to climate change than other parts of the world:

- Key economic sectors – specifically agriculture, and other natural resource-based sectors – are highly sensitive to climate variability and change.
- Many systems are already close to their tolerance limit for temperature rise or changes in rainfall.
- Multiple stresses – including endemic poverty, complex governance and institutional dimensions, limited access to capital, ecosystem degradation, disasters and conflicts – combine to exacerbate Africa's vulnerability to climate variability and change.
- Availability of climate information is limited in most African countries, and the quality is usually poor.
- Competing priorities, and short- to medium-term decision-making horizons, mean that politicians and other decision-makers do not give due attention to adaptation for climate change. And because adaptation does not have a clear immediate economic output of its own, it is often considered less important than other development objectives.
- Available funding for climate change adaptation in Africa does not come even close to that needed.
- The infrastructure to cope with climate disasters, including early warning and response systems, is underdeveloped.

Climate change does however bring some opportunities for Africa:

- Attention paid to climate risks in the face of climate change can help to reduce the impacts of climate variability and extremes that Africa is already facing today.
- New and improved technologies, and innovations in climate science, are becoming available that could help Africa adapt to climate change.
- Innovative private sector instruments, management practices and business approaches are being developed that can help to cope with climate risks.
- Climate change can act as a catalyst to enhance partnerships between government departments, the private sector, non-governmental organizations, and national and international providers of scientific information.
- New adaptation funding provides resources for enhancing the effectiveness of current investments, or developing and implementing innovative practices.
- Incorporating climate risk management into projects results in a re-orientation of project planning and development, and better operation and maintenance, with both immediate and long-term benefits.

Africa is especially vulnerable to climate change, as well as to current climate variability and extremes (Vredeseilanden.org).

opportunities and risks. Second, it will address the current underinvestment in climate risk management and climate adaptation.

The Strategy will be implemented through two main areas of intervention.

- Climate risk management as part of due diligence in AfDB projects and country/ sector planning

Climate risks directly affect AfDB operations. These risks should be addressed in project preparation processes and appraisals in a similar way to other risks: systematic analysis and incorporation into project design and decision-making. To do this, climate risk management must be integrated into: (i) the project cycle; (ii) Country Strategy Papers and country programming cycles; and (iii) sector and other thematic economic studies for climate-sensitive sectors. Eventually, a large share of the AfDB's operations will include systematic climate risk management, as part of its regular planning and due diligence.

- Support for climate risk management by regional member countries

The main entry point for regional member country support is the AfDB's own country operations. The AfDB should identify high-risk investment cases, where external resources can be found for climate risk management add-ons. These cases can be used as a trigger for broader climate risk improvements in regional member countries. The aim is for climate issues to be integrated into national, sub-national, local and sectoral development planning and decision-making processes. Such AfDB support may include advocacy, advisory services on climate risk management, knowledge generation and

dissemination, technical assistance, and programme and project financing.

A key challenge facing the AfDB in developing and implementing the Strategy is that current funding available for adaptation in developing countries does not even come close to the scale of the resources needed. This means that the AfDB should advocate for new and additional streams of funding to address rising climate risks, but also focus on the most effective ways to enhance climate risk management with the limited resources available. In order to achieve that effectiveness, the AfDB will need to develop strategic partnerships to create synergies in its support to regional member countries and to optimize climate risk management in its own operations.

Contents

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The report also benefited from discussions during the visit of Steven Zebiak and Haresh Bhojwani to the AfDB in Tunis in January 2007, as a precursor and as part of AfDB preparation for the 8th African Union (AU) Heads of State Summit in Addis Ababa. The report builds on the momentum from the AU Summit where Heads of State supported the declaration on climate change, as well as the related outcomes from the African Partnership Forum held in Berlin in May 2007, and discussions stemming from Sir Nicholas Stern's visit to the AfDB in Tunis in July 2007 and following consultations on climate change with various multilateral and bilateral organizations.

The report also extensively gained from the discussions during visits to the AfDB by Dr Hellmuth in June 2007, and during a seminar on climate risk management in July 2007 by Dr van Aalst, also at the AfDB in Tunis. The three authors thank all of the people who participated in those discussions.

Finally, the report benefited from discussions during an AfDB-hosted workshop entitled 'Toward a Bank Strategy on Climate Risk Management: A Consultative Workshop on the Implications of Climate Risks for African Development Bank Operations'. The workshop brought together a wide range of experts working in climate-sensitive sectors in Africa, including national governments, civil society, non-governmental organizations, the private sector, centres of excellence and development partners. Comments and reactions from the experts can be found in Annex 10.

Any questions or comments on this report should be sent to Daniele Ponzi at d.ponzi@afdb.org

1. Introduction

Climate change

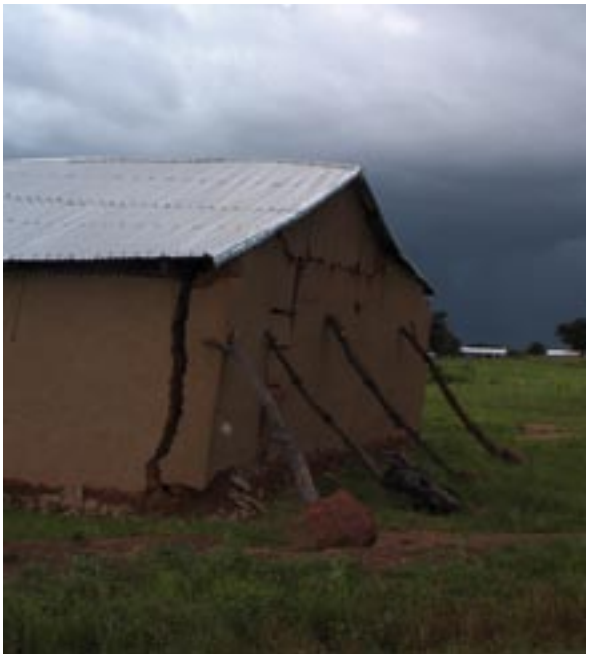
Climate change is happening now, and further changes during the next decades are inevitable (IPCC, 2007a). During the last century, the global climate warmed by about 0.7°C. At the same time, there were distinct changes in rainfall patterns, an increase in both frequency and severity of extreme weather events, and a rise in sea levels. The impacts of these changes are already being felt, and will intensify as further changes take place. Another 2–4°C rise is projected for the current century, mostly as a result of greenhouse gases that have already been emitted. This means that, although aggressive mitigation of greenhouse gas emissions is crucial to prevent longer term, potentially catastrophic changes, most of the changes projected for the coming decades cannot be avoided.

Africa is especially vulnerable. This is clear from the effects of current climate variability and weather extremes – such as floods, droughts and storms – which severely affect economic performance (AfDB, 2003; G8, 2005; Stern et al., 2006; IPCC, 2007b). The poor pay the highest price, because their livelihoods are most affected, and they have fewer resources to help them adapt to the changing climate. Box 1 describes some of the areas where climate change will have its most severe impacts in Africa.

African policy-makers and stakeholders are beginning to recognize the need to address adaptation to climate change. There is growing awareness of the setbacks to development and poverty reduction that will result from climate change, threatening the achievement of the Millennium Development Goals (MDGs). This was articulated in the multi-agency document 'Poverty and Climate Change' (AfDB, 2003), and more recently at the African Partnership Forum in May 2007 (APF, 2007). Climate change was placed on the agenda of the AU Heads of State Summit for the first time in January 2007, which resulted in the adoption of a Decision and Declaration on Climate Change and Development in Africa and in the endorsement of the Climate Information for Development – Africa (ClimDev Africa) Stakeholders Report and Implementation Strategy (GCOS, 2006).

Impacts on development in Africa

Climate variability, and the risks it presents, are already affecting development and poverty reduction efforts in Africa. First, sea level rise, climate variability and weather extremes such as heat waves, floods and droughts present severe direct threats. Overall economic performance in developing countries is especially affected because of their high dependence



The climate is already affecting development and poverty reduction efforts in Africa (Clarissa Wilkinson).

on natural resources, notably rain-fed agriculture (see Box 2), and their low access to economic and technological resources. Second, adverse climatic conditions can cause the under-performance of investments, e.g. new crops or irrigation investments, that are negatively affected if rainfall either increases or decreases significantly. Third, the uncertainty and unpredictability of climate can be a powerful barrier to investments and ultimately economic growth, even in years when climate conditions are favourable. The changing climate also complicates the design of infrastructure, and long-term investment planning. Finally, internal and cross-border migration driven by growing pressure on the natural resource base may create tensions among population groups and between countries.

Box 1. Climate change impacts in Africa (adapted from APF, 2007)

Agriculture and food security. Over 95% of Africa's agriculture is rain-fed. Agricultural production in many African countries and sub-regions is predicted to become severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are all expected to decrease. This will adversely affect food security and exacerbate malnutrition on the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020 (IPCC, 2007b).

Water. Half of Africa will face water stress. Three out of four African countries are in zones where small reductions in rainfall could result in large declines in river water (due to hydrologic dynamics in the watershed). Climate models show that 600,000 square kilometres currently classified as moderately water constrained will experience severe water limitations. By 2020, between 75 and 250 million people are projected to face water insecurity (IPCC, 2007b).The problem of water scarcity is particularly acute in North Africa because of high population growth rates and high rates of water use.

Health. The health effects of a rapidly changing climate are likely to be overwhelmingly negative. Africa is already vulnerable to a number of climate-sensitive diseases, such as Rift Valley fever, which afflicts both people and livestock; cholera, associated with both floods and droughts; and malaria, where a warming climate has resulted in the extension of the disease to the highlands of Kenya, Rwanda and Tanzania. These factors are superimposed upon weak health systems.

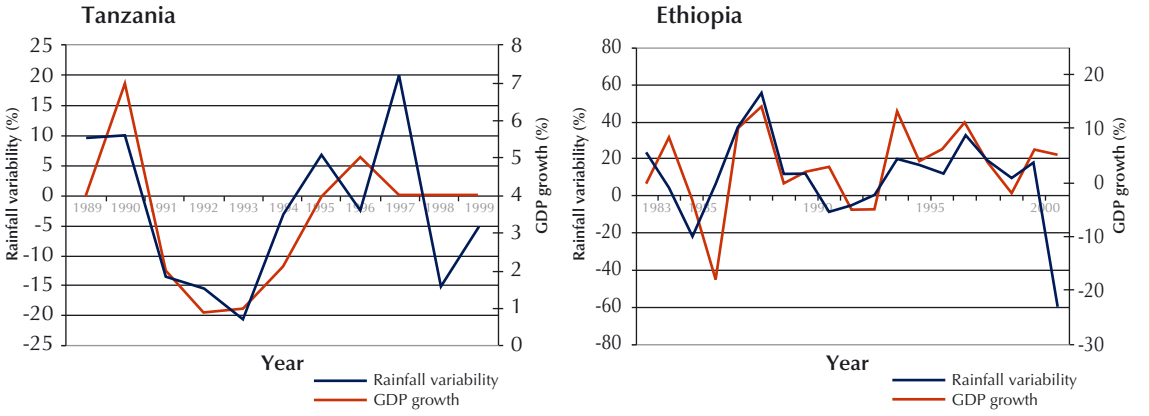
Coastal areas. Rising sea levels will severely affect coastal infrastructure and human settlements as well as natural resources, and could force major population movements. Sea level rise threatens coasts, lagoons and mangrove forests of both eastern and western Africa. More than a quarter of Africa's population lives within 100 kilometres of the coast, and projections suggest that the number of people at risk from coastal flooding will increase from 1 million in 1990 to 70 million in 2080. The costs of adaptation to sea level rise could amount to 5–10% of GDP in African coastal countries (Niang-Diop, 2005), but if no adaptation is undertaken, then the losses due to climate change could be up to 14% of GDP (Van Drunen et al., 2005).

Peace and stability. The direct and indirect effects of climate change could undermine the already fragile peace and stability on the continent. Interacting with other vulnerabilities, these could lead to significant population migrations internally as well as across borders, with severe humanitarian impacts, and increased risk of conflict.

