

Climate Change and Africa

A. Key Political Messages & Action Points 3

B. Supporting Technical Document

Introduction	4
I. Context.....	7
II. Commitments on climate change for Africa	7
III. Climate change compounding Africa's existing risks and vulnerabilities.....	8
IV. Mitigation efforts and clean energy development.....	10
V. Mainstreaming adaptation in development: challenges, gaps and lessons	13
VI. More resources and support are needed for climate risk management in Africa..	17
Annex: Participants at Expert Meeting	21
List of Acronyms	22
Glossary of Technical Terms	23
References	26

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A. Climate Change: Key Political Messages and Action Points

Climate change is a major threat to sustainable growth and development in Africa, and the achievement of the Millennium Development Goals: **urgent action is needed**. Although Africa is the continent least responsible for climate change, it is particularly vulnerable to the effects, including reduced agricultural production, worsening food security, the increased incidence of both flooding and drought, spreading disease and an increased risk of conflict over scarce land and water resources. Support from development partners is needed to help Africa cope with these effects. Action on a broader range of issues is also needed - by the wider international community, by multilateral and bilateral development agencies, and by African governments themselves. It is important that Africa should speak with a strong unified voice in future international negotiations, and that this voice should be heard.

1. **Strong commitments to reducing carbon emissions** will be essential in the successor to the Kyoto Protocol when it expires in 2012. The next stage in this process will be the UN Framework Convention for Climate Change meeting in Indonesia in December 2007. **We call for ambitious and binding commitments** on reducing global emissions, including incentives for key developing countries to cut emissions, together with recognition of Africa's legitimate development needs.

2. **Africa has a legitimate need to increase its energy supply**. It is in the wider global interest that Africa should be able to develop **clean energy** sources. There is enormous potential for this, including through the development of Africa's huge hydro-power potential. **We call for** the full implementation of the **Clean Energy and Development Investment Framework** being developed by the World Bank and the African Development Bank, and for a review of progress at the World Bank's next annual meeting in September. **We also call for** an intensified effort to encourage more **private sector investment** in renewable energies and energy efficiency and for agreement on specific measures to promote this both in the G8 and more widely.

3. Even if global carbon emissions were reduced tomorrow, Africa would still be faced with the massive challenge of **adapting to climate change**. A 10-year programme 'Climate Information for Development Needs: an Action Plan for Africa' has been developed jointly by the African Union, the UN Economic Commission for Africa and Global Climate Observatory System. The estimated budget for the 10-year 3-phase programme is around US\$ 200 million. In spite of earlier international commitments, and strong support from African institutions, this programme is not fully funded. **We call for** the current **financing gap to be closed** within the next 12 months and for development partners to systematically **integrate adaptation issues** into their policies, and in particular to provide **more support** to enable Africa to respond to the effects of Climate Change.

4. **The protection of forests is essential for reducing emissions from deforestation**. Africa's rainforests make a major contribution to protecting the global climate. **We call for** the acknowledgement that the contribution of the rainforests to climate protection is a **global public good**. We will also continue our support for the **Congo Basin Initiative**. We will support the development of new mechanisms to encourage and reward efforts to **avoid deforestation**.

5. **Current carbon finance mechanisms are not delivering enough resources**. More are needed. The Clean Development Mechanism, or purchasing emission reductions from projects in developing countries, has so far bypassed Africa. The Adaptation Fund, resourced by a 2% tax on CDM projects, could provide significant funds for adaptation, but has yet to do so. **We call for** a review of the design and operation of **carbon finance mechanisms**, in order to generate additional resources for Africa, at the UN Framework Convention for Climate Change meeting in December.

6. Climate change needs to be seen not only as an environmental concern but as a **growing threat to sustainable development and poverty reduction**. We welcome the increased attention that this is now receiving in Africa as well as globally. **We call for** the full integration of climate change issues into **economic planning and management** at both national and regional levels, and for this to be reflected in Poverty Reduction Strategies or their equivalents, and national budgets.

B. Climate Change and Africa

Introduction

1. Climate change is a major threat to sustainable growth and development in Africa, and the achievement of the Millennium Development Goals. Africa is particularly vulnerable to climate change because of its overdependence on rain-fed agriculture, compounded by factors such as widespread poverty and weak capacity. The main longer-term impacts include: changing rainfall patterns affecting agriculture and reducing food security; worsening water security; decreasing fish resources in large lakes due to rising temperature; shifting vector-borne diseases; rising sea level affecting low-lying coastal areas with large populations; and rising water stress.