Box 2. Rainfall variability and GDP in Tanzania and Ethiopia

The impact that climate variability has on predominantly rain-fed agrarian economies is clearly demonstrated by Tanzania and Ethiopia, where gross domestic product (GDP) closely tracks variations in rainfall (Figure 1). About half of Tanzania's GDP comes from agricultural production (including livestock), the majority of which is rain-fed and highly vulnerable to droughts and floods. In Ethiopia, around 75% of the population are dependent on agriculture, which is almost entirely small-scale and rain-fed; a further 10% earn their living from livestock. Both farmers and pastoralists are highly dependent on the climate for their livelihoods; this is reflected in the remarkable way that GDP fluctuations follow those in rainfall.

Figure 1. Relationship of rainfall variability and GDP growth in Tanzania (World Bank, 2006a) and Ethiopia (World Bank, 2006b).



Climate risk management

Climate risks due to changing climate will have to be taken into account by development planners. The future climate will almost certainly be very different from that of the present. However, many of the most effective measures to adapt to future climate change coincide with those that can reduce vulnerability to current climate risks.

The most promising approach is to integrate management of current climate variability and extremes with adaptation to climate change (Burton and van Aalst, 2004; World Bank, 2006c; Hellmuth et al., 2007). This *climate risk management* approach offers immediate benefits to economic development in Africa, as well as longer term security in the face of changing climate.

Implications for the African Development Bank

Climate change and the accompanying climate risks clearly affect the AfDB. First, through their impacts on regional member countries' economic performance, they affect the AfDB's mission of achieving sustainable poverty alleviation and economic development in Africa. But they also pose a direct threat to the AfDB's own investment portfolio. While infrastructure designs, agriculture investments and water management plans currently incorporate some awareness of climate variability, climate risks are seldom properly taken into account (see Box 3).

An in-depth analysis of climate risks facing the AfDB and its regional member countries has not yet

Box 3. Risking it: Ignoring climate risks in development projects

The presumption that climate risks will be taken care of in routine planning and project design often does not hold true. For example, engineers have historically made planning decisions based on the assumption that (a) the future climate will not be significantly different from the past climate, and (b) infrastructure provides the best 'solution' to reducing exposure to, or managing, current climate variability and extremes. An analysis of a set of World Bank projects considered to be exposed to climate risks clearly showed that none had paid specific attention to climate risk management in project design and implementation (Burton and van Aalst, 1999, 2004; van Aalst and Burton, 2002). For instance, a bridge in St Lucia constructed in the 1970s was severely damaged several times in the decades thereafter. A review study showed that the design had been appropriate at the time, but that, besides poor maintenance, damaging flood levels had also occurred much more frequently than had been considered in the engineering, which was based on past river runoff records. In this case, the increased flooding was not due to climate change, but to deforestation upstream. In hindsight, the project designers could have anticipated the population increases upstream and thus the risk of deforestation. In that light, one option might have been to upgrade the design criteria for the bridge. Another, much better, more sustainable and probably less expensive option would have been to include appropriate natural resources management strategies for the upstream areas. These could have saved increased construction costs and/or damages to the bridge, avoided erosion, and possibly even enhanced livelihood opportunities for the local population by providing alternative employment to 'slash-and-burn' agriculture on steep forested hillsides. This case and others illustrate the challenges that confront decision-makers in light of uncertain future climate change. The take-away lesson is that climate risks matter, that there are 'no regrets' measures that can be effective, and, in light of this, development planners need to adopt a new decision-making framework that goes beyond business-as-usual engineering practice (Callaway et al., 2006).

been undertaken.[1] However, estimates from other development agencies indicate that some 40% of development investments are at risk (OECD, 2005; World Bank, 2006d). These analyses indicate that, not only is climate change insufficiently addressed in project design, sector planning and national-level dialogues (as reflected, for instance, in Country Strategy Papers (CSPs)), but also that this lack of attention applies to the broader range of risks related to current climate variability and extremes (see Box 3). The Organization for Economic Cooperation and Development (OECD) analysis shows that many development efforts contribute to reducing vulnerability to climate variability and change, but that climate risks are seldom explicitly factored into development projects and programmes. Clearly, similar issues also affect sector and national development strategies.

The AfDB has begun preparing a Climate Risk Management Strategy to guide its efforts in tackling increasing climate risks. It aims to integrate climate risk management into the AfDB's regular operations, and to support enhanced climate risk management by regional member countries. This background paper contributes to the development of that Strategy, by highlighting some of the key challenges and opportunities related to climate change in Africa; reviewing experience in climate risk management within the AfDB and in other development organizations; and making suggestions for the way forward for the AfDB.

[1] Such a review would be highly useful in the preparation for the AfDB's Climate Risk Management Strategy, to determine the financial risk the Bank currently faces as a result of climate variability and change, and to generate specific project and sector examples to illustrate the key isseus an raise awareness among staff. Such a review should include three elements: an assessment of exposure to climate risks of the current lending portfolio (for instance, by sector, as in OECD (2005), a more in-depth evaluation of a representative sample of projects, and an assessment of a sample of CSPs and sector strategies.

2. Climate change: Challenges and opportunities for Africa

Challenges

Africa faces a number of special challenges that make it more vulnerable to climate change than other parts of the world. First of all, many systems are already close to their tolerance limit for temperature rise or changes in rainfall (see Box 1). A second aspect is the high sensitivity of key economic sectors to climate variability and change. Many African economies rely heavily on agriculture and natural resources, which are very sensitive to climate (see Box 2).

Another element is Africa's limited capacity to adapt. This is a result of multiple and complex stresses, that include endemic poverty, complex governance and institutional dimensions, limited access to capital (including markets, infrastructure and technology), ecosystem degradation, disasters and conflicts (Boko et al., 2007).

There is often a lack of attention to climate risk management in African countries and institutions because of competing priorities, and short- to medium-term decision-making horizons. Politicians and other decision-makers do not get credit for avoided impacts of climate change that will be evident only after several years or decades (or indeed, may go unnoticed if successful). Instead, they prefer to invest in rural development, infrastructure, agriculture, energy and other more 'visible' sectors.

Institutional challenges are also frequently a barrier. The cross-sectoral nature of climate risk management often does not fit well with existing agendas and mandates of government ministries.

Because adaptation is primarily aimed at preventing or reducing climate impacts, without a clear immediate economic output of its own, it is often considered less important than other development objectives. This overlooks the fact that it is these very development objectives that are at risk from climate change. Clear economic information on these implications is key for decision-makers to integrate climate risk management into policy and practice.

Africa faces a number of special challenges that make it more vulnerable to climate change than other parts of the world (C. Shirley/UNHCR).

A further challenge relates to the availability and quality of climate information in Africa. Global climate models typically provide projections of the future climate on a coarse spatial and time resolution that is often not suitable to identify impacts and appropriate response strategies within the continent. In addition, while climate information often exists that could improve decision-making, at present this information is seldom incorporated into development decisions. The reasons are varied, but include lack of capacity to translate the information into usable information, lack of communication infrastructure and a lack of demand (IRI, 2006).

The combination of these challenges is reflected in the high toll weather-related disasters such as floods and droughts are already having on development in Africa. A substantial amount of financial and other resources for development is each year being diverted to post-disaster relief, emergency assistance, reconstruction and rehabilitation. Besides the human suffering resulting from climate-related disasters, the setbacks in development, the disruption of economic activities and the diversion of national and international public finance from development investments to relief and reconstruction, the poorly managed climate risks also take an indirect toll: they discourage private sector investment. Investors want to be able to rely on infrastructure, on availability of human resources and on stable markets. All three of these are uncertain in the face of a changing climate and a lack of climate risk management.

A final challenge relates to funding for adaptation, and the equity dimensions of climate change. Africa as a continent has contributed very little to greenhouse gas emissions, yet it now lies directly in the path of climate change impacts. As industrialized countries begin to recognize the need to protect their own economies and populations, and are investing billions of dollars in climate risk reduction at home, there is a moral obligation to support similar adaptation in Africa. Box 4 (and Annex 2) show the scale of the costs of adaptation to climate change in Africa. Currently, the available funding does not come even close to that needed.

Opportunities

Climate change also brings some opportunities. In particular, the additional attention paid to climate risks in the face of climate change can help to reduce the impacts of climate variability and extremes that Africa is already facing today, especially if it results in a reorientation of project planning and development, and better operation and maintenance. There is currently substantial underinvestment in climate risk management in development efforts, as reflected by the high toll of climate-related disasters. Many of the best measures to reduce the risks of climate change will also reduce the risks of current climate variability and extremes, and enhance development effectiveness.

Climate change can be a trigger for governments, communities, enterprises and individuals to

Climate change can be a trigger for communities to implement climate risk management strategies in the context of their regular activities (Janot Mendler de Suarez).

Box 4. Adaptation costs and benefits

Estimates of the costs of climate change impacts vary, because they depend somewhat on future greenhouse gas emissions and assumptions regarding the way climate change will materialize, and also on how effective countries are in adapting. A conservative global estimate for all developing countries is that climate change will cost 0.5% of GDP for a 2–3°C rise, appearing over the coming decades. African economies are considered to be among the most vulnerable, and would be facing losses of at least 1–2% of GDP, or US$10–20 billion, annually. For instance, the Intergovernmental Panel on Climate Change (IPCC) estimates that in some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020 (IPCC, 2007a). Over the longer term (towards 2100), Sir Nicholas Stern has estimated that global impacts could be of the order of 5–20% of GDP (Stern et al., 2006). Again, African countries would be among the worst hit.

A rough order-of-magnitude estimate of the costs of adaptation, in terms of climate proofing new investments, can be made on the basis of total investment flows, their estimated sensitivity to climate risks, and the proportional cost of the required adaptation measures. Based on this approach, the global cost of 'climate proofing' new investments in developing countries has been estimated at US$10–40 billion per year (World Bank, 2006d). For Africa, a similar calculation is presented in Annex 2, resulting in a total annual cost in the range of US$2–7 billion. This is of the order of 0.5% of Africa's GDP, reflecting the high exposure of the continent, and in line with expected impacts over the course of the coming decades.

For the AfDB, the most immediate costs would be those to climate-proof new investments. Those additional costs are likely to be of the order of about US$300 million per year (see Annex 2).

In light of the scale of financing required, it is important to note that only limited global financing mechanisms have been established so far, mainly those administered under the Global Environment Facility (GEF) and the Adaptation Fund. The total of these funds could at most be of the order of a few hundred million dollars a year by 2012 (see Annex 3).

implement climate risk management strategies in the context of their regular activities. African governments have a special role in establishing the policy frameworks to encourage adaptation by individuals, communities and businesses – in particular to tackle the wide range of constraints that limit the current capacity for adaptation by these groups.

New and improved technologies are becoming available to integrate climate risks into agriculture and food security, water resources management, health, and disaster management. Innovations in climate science, such as climate forecasting and satellite-based monitoring, are being used to improve decision-making in these areas (Hellmuth et al., 2007). For example, SwissRe, one of the world's leading reinsurers, and the International Research Institute for Climate and Society (IRI) are together developing an innovative index insurance system with the objective of protecting farmers in Kenya from climate risks. In the past, climate variability has been largely considered as not amenable to intervention (IRI, 2005), however advances in climate science, and increases in the capacity of meteorological services and users of climate information, are slowly changing this perception in Africa (see Box 5 and Annex 4). For example, seasonal forecasting provides great opportunities to manage climate impacts one season

Box 5. Using climate information to enhance development outcomes

There are practical examples of climate information providing added value to development efforts and investments. Unfortunately, in most cases where seasonal forecasting information is integrated into decision-making, there is no control experiment (decisions without the use of forecasting) that permits quantification of the value of applying the forecast. In Zimbabwe, however, Patt et al. (2005) showed that farmers who reported changing specific decisions such as planting date or crop variety on the basis of seasonal forecasts clearly outperformed farmers who did not use the forecasts, with yield gains of up to 17%.

In addition, climate information may significantly help with reducing both preventative costs and incidence of epidemic malaria (Worrall et al., 2004; Connor et al., 2007). Partners in the Roll Back Malaria initiative have developed a new epidemic malaria early warning and response system that includes seasonal forecasts and climate monitoring, as well as vulnerability assessments, case surveillance and response planning. The system is currently being tested in several epidemic-prone countries of southern Africa, where the early evidence is that national control programmes have substantially improved their preparedness and response. Analysis of prevention and treatment cost data from Zimbabwe shows that a flexible response based on climate information may improve cost-effectiveness in both 'wetter' and 'drier' years.

ahead, and it could be applied much more effectively by better tailoring it to users' needs (Patt et al., 2007).