2. The purpose of this paper is to focus on how the international community and African governments themselves need to respond, within the UN Framework Convention for Climate Change (UNFCCC) of current commitments and future negotiations. Action plans have been agreed by the G8 at their Summits in Evian and Gleneagles. At its January 2007 Summit, the African Union highlighted the scale of the problem and called for an urgent international response. In March, the European Union (EU) agreed to detailed action to reduce its greenhouse gas (GHG) emissions by 20% from their 1990 level by 2020. Climate change will be discussed again by the G8 at their 2008 Summit. In December, parties to the UNFCCC will meet in Indonesia to begin the discussions about the successor to the Kyoto Protocol when it expires in 2012. It is important that Africa should speak with a strong unified voice in future international negotiations, and that this voice should be heard.

3. The response needs to take into account not only Africa's acute vulnerability but also its legitimate development needs, and the broader principles of equity and fairness in a global framework to reduce global GHG emissions. Action is needed at a number of different levels. Faster progress is needed on reducing global emissions. Africa faces massive challenges in adapting to the impact of climate change and in managing the increased levels of climate risk: increased support and financing for this is essential. Africa's needs to develop its energy must be recognised. Current carbon finance mechanisms are not delivering the resources which Africa needs and should be re-examined. African governments themselves need to integrate their response to climate change fully into economic planning and management at both the national and regional levels.

4. **Section I** of the paper provides the context. **Section II** summarizes the key commitments of development partners and African governments. **Section III** describes Africa's vulnerabilities to climate risk in greater details. **Section IV** discusses the need for mitigation efforts, primarily by the developed countries but also support for Africa to develop cleaner energy. **Section V** looks at the challenges of mainstreaming adaptation to climate risk and lessons from current practice in Africa. **Section VI** reviews current financing mechanisms for climate adaptation and some proposals for reform to address their shortfalls. **The main points in these areas are summarized in the rest of this executive summary. The key action points are contained in a one-side matrix of recommendations directly following this section.**

5. **Strong commitments to emission reductions** by developed countries, and incentives for major developing countries to cut emissions will be the key both to minimising the negative impact of climate change on Africa and to mobilising greater flows of carbon finance. It is thus urgent for *all countries* to agree on a long-term global stabilisation goal on GHG emissions and ways of allocating the effort equitably.

6. **African governments** must take a more pro-active approach in negotiating for a global GHG target that prevents dangerous climate change and to prepare for the next UNFCCC meeting in Indonesia in respect of the leading proposals for global emissions control, by evaluating these through the lens of equitable access to carbon finance. At the same time, Africa is facing the challenge of promoting access to modern energy. Development partners must work with Africa to establish a system to support avoided deforestation. In addressing the energy access challenge, some countries in Africa could rely on potentially important bio-fuel sources. Developing Africa's huge hydropower potential, of which less than 4% is currently utilized, also presents a unique set of challenges and opportunities.

7. **Mainstreaming adaptation into development.** In most of Africa, climate is infrequently integrated into development policy and investment decision-making. Adaptation to climate change should be understood as a continuous process which addresses current climate variability and extremes and future climate risks. Over time climate change may alter general climatic conditions leading to more frequent occurrences of climate extremes. Hence, climate change and its associated impacts on biophysical systems require also the integration of a forward-looking perspective into decision-making processes to ensure that changes in climate risks are recognized and addressed where necessary and possible.

8. Thus, for **African governments**, managing climate risk must rapidly shift from a purely environmental concern to addressing a growing threat to development. But because the impact of climate variability, e.g. the occurrence of a drought, often cannot be distinguished from that of climate change, managing both current and future climate risks should be an integral part of development processes at both the national and regional levels, and involve a cross-sectoral approach that needs to be reflected in the budget and thus the need for greater attention by ministries of finance. This is a shared responsibility, which requires political will from developed and developing countries. **Development partners** must deliver on their commitments to support African countries to adapt to the unavoidable effects of climate change. That includes scaling up efforts to improve and increase access to climate data; investment and transfer of technologies for adaptation in key sectors; developing and implementing best practice guidelines for screening and assessing climate change risk in their development projects and programs in climate-sensitive sectors; mainstreaming climate factors into development planning and implementation; and providing significant additional investment in disaster prevention.