Following on from this, climate change can act as a catalyst to enhance partnerships between government departments, the private sector, non-governmental organizations (NGOs), and national and international providers of scientific information, in order to share and jointly develop tailored climate information, and implement climate risk management interventions.

Innovative private sector instruments, management practices and business approaches are being developed that can help to cope with climate risks. Financial services can facilitate risk sharing through insurance. This helps absorb some of the impacts of climate variability and extreme events, and provides strong signals on the scale of risk exposure and the market valuation of expected losses. Weather insurance schemes to reduce farmers' vulnerabilities to climate shocks are being piloted in Kenya, Malawi and Tanzania (Warren and Osgood, 2007). Similar services should be facilitated and expanded for businesses, communities, households and farmers in the developing world, especially through low cost micro-insurance schemes for low-income groups (see Box 6). In other parts of the world, some governments are purchasing catastrophe insurance to mitigate the immediate fiscal impacts of major natural disasters. In the Caribbean, a number of small states have created a multi-country catastrophe risk insurance facility to reduce the costs of (re)insurance (see www.ccrif.org).

New adaptation funding, while not adequate to solve the problem, provides at least some resources for enhancing the effectiveness of current investments, or developing and implementing innovative practices. Aside from the United Nations Framework Convention on Climate Change (UNFCCC) funds (see Annex 3), further funding is available from multilateral and bilateral development agencies explicitly for this purpose.

Not all sectors face only negative impacts due to climate change. While the net economic effects are bound to be strongly negative in almost all parts of Africa, there will also be some opportunities to make use of the changes in climate. Increasing temperatures

An effective epidemic malaria early warning and response system can help countries deal with this climate-sensitive disease. The photo shows mosquito breeding sites (Arne Bomblies/MIT).

and changes in rainfall may in some areas lengthen the growing season, for instance in the Ethiopian highlands and parts of Mozambique (Thornton et al., 2006). Some studies have also shown increased potential for livestock farming, at least with moderate increases in temperature (Seo and Mendelsohn, 2006a; 2006b). More generally, the higher concentrations of carbon dioxide in the atmosphere may raise yields of particular crops.

Finally, and most importantly, there are several opportunities associated with reorientation of project planning and development. Incorporating climate risk management will enhance project performance, during project implementation but particularly in terms of long-term project results. As shown in Annex 5, investments in risk reduction can boost the economic performance of projects. A fresh look at sector and project planning could also help to raise the profile of 'no-regrets' strategies for climate risk management, which pay immediate development benefits regardless of precisely how climate change unfolds. One such example is the promotion of appropriate natural resources management, which can yield many benefits at once (in fact, these benefits may even include contributing to climate change mitigation by sequestering greenhouse gases from the atmosphere and/or avoiding deforestation).

Box 6. Insuring against adverse weather
(adapted from Hellmuth et al., 2007; Osgood et al., 2007)

Insurance is an important tool in risk management, and weather-related insurance is very useful in climate risk management. Recent innovations in insurance contracts have led to the initiation of several weather-related insurance activities in Africa, as well as other regions around the world. In Ethiopia, Kenya, Malawi and Tanzania, for example, pilot projects are under way that insure farmers against drought.

Traditional insurance contracts insure against crop failure, but these lead to perverse incentives to farmers to allow the crops to fail. There is also an incentive for less productive farmers to buy insurance and for more productive farmers not to buy insurance. These problems lead to more payouts, which in turn lead to higher premiums, ultimately making this type of insurance too expensive to be workable in African countries.

The new insurance contracts are written against an index, for example, of rainfall. The index depends on an established relationship between, for example, lack of rainfall and crop failure, ideally verified by long historical records of rainfall and yield. As the season progresses, if rainfall turns out to be low (below an agreed trigger point), the farmers receive payouts. However, farmers still have the incentive to make the best productive choices, whether the insurance pays out or not. Index insurance is also cheaper to implement because the insurance company does not need to send employers to the field to verify damage.

The main advantage is that, when rainfall is low enough to cause crops to fail, insurers will pay out to farmers within days or weeks, so that farmers do not need to sell off their assets to survive. The money will see them through the drought period, and they will then be able to continue farming when the rains resume. Without insurance, farmers or pastoralists are forced to sell equipment or animals to survive a drought, and this often means they become dependent on aid for a much longer period after the drought has ended. Another advantage of insurance is that, with this support in place, farmers may feel more able to take greater risks which have potential high returns, for example invest in fertilizers or sustainable land management practices. In addition, insurance spreads the cost of drought across insurance companies, and reduces the need for donors to find large sums of money quickly in an emergency.

There are some disadvantages. The farmer is not insured against crop failure, but only against drought. If crops fail for a reason other than drought, then the farmer receives no compensation. But even if the index does not protect against all risks, if the risk that it protects against is sufficiently important then the insurance is worthwhile. Index insurance systems are typically developed as a part of a larger risk layering strategy in which index insurance is applied at the most appropriate point, and other tools – such as traditional insurance – complete the package.

New rainfall-linked insurance contracts can protect small-scale farmers against climate risks (Dan Osgood/IRI).

3. Experience in climate risk management

While much remains to be done to address the challenges and opportunities highlighted above, there is an emerging body of knowledge and experience that can be drawn upon from other development banks and development agencies, and also from initial AfDB experiences, particularly in Malawi.

Eventually, a large share of the AfDB's operations will need to include systematic climate risk management, as part of due diligence in country programming and project preparation. In the short term, the AfDB is building its capacity in a few selected cases, developing cross-cutting capacity support mechanisms, as well as preparing systematic institutional and policy responses.

Experience in other development agencies

The systematic integration of climate risk management in development operations is receiving increasing attention in various development agencies and development banks. Annex 6 provides an overview of some of the methods and tools that are being developed for this purpose. Examples include the World Bank's Climate Risk Screening Tool; methods from the Asian Development Bank's CLIMAP programme, which have been used to assess adaptation needs in several Pacific Island Countries; and risk screening tools developed by the UK's Department for International Development (DFID) and currently applied in Bangladesh.

Besides the development of these tools, there is also a growing body of projects implemented by development banks that explicitly include climate risk management. The World Bank is leading these efforts, with a number of innovative projects in various regions. The private sector, in particular insurance and re-insurance companies, are also beginning to integrate climate risks into their insurance products.

There have been several climate risk management programmes in Latin America and the Caribbean, most recently also including innovative financial instruments for risk transfer (including risk pooling between different countries). In the Asia/Pacific Region, the World Bank supports a programme to integrate climate change into national economic planning in the Pacific island nation of Kiribati, working directly with the Ministry of Finance and Economic Planning (see Annex 7). In the same region, a project in the Philippines aims to integrate climate risk management into a set of World Bank lending operations in agriculture, irrigation and natural resources management (see Annex 8). In Africa, the World Bank has initiated an add-on to the Kenya Arid Lands Project, integrating long-term climate risk management into the existing project.

Experience at the African Development Bank

The AfDB is building experience and partnerships for addressing climate risks, most notably through the ClimDev Africa programme (Annex 9) and the Climate Adaptation for Rural Livelihoods and Agriculture (CARLA) project in Malawi (Annex 8). The AfDB is working with the African Union and the United Nations Economic Commission for Africa on implementing ClimDev Africa, which aims to improve the availability and use of climate information and services in support of sustainable development and achievement of the MDGs. CARLA is a Global Environment Facility (GEF)-funded project which aims to 'climate-proof' a smallholders' crop production and marketing project in Malawi. The add-on is expected to generate significant benefits in terms of

Box 7. Generating net returns: Integrating climate risk management in development projects

There is good qualitative evidence that climate risk management pays off, and there are many examples that show that ignoring it has reduced the effectiveness of development investments (see Box 3). However, there is only a limited number of specific economic analyses of the costs and benefits of climate risk management. This is mainly because it is easier to find evidence of costs and benefits of investments that have a productive purpose, than for investments to avoid negative impacts. In many cases, such investments will be add-ons to other productive investments, and their benefits are hidden in the better performance of the baseline project. Annex 5 presents an overview of some ex-ante and ex-post analyses of climate risk management interventions, which clearly show that the economic benefits can be very large indeed. For instance, for specific infrastructure investments, such as buildings or ports, appropriate risk management solutions often add only a few percent to the initial project cost, but can save damage and reconstruction costs similar to the original investment. For example, for a deep sea port in Dominica, the original investment cost with appropriate risk management would have been less than 12% higher, saving reconstruction costs of over 40% (inflation-adjusted), and avoiding substantial additional indirect economic losses due to interrupted services (OAS, 1998). As another example, a Vietnam Red Cross mangrove planting programme to protect coastal inhabitants from storms cost an average US$0.13 million a year over the period 1994 to 2001, but reduced the annual cost of dyke maintenance by US$7.1 million (IFRC, 2002). The US Federal Emergency Management Agency (FEMA) has estimated that one dollar spent on hazard mitigation generates on average US$4 in future benefits (MMC/NIBS, 2005).[2]

[2] According to a study of FEMA grants (including for retrofitting, structural mitigation projects, public awareness and education and building codes); see MMC/NIBS (2005).

Climate risk management needs to be mainstreamed into regular project planning and implementation (Arne Bomblies/ MIT).

reduced climate risk to the original project, but it will also enhance institutional capacity for climate risk management in the sector, giving it a much broader impact than just the protection of the original investments.

Elements for success

Most of the current climate risk management efforts by development banks and other agencies aim to mainstream climate risk management into regular sector operations. That is, specific attention is paid to the integration of climate risk management into regular planning, programming, project preparation and implementation. Another element for success is that the primary in-country stakeholders are not the environment ministries or meteorological offices, but the sectoral decisions-makers in the line agencies, such as water, agriculture and energy departments (sometimes complemented by central agencies such as finance and planning); as well as individuals, the private sector and NGOs working in the sector. The AfDB has a key comparative advantage here: through its sector operations it has an ongoing dialogue with the right stakeholders who need to integrate climate risk management into their own investment plans, programmes and projects.

4. Towards a Climate Risk Management Strategy for the African Development Bank

As highlighted in the first two sections of this paper, climate change is a major threat to the AfDB's core mission, putting overall economic development and poverty alleviation in Africa at risk. The AfDB's existing portfolio and future investments face a direct risk from climate variability and change, as well as the risk of underperformance. Better climate risk management will reduce these risks, and at the same time provide opportunities to enhance the effectiveness of the AfDB's investments and support to regional member countries. Together, these conclusions provide a strong argument for better climate risk management within the AfDB's operations, and support for better climate risk management in regional member countries. The proposed new Climate Risk Management Strategy should guide the AfDB's efforts in these areas.[3]

The Strategy will address two key gaps in current AfDB work. First of all, it will help AfDB operations integrate the notion that the future climate will be different from the past, which changes investment opportunities and risks. Second, it will address the underinvestment in climate adaptation and climate risk management, even in light of current climate variability and extremes.

The Climate Risk Management Strategy will be implemented through two main areas of intervention:

- Climate risk management as part of the due diligence in AfDB projects and country/sector planning
- Support for climate risk management by regional member countries.

Climate risk management as due diligence in African Development Bank projects and country/sector planning

Climate risks directly affect AfDB operations. These risks should be addressed in project preparation processes and appraisals in a similar way to other risks: by systematic analysis and incorporation into project design and decision-making. In this sense, climate risk management should become part of regular due diligence. Just as any AfDB project must show a good rate of return on investment, even in the case of adverse international market prices or currency fluctuations, so climate-sensitive development interventions must show adequate robustness and resilience in the light of climate variability and change.

In order to safeguard the effectiveness of AfDB-financed operations in the face of increasing climate risks, climate risk analysis must be integrated into:

(i) the project cycle
(ii) Country Strategy Papers (CSPs) and country programming cycles
(iii) sector and other thematic economic studies for climate-sensitive sectors.

The integration of climate risk management into regular project and country operations may require revision of the following:

- The AfDB's Environmental and Social Assessment Procedures (ESAP), and its guidelines for Environmental and Social Impact Assessments (ESIA) and Strategic Environmental and Social Assessments (SESA)

[3] The new strategy will function in parallel to the AfDB's Clean Energy Investment Framework (CEIF), which addresses the AfDB's activities in order to enhance energy access in Africa and reduce greenhouse gas concentrations in the atmosphere.

- ❑ AfDB operational and sector policies, procedures and guidelines, including the operations manual, and project identification, preparation and supervision processes, procedures and document formats/templates.

Supporting climate risk management by regional member countries

The second area consists of support to regional member country governments for better climate risk management, for instance in their national planning, sectoral operations and cooperation with local governments, private sector and NGOs. This may involve:

- ❑ Advocacy (to regional member country and donor governments, external civil society and the private sector)
- ❑ Advisory services on climate risk management
- ❑ Knowledge generation and dissemination (including financing for research on detailed impacts and appropriate responses to climate change in Africa)
- ❑ Technical assistance (including financing for detailed studies and incorporation of climate risk management into project feasibility studies)
- ❑ Policy-based financing (for specific programmes of sector adjustments and institutional reforms)
- ❑ Programme financing – preferably on grant terms (for sets of implementation of specific responses)
- ❑ Project financing – through both mainstreaming and add-on interventions to improve climate risk management in project identification, planning, design and implementation.

Given the scale of climate change, as well as the challenges and opportunities, it is essential to prioritize. The main entry point for regional member country support should be the AfDB's own country operations. Integrating climate risk management into these regular operations will help to identify key sectors and countries that are at particularly high risk, and thus provide the most effective starting points for assistance. Attaching support to AfDB projects also helps to safeguard baseline investments, as well as build broader capacity for climate risk management (a good example is the CARLA project; see Annex 8).

A key priority throughout such efforts is to mainstream climate issues into national, sub-national, local and sectoral development planning and decision-making processes. This includes national frameworks such as Poverty Reduction Strategy Papers (PRSPs), sectoral strategies and plans, as well as national and local strategies for sustainable development. A key

Infrastructure should be properly designed to support climate-sensitive development as climate variability and change may result in underperformace of investments (Claire Adida).

Better climate risk management in regional member countries will contribute to the AfDB's mission (Arne Bomblies/MIT).

issue is integration into economic planning and the budgetary process, within and across all sensitive sectors. Effective adaptation will also require high-level cross-sectoral coordination and adequate ownership by sectoral departments and agencies of adaptation implementation programmes. It may be necessary to revise national policies and remove perverse policy instruments – for example, distorting subsidies and ill-defined property rights – that impede adaptation or discourage appropriate climate risk management.

A cross-cutting area of support, which will facilitate such implementation and policy development, involves capacity building and awareness raising among regional member country stakeholders. Awareness-raising efforts can draw on information contained in UNFCCC-associated National Communications as well as in National Adaptation Programmes of Action (NAPAs), where they have been developed. Efforts to build capacity for adaptation to climate change at the country level should include human resources development and training, institutional capacity building and management change, and public finance improvement.

Climate risk management in regional member countries can also be facilitated by the generation and sharing of high quality climate and adaptation information, including on best adaptation practices and lessons learnt and transfer of appropriate technologies. In particular, good climate observations and climate data services are crucial. While climate science has made substantial advances in recent years and reliable information is increasingly available, it is essential that this information can be well used locally. Information must to be packaged in a user-friendly format, and communication must flow at all levels, from government agencies to businesses and from utilities to farmers, in all key climate-sensitive sectors. The AfDB is currently addressing some of these challenges under the ClimDev Africa programme (Annex 9). A specific application for such information is the development of reliable, comprehensive and integrated early warning systems at local, national and regional levels.

Another priority is to develop and apply appropriate climate risk management methods and tools (see

Annex 6). This includes their integration into relevant economic and financial analyses and other studies, such as social and environmental assessments. Tools are needed for assessing vulnerabilities and weighing risks, as well as for assessing the costs and benefits of different climate risk management options. Such analyses will also help to improve the economic rationale of decision-making under conditions of climate uncertainty. Development banks can play a key role in developing and supporting the introduction of such tools into country and sector strategies and project planning, design and implementation. There is a need to work closely with the private sector in this area and to share lessons on current investment decision-making practices used by the private sector.

Clearly the impact of such information, methods and tools depends entirely on good implementation. A key component of supporting regional member countries, especially with respect to infrastructure investments, relates to appropriate design, construction, operation and maintenance during and after implementation. Policies and guidelines are only a small step. Specific attention is required to ensure that climate risk standards are indeed applied, that current design codes are developed or updated, and that material selection, construction methods, supervision, and operation and maintenance are all up to standards. This requires close attention by AfDB staff responsible for project design, interacting with those supervising the implementation process and eventual operation and maintenance. It also merits attention in country dialogues, and may benefit from collaboration with partners such as the United Nations Environment and Development Programmes (UNEP and UNDP), insurance companies and others.

But adaptation can only partly be addressed through macro-level analysis, policies and investments.

Reliable climate information, which is user friendly and easily available, can help protect irrigation schemes (Kevin Day).

Coastal African countries need to address the threat to their coastlands from rising sea level (Nick Brooks).

A complementary challenge, and long-term goal, is to empower communities to realistically assess their own vulnerability to climate change and contribute towards strengthening climate risk management strategies at local community, national and regional levels. Communities will need access to climate information, and actors at higher levels should ensure that adaptation responses address local stakeholders concerns. This includes increasing the resilience of livelihoods and infrastructure as a key component of effective poverty reduction strategies. Adaptation strategies should therefore build upon, and sustain, existing livelihoods, and take into account the existing knowledge and coping strategies of the poor.

Finally, the AfDB should lend support to regional member countries for resource mobilization for effective climate risk management in national planning and sectoral strategies for climate-sensitive sectors. The AfDB can draw on emerging experience with the GEF-funded CARLA project in this. Specifically, in the near term, the AfDB should aim to develop more UNFCCC/GEF-funded projects supporting climate risk management in the context of regular AfDB operations.

Box 8. Areas where climate risk management in regional member countries could be improved

Increasing public awareness of vulnerability to country-specific climate threats and risk management options

- Adapting technical standards, such as building codes, to the expected changes in climate
- Managing increasing climate variability and extreme weather events, through early warning systems, protective infrastructure, and improved shelters and human settlements
- Mitigating rising stress on water resources, especially on trans-boundary water basins
- Sustaining agriculture and food security in drier, more uncertain climates, including R&D on more resilient crop and animal strains, adaptation of agricultural practices, and support for appropriate agricultural futures markets, weather index-based crop insurance, etc.
- Mitigating the increasing threat of vector- and water-borne diseases
- Countering rising stress on ecosystems and natural resources, including biodiversity, to increase resilience to climate change
- Addressing the threat to coastlands and small islands from sea level rise.

5. Conclusions

This paper has outlined the main issues facing the AfDB in terms of addressing the rising risks of climate variability and change, and has highlighted opportunities to maximize the effectiveness of its investments. The analysis can be summed up in ten key messages.

1. First and foremost, climate change is real, and is happening now. As confirmed by the IPCC, climate change is already affecting people, economies and the environment.
2. Africa has much at stake, perhaps more than any other continent. Current climate variability and extremes, such as floods, droughts and storms, severely affect the livelihoods of the poor, economic performance and key assets, including transport and energy infrastructure and water and sanitation systems. Parts of Africa are particularly vulnerable to climate change due to heavy reliance on rain-fed agriculture, as well as low adaptive capacity due to lack of economic resources and technology.
3. These risks directly affect the AfDB's work, by hampering its mission of economic development and poverty alleviation in Africa, and through direct threats to its investments.
4. While mitigation of greenhouse gas emissions is crucial to limit long-term climate change, in the short term adaptation is the only option to manage the impacts of climate change and maximize development outcomes.
5. Climate change adaptation is best addressed through a comprehensive climate risk management approach, integrating adaptation to climate change with better management of risks related to current climate variability and weather extremes. Such climate risk management is not just a defensive strategy in the face of rising risks, it is also an opportunity to enhance the effectiveness of development efforts right now.
6. In the face of the current and rising risks, the AfDB must start enhancing climate risk management, focusing on two core areas: (a) due diligence in AfDB projects and country/sector planning; and (b) supporting regional member countries to integrate climate risk management into their national planning, sectoral operations, and cooperation with local governments, private sector and NGOs.
7. As a starting point, the AfDB should identify high-risk investment cases, where external resources can be found for climate risk management add-ons. These cases can be used as a trigger for broader climate risk improvements in regional member countries.
8. The AfDB can make use of existing experience, as well as new and improved technologies for climate risk management. It can draw on experiences both within and outside Africa.
9. Current funding available for adaptation in developing countries does not even come close to the scale of the resources needed. This means that the AfDB must find the most effective ways to enhance climate risk management with the limited resources available, but that it should also advocate for new and additional streams of funding to address the inequities associated with the rising climate risks.
10. Finally, given the enormity of the challenge and constraints, the AfDB must develop strategic partnerships to create synergies in its support to regional member countries and to optimize its internal due diligence.

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Annex 1. Glossary of terms [4]

Adaptation (to climate variability and change) – Policies, actions and other initiatives designed to limit the potential adverse impacts arising from climate variability and change (including extreme events), and exploit any positive consequences.

Adaptive capacity – The capacity of an organization or system to moderate the risks of climate variability and change, or to realize benefits, through changes in its characteristics or behaviour. Adaptive capacity can be an inherent property or it could have been developed as a result of previous policy, planning or design decisions.

Climate – The 'average weather': the statistics of weather conditions such as temperature, rainfall, sunshine and winds, averaged over a period of time ranging from months to thousands of years. The World Meteorological Organization (WMO) definition uses a 30-year average. Although the most basic aspect of climate is the long-term average for a particular time of year, it can also refer to statistics related to variability (such as the number of days with rainfall above a certain threshold, or the likelihood of a particular extreme weather event).

Climate change – Any long-term change in climate over time, typically decades or longer. Climate change can be due to natural variability or the result of human activities. It is often used in the context of human-induced changes in greenhouse gas concentrations and land use.

Climate change mitigation – See mitigation.

Climate forecast – The prediction of various aspects of the climate of a region during some future period of time.

Climate proofing – An approach which tries to assess a project's climate risk, and (re)design the project to reduce this risk to an 'acceptable' level, given the uncertainties of present and future climate change. It does not mean to suggest that assets, livelihoods or communities can be completely immunized against the impacts of climate change and variability; instead it refers to the need for increased resilience and reduced vulnerability to be at the heart of development work.

Climate risk management – Integrating management of current climate variability and extremes with adaptation to climate change. It involves proactive 'no regrets' strategies aimed at maximizing positive and minimizing negative outcomes for communities and societies in climate-sensitive sectors such as agriculture, food security, water resources and health.

Climate shock – A damaging climatic extreme, such as a drought, flood or heat wave.

Climate variability – Variations in the atmosphere at time scales ranging from months to decades, falling between the extremes of daily weather and the long-term trends associated with climate change.

Early warning systems – Systems to provide an advance warning of an impending hazard event. These systems usually include: understanding and mapping the hazard; monitoring and forecasting impending events; processing and disseminating understandable warnings to political authorities and the population; and undertaking appropriate and timely actions in response to the warnings.

[4] Drawing, in part, on Asian Development Bank (2005), IRI (2006) and Commonwealth of Australia (2006).

Global warming – An increase in the global average surface temperature.

Mitigation (of climate change) – Policies, measures and activities that reduce the emission of greenhouse gases into the atmosphere or enhance their sinks (in order to limit global warming).

National Adaptation Programmes of Action (NAPAs) – Established in 2001 by the 7th Conference of the Parties of the UNFCCC, NAPAs are intended to assist least developed countries in meeting their needs and concerns with respect to adaptation to climate change, by setting priority activities to be undertaken.

No regrets (policies for climate change) – Policies, plans or actions that would generate net social benefits whether or not climate change occurs as currently expected.

Risk – The combination of the chances of a hazardous event occurring, and the impact or consequence of that event.

Sea-level rise (fall) – An increase (decrease) in the mean level of the ocean, persisting for an extended period, typically decades or longer.

Vulnerability – Characteristics of human communities or social systems that cause them to be susceptible to adverse outcomes when exposed to a particular shock, in this context climate variability, climate change or an extreme weather event.

Weather – The state of the atmosphere at a particular place and time. It can be characterized by variables such as rainfall, temperature, sunshine, cloudiness and wind.

Weather index insurance – An insurance in which a payoff is triggered by a weather index, for instance the amount of rainfall over a given period.

Annex 2. Financing adaptation to climate change in Africa

Adaptation costs for Africa

The global cost of 'climate-proofing' new investments in developing countries has been estimated at US$10–40 billion per year. For Africa, a similar calculation is presented in Table A2.1, which gives an annual cost of US$2–7 billion. (Note that this amount does not include retrofitting of existing capital stock. Furthermore, it does not include adaptation expenditures to safeguard lives and livelihoods of millions of poor people who do not contribute substantially to the cash economy or macroeconomic investment flows.)

Funding for adaptation

This analysis suggests that adaptation in Africa will require of the order of several billion US dollars per year in additional resources. Note that if such expenditures are not made today in the context of new investments, retrofitting later will often be more expensive. On the other hand, while primarily intended to safeguard investments from the incremental impacts of climate change, the additional efforts and expenditures to reduce climate vulnerability do start paying off right away in the face of the existing climate variability and extremes (see also Annex 5).

The costs of these additional efforts should be compared to the international adaptation financing available (primarily under the umbrella of the UNFCCC, and administered by the GEF; see Annex 3). These funds currently amount to about US$277 million (US$50 million in the Special Priority for Adaptation (SPA) of the regular GEF Trust Fund; US$67 million in the Special Climate Change Fund (SCCF), and about US$160 million in the Least Developed Countries Fund (LDCF)). In addition, the Adaptation Fund under the Kyoto Protocol, which is filled by a 2% tax on Clean Development Mechanism transactions, could provide of the order of several

Table A2.1. Estimated costs of adaptation in the context of new investments in Africa

Item	Amount per year (billion US$)	Estimated portion sensitive to climate change	Estimated costs of adaptation	Total adaptation costs per year (billion US$)
Official Development Assistance (ODA) and concessional finance	35	40%	10–20%	1.4–2.8
Foreign Direct Investment (FDI)	30	10%	10–20%	0.3–0.6
Domestic Financed Investment (DFI)	200	2–10%	10–20%	0.4–4
Total annual costs of adaptation				**2–7**

Sources: World Bank, Organization for Economic Cooperation and Development (OECD)/AfDB, United Nations Economic Commission for Africa (UNECA).

hundred million US dollars over the first commitment period (until 2012). An optimistic scenario would yield global annual adaptation financing of the order of US$200 million per year between now and 2012, falling far short of the adaptation needs (estimated to be of the order of US$10-40 billion globally).

This comparison clearly shows that, while the UNFCCC-related funds can and should be used to encourage effective adaptation in Africa, they will not be sufficient to meet Africa's adaptation needs.

Resource requirements for the AfDB

The immediate responsibility of the AfDB itself is more limited than the large figures listed above. First of all, AfDB will need to enhance its internal capacity for climate risk management in project preparation and country dialogues. More importantly, it must safeguard the effectiveness of new AfDB/African Development Fund (ADF)[5] investments. The estimates in Table A2.2 suggest that this will amount to additional resources of the order of US$300 million.

These needs could partly be addressed within the regular AfDB and ADF windows, partly by bilateral and multi-donor trust funds, and partly by add-ons to regular operations funded by international adaptation funds administered by the GEF. Many of these additional efforts in the context of regular operations will also provide spin-offs in terms of enhanced capacity by regional member countries and thus contribute to the broader adaptation efforts needed to rise up the bigger challenge of adaptation in Africa (highlighted by the figures from Table A2.1).

Table A2.2. Estimated costs of climate-proofing AfDB and ADF investments

Item	Amount per year (million US$)	Estimated portion sensitive to climate change	Estimated costs of adaptation	Total adaptation costs per year (million US$)
AfDB window new approvals	2775	40%	15%*	165
ADF window new approvals	2250	40%	15%	135
Total annual costs of climate proofing AfDB investments				**300**

Sources: World Bank, AfDB.

* Likely range: 10–20% (World Bank, 2006d).

[5] The part of the AfDB Group that provides grants and concessional lending as well as technical assistance and capacity building to low-income regional member countries.

Annex 3. Overview of UNFCCC/GEF funds

There are currently three international financing sources for adaptation under the umbrella of the UNFCCC, and administered by the GEF.

Strategic Priority on Adaptation (SPA) – GEF Trust Fund

Objective: To create demonstration projects that address local adaptation needs, while generating global environmental benefits within the GEF focal areas (biodiversity, climate change mitigation, international waters and land degradation). The key characteristic of the SPA in comparison to the new funds is, therefore, that its primary focus must be on environmental adaptation. However, increased resilience of sustainable local development is still a key element in most of the SPA projects funded to date.

- Project activities are supposed to provide global environmental benefits in the areas of biodiversity, climate change, international waters and land degradation.

- Eligibility: countries that are parties to the UNFCCC and eligible to borrow from the World Bank/receive technical assistance grants from the UNDP.

- Time-scale: project life: 3 years average; project benefits: one to several decades.

- Incremental cost: the cost required to ensure that baseline activities in development and generation of global environmental activities are made resilient to future climate change.

- Finances:
  - Total fund: US$50 million from 2006 to 2008 (may be replenished)
  - Fund will cover incremental costs of adaptation and co-financing from other sources will cover the baseline costs (what would be done without GEF intervention). Incremental costs must be determined as the margin between a baseline and an 'adaptation alternative' scenario.

- Projects: 12 projects funded for a total of US$29.6 million from GEF. Many more projects are in the pipeline, and the fund is currently closed for new submissions. Once the current SPA portfolio is completed (expected at the council meeting in June 2008 at the latest), the SPA will be evaluated and replenished. The Fund became operational in November 2005. Sample projects include:
  - Community Based Adaptation to Climate Change (US$10 million, US$5.46 million from GEF) in Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger and Vietnam
  - Adaptation to Climate Change – Responding to Shoreline Change and its Human Dimensions in West Africa through Integrated Coastal Area Management (US$ 8.36 million, US$4.36 million from GEF)
  - Integrated National Adaptation Plan: High Mountain Ecosystems, Colombia's Caribbean Insular Areas and Human Health (INAP), Colombia (US$18.1 million, US$6.2 million from GEF)
  - Integrating Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation in Southern and Eastern Africa (US$2.35 million, US$1.1 million from GEF).

Least Developed Country Fund (LDCF)

Objectives: To support the (a) preparation of NAPAs to identify urgent and immediate adaptation needs in least developed countries; and (b) implementation of priority adaptation activities highlighted in the NAPAs process.

- Eligibility: LDCs only.
- Time scale: short-term (interannual to 10-year).
- Additional cost: costs imposed by climate change on current development investments. It is not necessary to generate global environmental benefits in LDCF projects. Additional costs can be calculated as the margin between a baseline and an 'adaptation scenario' or be estimated by a sliding scale which takes into account the size and nature of projects. Existing development funds can be used as a basis for co-financing in the LDCF, and there is an option for full-cost funding.
- Finances:
  - Total fund: currently US$160 million pledged, US$25 million in current portfolio.
  - Cost sharing/sliding scale: depends on size of projects. Less than US$300,000, no cost sharing required; greater than US$18 million, 75% co-financing required.
- Projects: The implementation phase of the fund became operational in June 2006. A total of 46 nations have received about US$200,000 to prepare their NAPAs. No NAPA implementation projects have been finalized yet. Projects in the pipeline include:
  - Community-based adaptation to climate change through coastal afforestation, Bangladesh.
  - Reduce climate change-induced risks and vulnerabilities from glacial lake outbursts in the Punakha-Wangdi and Chamkhar Valleys, Bhutan.
  - Climate Adaptation for Rural Livelihoods and Agriculture (CARLA), Malawi.
  - Implementing NAPA priority interventions to build resilience and adaptive capacity of the agriculture sector to climate change in Niger.

Special Climate Change Fund (SCCF)

Objective: To finance activities related to climate change that are complementary to those funded by GEF, in the following areas: adaptation to climate change; technology transfer; energy, transport, industry, agriculture, forestry and waste management; and economic diversification. Among these categories, adaptation has the top priority. Adaptation activities must take into account the priorities identified in national communications and/or NAPAs. The SCCF adaptation programme focuses on the following adaptation areas: water resources, agriculture, health, infrastructure, integrated coastal zone management and fragile ecosystems, including mountain ecosystems. Priority is also given to capacity building for preventive measures, planning, preparedness and management of disasters relating to climate change, including contingency planning for droughts and floods in areas prone to extreme weather events.

- Eligibility: LDCs and emerging economies (non-annex I countries of the UNFCCC).
- Time-scale: long-term (multi-decadal, 30-year horizon).
- Additional costs: definition same as LDCF; it is not necessary to generate global environmental benefits. Additional costs can be calculated as the margin between a baseline and an 'adaptation scenario' or be estimated by a sliding scale which takes into account the size and nature of projects.
- Finances:
  - Total fund: currently US$67 million pledged (of which approximately US$10 million are earmarked for technology transfer). Around US$75 million in current portfolio and pipeline, and the SCCF is thus currently closed

for further project submissions. The pipeline may be reopened once the SCCF is sufficiently replenished by donors.
  - Cost sharing/sliding scale: depends on size of projects. Less than US$1 million, 50% cost sharing required; greater than US$5 million, 75% co-financing required.

- Projects: Fund became operational in November 2004. Nine projects have been included in the work programme so far, totalling around US$33 million of SCCF funding. Projects include:
  - Mainstreaming Adaptation to Climate Change Into Water Resources Management and Rural Development, China (US$55.8 million, US$5.8 million from GEF)
  - Design and Implementation of Pilot Climate Change Adaptation Measures in the Andean Region (US$28.3 million, US$8.1 million from GEF)
  - Adaptation to Climate Change through Effective Water Governance, Ecuador (US$9.7 million, US$3.7 million from GEF)
  - Coping with Drought and Climate Change, four separate projects in Ethiopia, Mozambique and Zimbabwe (US$7.3 million, US$3.1 million from GEF).

The Adaptation Fund

Is not active as yet and is not expected to generate significant resources until at least 2010.

- Source of funds: A 2% tax levied on CDM project proceeds from the sale of certified emission reductions.

- Eligibility: Still under discussion.

- Management: Still under discussion.

- Amount: US$200–400 million estimated through 2012.

Annex 4. Climate as a resource: How climate information can serve African development[5]

Climate is a resource which can be used to improve decision-making within key development sectors, thereby reducing the impacts of adverse climate, or increasing benefits from favourable climate. A wide array of development decisions, from operational to strategic, can be better informed by climate information and services.

There are three types of climate information:

- Historical data, which help elucidate trends, provide climate statistics, set a context for current data, and allow variability and the occurrence of extremes to be quantified
- Real-time data, i.e. current climate observations. These aid short-term predictions of the consequences of specific weather events – for example, heavy rainfall leading to flooding
- Climate forecasts, i.e. predictions of the climate, ranging from long-term weather forecasts, through seasonal forecasts, to medium- (10–30 year) and long-term climate change projections.

Advances in climate science are improving the availability and quality of all three information types. Data rescue techniques are extending historical datasets and making them more accessible and useful. Satellite remote sensing is providing large amounts of useful data to supplement ground observations (though the latter remain essential for calibration purposes). Climate forecast modelling is rapidly improving with the development of new software and more powerful computers.

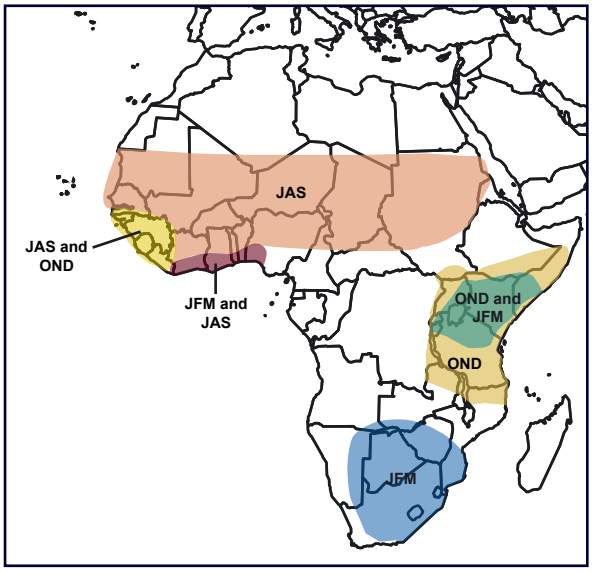
As a starting point, to characterize the nature of the climate risks at a particular location, we rely on the past. Historical climate observations are central to many development applications, as they provide the basis for planning and optimizing investments (i.e. feasibility, design, location, performance). Analysis of climate observations allows planners to better understand trends, derive climate statistics of interest, and place current observations into historical context. Developing this baseline of climate risks is second nature in developed countries; unfortunately in many parts of Africa reliable and accessible climate information is in short supply. However, better integration of existing historical data at the regional scale may favour a more direct connection between our understanding of climate variability, which is best expressed at regional to continental scales.

Real-time climate observations serve as a useful proxy for climate-sensitive variables, such as soil moisture and habitat for disease vectors, as well as helping early warning systems for flood, drought and disease. Operational systems for forecasting these types of impacts derive at least some of their predictability from real-time observations. The use of real-time data and information to monitor and predict malaria outbreaks is a new innovation that is being introduced in southern Africa to help manage epidemic malaria.

Where proven to have skill, forecast products at different time scales (weather, medium-range, seasonal) may contribute to operational management, hazard management and longer-term planning when integrated into appropriate decision-making frameworks. For example, at operational scales for water resources management we rely heavily on historic and current hydrologic information (water levels, flows, etc.) and weather forecasts, and in some innovative cases, seasonal forecasts. In particular, and of relevance for many development issues in Africa, the skill of seasonal forecasting has been strengthened over the years (see Figure A1). Seasonal forecasts

[5] Modified from Hellmuth et al., 2007.

Figure A4.1. Regions in sub-Saharan Africa where seasonal rainfall can be simulated with a high degree of skill based on models calibrated over the 1950–1995 period. The labels indicate the season(s) of greater predictability; these generally coincide with the regions' rainy seasons: January/February/March (JFM) for southern Africa; July/August/September (JAS) for the Sahel and western Africa; October/November/December (OND) for eastern Africa. Source: Adapted from IRI (2005).



have been proven useful for planning agricultural activities, and as a starting point for early warning and response planning. Of course, such forecasts indicate a 'tilt in the odds' towards a particular outcome; they will never give a 'perfect' prediction – one that turns out to be 100% right. The challenge is to incorporate such probabilistic information, with its explicit uncertainties, into decision-making.

For longer-term planning of infrastructure, policy and investment, we can no longer rely solely on the past observations due to climate change. At the intersection between year-to-year climate variability and climate change lies decadal variability (over one or more decades, usually involving predictions over the next 10–30 years). This timescale has immediate relevance to strategic planning, and is consequently the subject of much ongoing research. Over relatively long timescales (i.e. 30 years or more) and large spatial scales (i.e. hemispheric, global), today's climate change models broadly agree, both with each other and with physical theory, about what is likely to happen in aggregate, at least with regard to anthropogenic climate change. At shorter timescales and on local and regional scales, there is considerable disagreement among the models, making it difficult to reach conclusions. However, there is a consensus amongst the IPCC models[6] that there will be a drying of the coast of North Africa and in southern Africa. This drying will have important impacts on water resources, water quality and, by extension, on agriculture, human health, migration, social conflict and, potentially, even war. To plan how to adapt to these hydrological changes will take years to decades and must begin now.

Despite the large uncertainties in long-term climate predictions, this type of information can be useful when used in a decision-making context. For example, methodologies have been developed and tested to evaluate the potential economic, environmental and social risks and implications of climate change, as well as the implications on investment alternatives. For example, decision-makers can weigh the pros, cons, costs and benefits of different investment strategies in light of climate change predictions. One of the biggest 'climate' risks faced by decision-makers is that of making mistakes based on false expectations about the climate. Economists are developing strategies and tools for weighing the risks, costs and benefits of different courses of action in order to address and improve development outcomes in the face of future climate change uncertainty (Callaway et al., 2006).

[6] It is a robust result in the models that participated in the IPCC Working Group 1 Fourth Assessment Report that the subtropical dry regions get even drier and expand poleward. This is a simple consequence of intensified patterns of atmospheric water vapour transport as the atmosphere warms and holds more moisture and of the poleward expansion of the Hadley Cell and poleward shift of the mid-latitude storm tracks. Land regions predicted to be severely affected by this anthropogenic drying are: the southwestern United States and northern Mexico, the Caribbean and Central America, tropical South America (Brazil), southern Europe, the coast of North Africa, the Middle East and southern Africa. In each of these areas the anthropogenic drying sets in, according to the models, in the late 20th and early 21st Centuries and reaches levels of permanent aridity equivalent to those of historic multiyear

Annex 5. Costs and benefits of climate risk management: A disaster risk reduction perspective

Table A5.1 provides an overview of some analyses of the benefit–cost ratio and/or internal rate of return of investments in disaster risk reduction.

The examples in the table do not explicitly account for climate change. Several analyses by the Asian Development Bank show that climate change is

Table A5.1 Costs and benefits of disaster risk reduction[7]

Source and type of analysis	Actual or potential benefits	Result/return
***Ex-ante* appraisal (assessment before implementation)**		
Kramer (1995): Appraisal of strengthening the roots of banana trees against windstorms in St. Lucia	Increase in banana yields in years with windstorms	Expected return negative as banana yields decreased
World Bank (1996): Appraisal of Argentinean Flood Protection Project. Construction of flood defence facilities and strengthening of national and provincial institutions for disaster management	Reduction in direct flood damages to homes, avoided expenses of evacuation and relocation	Internal Rate of Return (IRR): 20.4% (range 7.5–30.6%)
Vermeiren et al. (1998): Hypothetical evaluation of benefits of retrofitting of port in Dominica and school in Jamaica	Potentially avoided reconstruction costs in one hurricane event each	Benefit/cost ratio: 2.2–3.5
Dedeurwaerdere (1998): Appraisal of a range of different prevention measures (mostly physical) against floods and lahars (volcanic flows) in the Philippines	Avoided direct economic damage	Benefit/cost ratio: 3.5–30
Mechler (2004): Appraisal of risk transfer for public infrastructure in Honduras and Argentina	Reduction in macroeconomic impacts	Positive and negative effects dependent on exposure to hazards, economic context and expectation of external aid
Mechler (2005): Prefeasibility appraisal of Polder system against flooding in Piura, Peru	Reduction in direct social and economic and indirect impacts	Best estimates: Benefit/cost ratio: 3.8 IRR: 31%
Mechler (2005): Research-oriented appraisal of integrated water management and flood protection scheme for Semarang, Indonesia	Reduction in direct and indirect economic Impacts	Best estimates: Benefit/cost ratio: 2.5 IRR: 23%

Table A5.1 Costs and benefits of disaster risk reduction[7] (continued)

Source and type of analysis	Actual or potential benefits	Result/return
***Ex-post* evaluations (assessment after implementation of measures)**		
Benson (1998): *Ex-post* evaluation of flood control measures in China over the last four decades of the 20th century	Reduction in direct damage to property and agricultural land	$3.15 billion spent on flood control averting damage of about $12 billion
IFRC (2002): *Ex-post* evaluation of Red Cross mangrove planting project in Vietnam for protection of coastal population against typhoons and storms	Savings in reduced costs of dyke maintenance	Annual net benefits: $7.2 million Benefit/cost ratio: 52 (over period 1994–2001)
Venton and Venton (2004) *Ex-post* evaluations of implemented combined disaster mitigation and preparedness programme at the community level in Bihar and Andhra Pradesh, India	Reduction in direct social and economic, and indirect economic impacts	Bihar: Benefit/cost ratio: 3.76 (range: 3.17–4.58) Andhra Pradesh: Benefit/cost ratio: 13.38 (range: 3.70–20.05)
ProVention (2005): *Ex-post* evaluation of Rio Flood Reconstruction and Prevention Project, Brazil. Construction of drainage infrastructure to break the cycle of periodic flooding	Annual benefits in terms of avoidance of residential property damage	IRR: > 50%

indeed a growing factor in the cost/benefit ratio of specific investment decisions.

For instance, in the case of a new road in Kosrae, rising rainfall intensity is affecting the effectiveness of drainage systems. A cost–benefit analysis of climate proofing took into account construction costs (with and without climate proofing) and maintenance costs over 50 years (with and without climate proofing).

The assessment (Asian Development Bank, 2005) showed that while the capital cost of the climate-proofed road would be 27% higher than if the road were constructed to the original design, the accumulated costs will be lower after only about 15 years because of reduced repair and maintenance costs (under the current climate, but particularly with increasing risks due to rising peak rainfall intensity).

[7] Based on Mechler (2005) and Venton (2007).

Annex 6. Overview of climate risk screening tools

Better addressing the climate-related risks that we face today goes along with managing the risks in a future climate. In that sense, a lot of methods and tools from 'regular' disaster risk reduction can be applied to help reduce vulnerability to climate change. An excellent overview of such tools is provided on the website of the ProVention Consortium (www.proventionconsortium.org).

The methods and tools discussed in this annex focus primarily on finding out how a changing climate affects a particular activity, plan or policy. We review those potentially most useful to the AfDB for (a) screening projects and (b) analysing country and sector portfolios. In addition, we provide a few key methodologies and approaches that may be relevant to AfDB climate risk management efforts. For a more comprehensive overview of methods and tools, see UNFCCC (2005).

Project screening

This section discusses some of the emerging tools that help screen development projects for climate-related risks, and may guide the user how to address them. ADAPT is a tool for large investment projects, typically of the scale of AfDB investments. CRiSTAL, on the other hand, is more suited to local/community-based projects.

ADAPT is being developed by the World Bank. It provides a simple and quick screening that tells a project developer whether he or she should worry about the changing climate, classified according to the five flags:

- Red flag – adaptation issues are important and further follow up is strongly recommended
- Yellow flag – some concerns, which should be checked

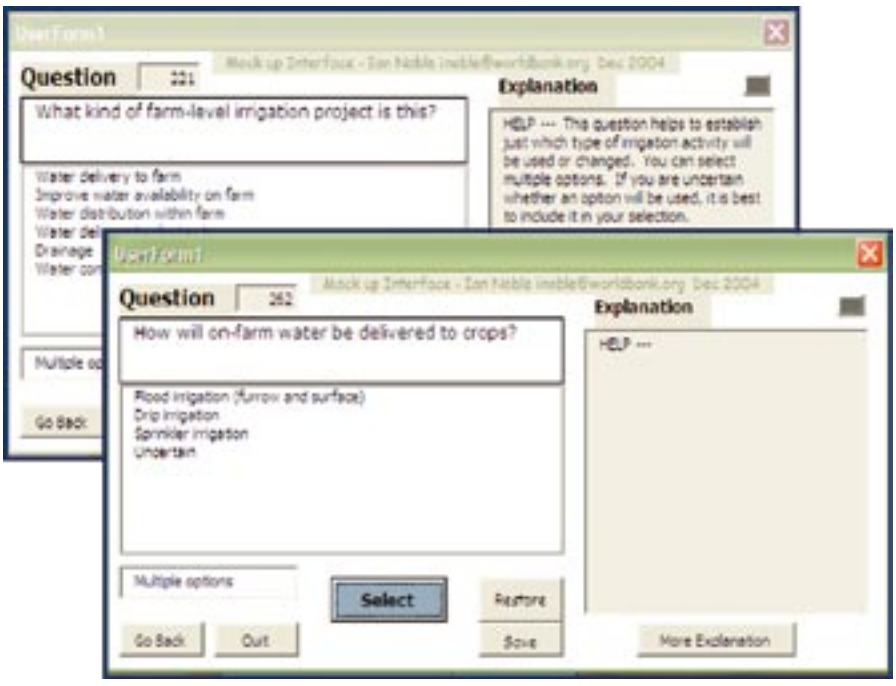


Figure A6.1. An example of the screens midway in ADAPT screening, in this case for an irrigation project in India.

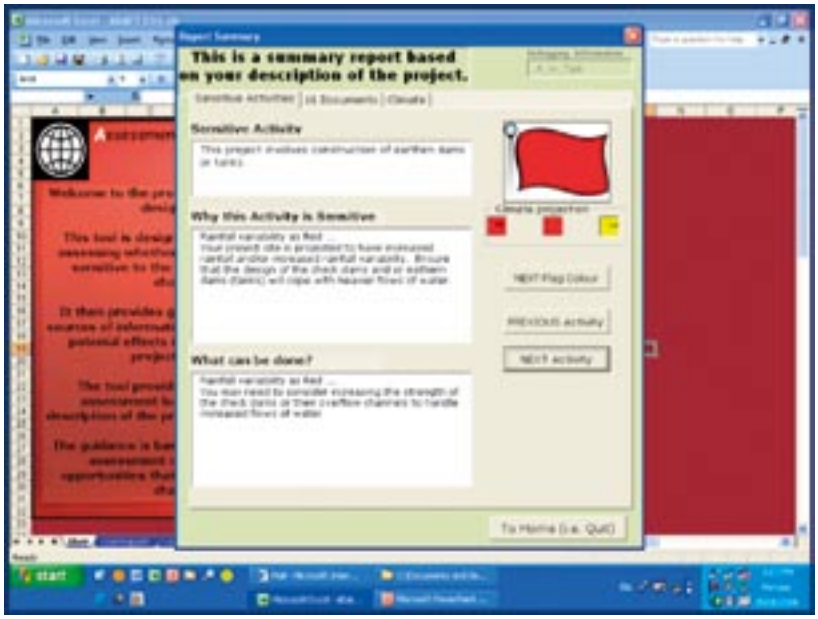


Figure A6.2. ADAPT's final summary report, in this case indicating that the irrigation project should consider the risk of increasing intensity in rainfall, and may need to adopt more robust infrastructure designs.

- Orange flag – Not enough known to assess
- Green flag – No adaptation issues foreseen
- Blue flag – Positive action for adaptation.

The tool also provides initial guidance on next steps, including pointers to appropriate literature and project examples. It is easy to use (it is Excel-based), asking the project developer iterative questions to identify key activities that might be sensitive to climate variability and change.

Another tool, CriSTAL[8] (Community-based Risk Screening Tool – Adaptation and Livelihoods) aims to assist local communities, project planners and project managers to assess climate risk management for planned or ongoing development projects. The tool guides users through a set of questions to systematically understand the links between livelihoods and climate, to assess a project's impact on community-level adaptive capacity, and to assist users in making project adjustments to improve the project's effectiveness.

Portfolio screening

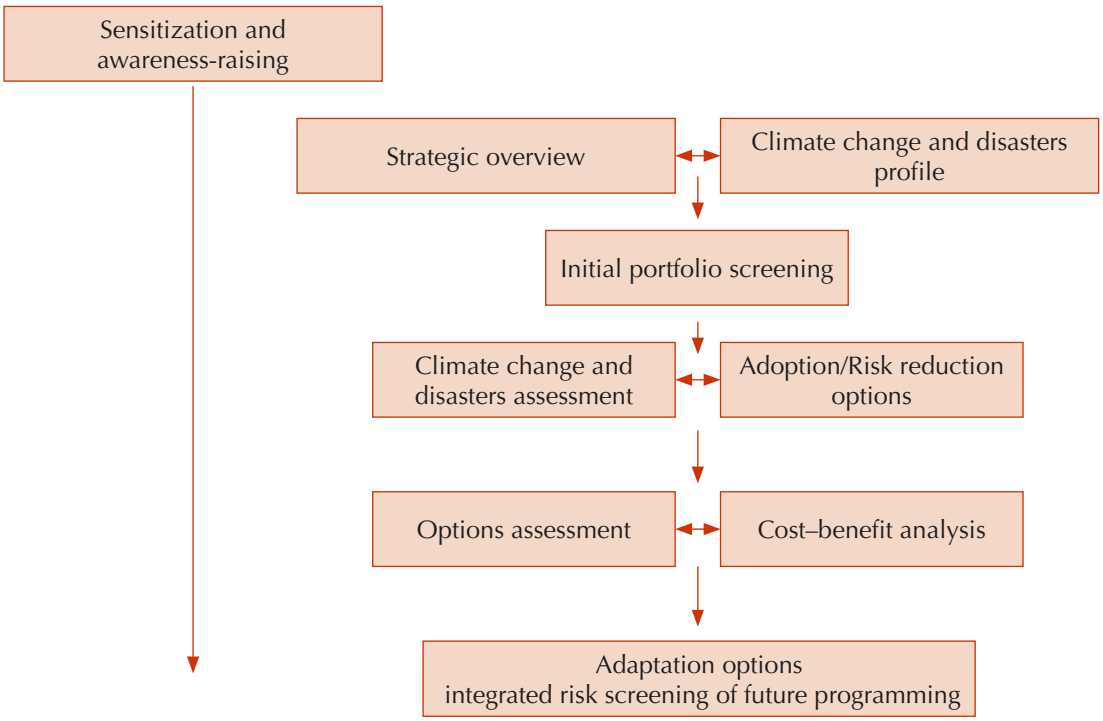
Another set of methods has been developed by donor agencies to get a quick sense of exposure across their portfolios. An example is the OECD Climate Change and Development Project (van Aalst et al., 2005). This screening looked at the sectoral classification of development projects to get a general impression of how vulnerable the overall portfolio might be.

The Dutch development agency DGIS has taken an expert-judgement approach. A consultant with good knowledge of development planning and of climate risk management in a particular country makes a quick assessment of projects in that country, and then carries out a more in-depth analysis of a few cases at relatively high risk.

Other development agencies have taken a more in-depth approach. For instance, DFID's ORCHID process, currently applied in Bangladesh, has straightforward portfolio screening as an initial step, but then continues to assess changing risks and adaptation options through a systematic process, including economic analysis.

[8] Developed by the International Institute for Sustainable Development (IISD), Stockholm Environment Institute (SEI), the World Conservation Union (IUCN) and Intercooperation.

Figure A6.3. DFID's ORCHID screening process.



Process guidance and guidelines

There are also sets of standardized guidance and approaches for climate risk reduction. Some are generic; others are tailored to particular sectors or organizations. They include guidance on (a) concepts and frameworks for assessing risk; (b) ways to identify all the appropriate policy and project entry points; and (c) approaches to engage the right stakeholders.

An example of general guidelines is the UNDP/GEF Adaptation Policy Framework (http://www.undp.org/gef/adaptation/climate_change/APF.htm) This is intended for planning and policy-making. It systematically describes a number of elements needed to design and implement appropriate adaptation responses.

For its CLIMAP programme, the Asian Development Bank also developed step-by-step mainstreaming guidance, including guidelines for integrating climate risk management into development planning by Pacific Island countries. Similar guidance would apply to AfDB regional member countries.

Another general guidance tool, which also includes specific tools, is the United Kingdom Climate Impacts Programme (UKCIP) Adaptation Wizard. The wizard, and particularly the information in the tools supporting it, is targeted at the UK, but it provides interesting and more widely applicable process guidance.

Annex 7. Adaptation mainstreaming at the country level[9]

This annex presents an example of mainstreaming of climate risk management at the national level. The Kiribati Adaptation Programme (KAP) is the first programme in the world to integrate climate risk management in national economic planning. While some aspects of the KAP are exclusive to this country's circumstances, many elements are relevant to other countries.

By linking bottom-up participatory consultation with top-down planning, the programme is mustering the capacity of a wide range of stakeholders to reduce the small Pacific island country's vulnerability to climate change, climate variability and sea level rise. The key lessons learned are:

- Treat climate change and sea level rise as major economic and social risks rather than as long-term environmental problems
- Adopt a climate risk management perspective: integrate climate change adaptation and disaster risk management
- Integrate climate risk management in economic and operational planning
- Include a solid consultation process, coupled to policy-making.

Background

Kiribati's 33 low-lying atolls and small reef islands are spread over a vast sea area of 3.5 million km^2 in the western and central Pacific. The country is extremely vulnerable to climate change and sea level rise. Most of the land is less than 3 metres above sea level and lies along a narrow strip surrounded by sea on both sides. In addition to natural exposure, there is considerable socioeconomic vulnerability, partly as a result of high population growth rates and the associated environmental degradation, particularly on the main island, Tarawa. Climate change projections include higher average temperatures and sea levels, and likely higher average rainfall. The main impacts of these changes will materialize through climate variability and extreme events: shorter return periods of storm surges, more intense rainfall events, and possibly more droughts.

The social and economic impacts of these changes are expected to be severe. The World Bank's 2000 Regional Economic Report (RER) projected serious impacts on coastal land and infrastructure, water resources, agriculture, human health, ecosystems and fisheries. In the absence of adaptation, by 2050 Kiribati could experience economic damage costing US$8–16 million a year, equivalent to 17–34% of the 1998 GDP (World Bank, 2000).

Kiribati Adaptation Programme

In the face of these risks, the Government of Kiribati determined to reduce its vulnerability, and requested World Bank support for the KAP. This was conceived as a three-phase programme. KAP-I, the Preparation Phase (2003–2005), had two objectives: to mainstream adaptation into national economic planning, and to design a pilot implementation phase (KAP-II). In addition, it coincided with the preparation of a National Adaptation Programme of Action (NAPA). KAP-II, the Pilot Implementation Phase (2006–2008), is aimed at developing and demonstrating the systematic diagnosis of climate-related problems and the design of cost-effective adaptation measures, while continuing the integration

[9] The material in this annex is based on a 'lessons learned' paper on the preparation phase of the Kiribati Adaptation Programme, prepared by Maarten van Aalst, Idah Pswarayi-Riddihough and Sofia Bettencourt

of awareness and responsiveness in economic and operational planning. KAP-III+, the Expansion Phase (2009–2015+), will gradually scale up the investments piloted under Phase II to cover all major islands and vulnerable sectors of Kiribati. External assistance to deal with continuing climate change will be channelled fully through regular planning processes.

KAP-I: The Preparation Phase

KAP-I's main activities included national and local consultations, technical and economic assessments, and an in-depth social assessment to gauge concerns about climate risks and obtain people's suggestions on climate risk management strategies. All of these inputs were used to incorporate climate risk management in the government's planning processes, and, on that basis, design a pilot implementation programme (KAP-II).

Adaptation as a development concern, integrated in economic planning

Instead of being driven solely by the Environment Ministry, the project attracted a wide range of government agencies, including the Ministry of Finance and Economic Development, which became the lead agency for KAP-I. These institutional arrangements underscored a key message: adaptation is not just an environmental issue, but a key development concern that needs to be addressed by central policy-makers and integrated in the economic planning process.

Climate risk management

The project adopted a climate risk management approach, reducing vulnerability to climate change by strengthening the management of all climate-related risks, including the current risk of natural hazards. This here-and-now approach to the long-term challenge of adaptation to climate change helped convince policy-makers and other stakeholders of the urgency and immediate benefits of the adaptation agenda.

Involvement of all key stakeholders

The project was guided by a cross-sectoral Steering Committee chaired by the Secretary to the Cabinet and composed of experts from all key sectoral ministries, as well as representatives of the Kiribati Association of NGOs (KANGO); the women's organization, All Women of Kiribati (AMAK); the Council of Churches; and the Chamber of Commerce. A close linkage to the expertise in the Ministry of Environment was retained through the Climate Change Study Team, a body of experts from various ministries who not only provided substantive support to KAP-I but also guided the preparation of the National Adaptation Programme of Action (NAPA).[10]

KAP-II: The Pilot Implementation Phase

KAP-II continues the adaptation process initiated in KAP-I. Its main aim is to change the way Kiribati handles its planning and implementation of regular activities so that they take better account of climate risks. This integration requires progressive reinforcement of adaptation-related programmes in the national government's budget and sectoral plans. This government investment perspective is combined with a process of participatory adaptation, involving island councils, NGOs, churches, communities and individuals. The adaptation investments not only immediately reduce vulnerability but will also help demonstrate and promote a climate-risk-aware approach to planning and design of such activities, to be expanded after KAP-II.

KAP-II has the following components:

- *Component 1. Policy, planning and information (US$1.17 million).* This component provides three supporting elements: awareness raising

[10] The NAPA was prepared in parallel to KAP-I, funded by an LDCF grant to the Ministry of Environment, Lands and Agriculture Development (MELAD), and administered by UNDP.

and consultation; policy coordination and planning; and generating scientific climate risk information and strengthening the capacity of the Meteorological Office.

- *Component 2. Land use, physical structures and ecosystems (US$2.17 million).* This component reduces the vulnerability of the coastline. It shifts coastal management practice from the reactive, single-technique approach of repairing damage as it occurs, to a preventive and more technically varied risk mitigation strategy, including more attention to environmental sustainability.
- *Component 3. Freshwater resources (US$2.16 million).* This component includes the development and management of freshwater resources to reduce their vulnerability to climate variability and climate change. It provides support for technical assistance; awareness materials; and workshops to update the national water policy, improve water resource management, and revise building codes to enhance opportunities for rainwater collection and storage. In addition, it supports the implementation of pilot projects to identify and increase water resources in freshwater lenses; rainwater collection and storage systems at government and community buildings; a public awareness and education campaign to change user attitudes; and a community development grant scheme for roof catchment and sanitation.
- *Component 4. Capacity at island and community level (US$0.55 million).* This component provides technical assistance to the Ministry of Internal and Social Affairs to include adaptation in the Outer Island Profiles (a key planning tool for outer island governance) and training on climate risk management for local governments. Furthermore, it includes a pilot programme of small-scale adaptation investments in two selected outer islands.
- *Component 5. Project management (US$0.39 million).*

Annex 8. Adaptation mainstreaming at the project level

For high-risk projects, a climate risk management add-on project can be an effective way to reduce vulnerability to climate change. Funding for such add-on projects can be requested from the global adaptation funds managed by the Global Environment Facility (GEF).

Key to the success of such add-on projects is that they are truly integrated with the baseline projects they are attached to, but also that they use sectoral engagement as a vehicle for broader capacity building and coordination, thus reducing climate risk beyond the scope of the original projects.

This annex discusses two examples of this approach.

Climate Adaptation for Rural Livelihoods and Agriculture (CARLA) in Malawi[11]

Malawi faces significant challenges in terms of food security and poverty reduction. Recurrent floods and droughts are affecting key development investments intended to address these challenges. They are affecting the effectiveness of projects, and also adding to the costs of achieving the government's poverty reduction targets. CARLA takes a key investment project in relation to food security and agriculture development as its starting point – the AfDB project 'Smallholder crop production and marketing'. This project has two main components: (i) irrigation development; and (ii) farmer support. CARLA will strengthen the climate resilience of these investments and their outcomes, while at the same time enhancing broader climate risk management in relation to agriculture and food security in Malawi, including its integration in strategic and operational planning in the agriculture sector.

The project's objective is to 'improve resilience to current climate variability and future climate change by developing and implementing cost-effective adaptation strategies, policies and measures that will improve agricultural production and rural livelihoods'.

The CARLA add-on component, financed by the GEF LDCF grant, will support:

- Investments aimed at improving agriculture, land management and natural systems as well as rural livelihoods through targeted on-the-ground adaptation interventions, fostering adaptation of individuals, communities and the private sector.
- Enhanced climate risk management planning and coordination, including plans, policies, legislation and regulations, and resource allocation; institutional coordination; the generation and tailoring of knowledge on climate risk management for specific user groups, particularly in the context of the investment component; and awareness-raising.

The Philippines Climate Change Adaptation Project

Similar projects are being developed by other agencies, in Africa and in other parts of the World. For instance, the World Bank is assisting the Government of the Philippines to reduce climate risks to its agriculture and natural resources sectors. The Philippines is widely known as one of the countries that is most exposed to natural hazards, and also most vulnerable, because of high levels of poverty and severe environmental degradation. Increasing risks due to climate change are likely to significantly affect agriculture and other natural resources-related sectors.

[11] Source: GEF CARLA Project Identification Form (PIF) as approved by GEF CEO in May 2007.

The Climate Change Adaptation Project, currently under development, aims to develop systematic diagnosis of climate-related problems and design cost-effective adaptation measures, while integrating climate risk awareness and responsiveness into economic and operational planning, particularly in agriculture and natural resources management.

Funded through the SCCF under the UNFCCC, this add-on project will focus on the following projects, reducing their vulnerability to climate variability and change:

- The Diversified Farm Income and Market Development Project, which is strengthening the Department of Agriculture's capacity in the provision of market development services to improve competitiveness and incomes in the agricultural sector.
- The National Program Support for Mindañao Rural Development 2, which aims to accelerate and complete the decentralization of agricultural and fisheries sector services delivery and rural poverty alleviation in Mindañao provinces, with investments in rural infrastructure, agricultural production and technology, fisheries management and micro-enterprises development.
- The Participatory Irrigation Development Project, which involves modernization of the national irrigation systems including strengthened operation and maintenance and improving the quality of technical services provided by the National Irrigation Authority.

Just like CARLA, the add-on would use the climate risk management activities in the context of these projects as a trigger to enhance overall capacity and coordination. Besides the sectoral agencies, this would also include the National Disaster Coordinating Council and the National Climate Change Coordination Committee.

Annex 9. ClimDev Africa[12]

The Climate Information for Development – Africa (ClimDev Africa) programme is the response to a widely recognized need for improved climate observation in Africa, in order to help Africa better understand, prepare for and adapt to climate change. ClimDev Africa is implemented through a Joint Secretariat shared by the AfDB, the African Union (AU) and United Nations Economic Commission for Africa (UNECA).

The goal of ClimDev Africa is to improve the availability and use of climate information and services in support of sustainable development and achievement of the MDGs. ClimDev Africa should result in better food security, better protection from malaria and other climate-sensitive diseases, improved management of water resources, better disaster risk management, more judicious use of energy resources and improved environmental sustainability.

Initial funding for ClimDev Africa, whose total budget is estimated at US$250 million, has been tentatively pledged by the UK's Department for International Development (DFID), the Government of Ireland and the Netherlands. Further sources of funding are needed – potential investors are G8 countries other than the UK, the European Commission, the World Bank and the Group on Earth Observations (GEO).[13]

The ClimDev Africa programme is structured under four areas of intervention:

- Policy: improved political engagement of all African countries in climate risk management to assist delivery of the MDGs and adaptation to climate change
- Practice: improved management of resources in all African countries through better climate risk management practices
- Services: adequate climate information services for the full range of climate risk practices
- Data: strengthened climate observation networks and improved data management for monitoring climate variability, detecting climate change and use in sectoral climate risk management.

The Joint Secretariat will undertake the implementation of ClimDev Africa. First steps include:

- Institutional and capacity mapping to identify African institutions capable of handling climate data and information; assess resources, gaps and areas of specialization; and increase awareness among actors of choices.
- Formulating a programme for achieving liaison and logistic cooperation with all on-going climate-related activities at the continental, sub-regional and African national levels, and with appropriate programmes, organizations, groups and activities relevant to ClimDev Africa.
- An ecological survey to provide updated information on climate change impacts on African countries and in particular in the water resources and agriculture sectors. The survey is also meant to predict local, national and regional climate change effects in relation to donors' future investments.
- Preparation of a ClimDev Africa Appraisal Report by early 2008.

[12] Information herein comes largely from the meeting report of the Third Meeting of the GCOS Cooperation Board, held in Geneva, Switzerland, 27 April 2007.

[13] See page 17, http://www.africapartnershipforum.org/dataoecd/47/0/38670823.pdf

Annex 10. A consultative workshop on the implications of climate risk for African Development Bank operations

As part of the consultation process for the development of the AfDB's Climate Risk Management Strategy[14], a workshop was held on 20 November 2007, which brought together a wide range of experts and practitioners with a stake in climate and development issues in the region, including representatives from international organizations, national governments, civil society, regional organizations, NGOs, private sector, centres of excellence, and development partners. The workshop was organized as a side event to the International Solidarity Conference on Climate Change Strategies for the African and Mediterranean Regions. Most of the stakeholders of that conference could also be seen as stakeholders for the AfDB's Climate Strategy. Of those, approximately 80 persons attended the workshop. The purpose of the workshop was to strengthen the Strategy as a result of the consultation with these stakeholders.

The Concept Note on the Climate Risk Management Strategy and a brochure based on that note were offered to all participants of the conference and to all attending the workshop. The AfDB was represented by the Director of the Department of Agriculture and Agroindustry, the Manager of the Sustainable Development Division and the Manager of the Sector Policies Division.

The workshop began with an introduction to the AfDB's response to climate change, followed by a presentation on the envisaged Strategy on Climate Risk Management. The work of the AfDB in the field of adaptation was demonstrated by two projects: CARLA and ClimDev. In a second section of the workshop, the experiences and perspectives of the civil society and NGO stakeholders were presented in three contributions. First, the NGO perspective on managing climate risks in Africa was provided by Dr Payet, who demanded a radical turn around from 'business as usual', and insisted that the dire perspectives must be made more widely known. Second, the results presented by the Red Cross/Red Crescent showed a marked increase in hydro-meteorological disasters in parallel with global warming, with severe consequences for food production, disaster relief and migration, over-taxing the relief organizations and showing that there is great need to invest in risk reduction. Third, the Arab Network for Environment and Development (RAED), an Egyptian NGO presented itself as a facilitator and organizer of environmental projects in the Arab and Nile Basin countries, now also preparing and promoting adaptation projects, with a particularly focuson bringing the voice of civil society into the fore.

The initiative by AfDB to develop a Climate Risk Management Strategy was generally welcomed, especially since the premise that climate change is hitting Africa hard and is inevitable was generally accepted. Participants flagged the following key issues during the 60 minute-long intervention session:

1. The AfDB and NGO/civil society interaction needs to be enhanced in order to meet the very real challenges being faced at the community level. There should be a 'space' at the AfDB with this specific mandate. Participants were pleased to hear that the Sustainable Development Division is the focal point for NGO/civil society and that further interaction between AfDB and NGO/civil society

[14] See 'Concept Note on the Bank Group Climate Risk Management Strategy: Integrating Climate Change Adaptation into Bank Group Operations'

was already planned during the rest of the Strategy preparation process.

2. There was concern that the Strategy might become too focused on managing current climate risks, at the expense of looking at future climate change risks, as posed by climate change. AfDB staff responded that the strategy approach advocated addressing long-term climate change by first addressing current climate risks. However, this approach would not exclude measures addressing longer-term climate change risks especially in those cases when the level of uncertainty relating to long-term climate-forecasting scenarios were deemed acceptable.
3. Several stakeholders pointed to other institutions following the same goal with similar means. They asked AfDB to form partnerships and to avoid duplication of efforts. There was a general sense that much can be learned from looking closely at ongoing initiatives and experiences, as well as at existing methodologies and tools from a wide range of stakeholders. The implication was that AfDB should use and modify existing tools as much as is feasible to avoid duplication of efforts. AfDB staff welcomed these remarks and recalled the guiding principles of the Strategy Concept Note where these aspects are very much at the centre of the Strategy itself.
4. There was a general feeling that much wider consultation should be undertaken in the development of the Strategy. All stakeholders at the workshop were interested in continuing the dialogue and were satisfied to see that AfDB had planned further steps. Some recommended doing consultations as side events to climate meetings, such as the Bali conference in December 2007, since this facilitated attendance. AfDB staff took note of this request and confirmed next consultation rounds and other planned events in the 'way forward' discussions.
5. It was also suggested that AfBD should take a strong leadership role both regionally and internationally as leading advocate for African needs, going beyond the current Strategy formulation. Others said that AfDB should stick to its core business.
6. Several stakeholders asked for more elaboration of the question of financing, pointing out that present sources were inadequate and not tailored to meet current and future adaptation requirements.
7. Some stakeholders were weary of the big wave of adaptation action, pointing out that poverty and not climate change was the major problem in developing Africa, urging AfDB to take this into account in the Strategy. AfDB reassured participants that the Strategy is very much aligned to the principles of poverty reduction and by and large driven by the sustainable development agenda.
8. Some stakeholders called for more government (local and central) engagement in climate risk management while others emphasized that the AfDB should also engage more with the NGOs. Some participants stressed the need for regional strategies/activities and for more participation by the private sector.
9. Finally, a number of participants stressed the need for capacity building and training, requesting the AfDB to be more pro-active in this area. AfDB staff again reassured stakeholders on this point by clarifying some of the activities envisaged under Pillar 2: Support to regional member countries where capacity building is given a major role.

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