9. **Much more resources are needed for climate risk management in Africa.** Only a tiny portion (less than 1%) of official development assistance (ODA) and concessional lending is specifically directed to adaptation. The Adaptation Fund, resourced by a 2% tax on clean development mechanism transactions (CDM) is a new source of funding for adaptation distinct from ODA. The CDM, a project-based mechanism designed to promote investment in projects that reduced or sequestered emissions of green house gases in developing countries, has the potential to provide funds to those countries but has not delivered for Africa. **Development partners and African countries** must review carbon finance mechanisms to make them more easily accessible to Africa for climate adaptation and to help Africa meet its energy requirements while moving to cleaner energy. This must be accompanied by efforts to raise awareness about the potential benefits of CDM in helping African countries develop new sectors such as renewable energy, and support by external partners for capacity development to elaborate and certify CDM projects. Decisions on the policies, programmes and eligibility procedures concerning the Adaptation Fund must be expedited to provide additional resources required by Africa for climate adaptation. Access to the Global Environment Facility must be simplified and funding be made more readily available to small projects. **African governments** must be prepared to evaluate the various carbon finance options in preparation for a more pro-active role at the next UNFCCC meeting in Bali.

Table 1: Matrix of Key Policy Areas and Action Points on Climate Change

KEY POLICY AREAS	KEY ACTION POINTS	
	Development Partners	African Governments
Global GHG emissions mitigation	<p>Agree on a global GHG target at a level that prevents dangerous climate change, including incentives for key developing countries to cut emissions, in the successor to the Kyoto Protocol when it expires in 2012, beginning with the next UN Framework Convention for Climate Change (UNFCCC) meeting in Indonesia in December 2007.</p> <p>Ensure that necessary funding is available to support full implementation of the Clean Energy and Development Investment Framework being developed by the World Bank and the African Development Bank.</p> <p>Develop urgent plans to reduce deforestation, recognising the importance of conserving Africa's rainforests as a global public good, and reviewing in particular the treatment of 'avoided deforestation' under the Clean Development Mechanism.</p>	<p>Agree on a global GHG target at a level that prevents dangerous climate change and to take a more pro-active approach to the preparation of the next UNFCCC Conference of Parties meeting in Bali (December 2007) in respect of the leading proposals for global emissions control, by evaluating these through the lens of equitable access to carbon finance.</p> <p>Continue to improve the environment for investment to encourage private sector investment in carbon finance activities.</p> <p>Work with the international community and other stakeholders to facilitate progress in reducing deforestation in Africa.</p>
Mainstreaming adaptation into development	<p>Close by the end of 2007 the current financing gap for the 10-year 'ClimDev Africa' programme developed jointly by the African Union, the UNECA and GCOS, in order to help address gaps in climate risk management.</p> <p>Fulfil their 2005 agreement to develop and implement good practice guidelines for screening and assessing climate change risk in their development projects and programs in climate-sensitive sectors.</p> <p>Identify specific ways of increasing private sector investment in energy production, energy efficiency, and climate change adaptation at the Gleneagles Dialogue on Climate Change in September, under the auspices of the G8 Presidency.</p> <p>Deliver on past promises including increased ODA for Africa; support for climate information and capacity building; and carbon finance and technology transfer.</p>	<p>Integrate climate issues into economic planning and management at both the national and regional levels, including through high-level inter-ministerial coordination at national level and an increased role for Regional Economic Communities, and to review progress in this area in a further discussion at the African Union in 2008, following its Summit of January 2007.</p> <p>Make stronger efforts to assess their development projects and programmes in their sensitivity to current and future climate risks.</p> <p>Improve access of local communities to weather and climate-related information and to the knowledge of best coping strategies.</p>
Resources to support Africa in addressing current and future climate risks	<p>Review the CDM mechanisms and GEF procedures to make them more easily accessible to Africa.</p> <p>Expedite decisions on policies and eligibility procedures concerning the Adaptation Fund to provide additional resources required by Africa.</p> <p>Scale up financial support and, in collaboration with the private sector, financing for the development and sharing of low carbon technology and energy efficiency with Africa.</p>	<p>Evaluate the various carbon finance options (access rules and procedures) in preparation for a more pro-active positioning at the next UNFCCC Conference of Parties meeting in Bali, Indonesia in December 2007.</p>

I. Context

10. Climate change is emerging as one of the most important challenges of the 21st century. Eleven of the last twelve years (1995-2006) rank among the 12 warmest years of global surface temperature since 1850. According to the recent report of the Intergovernmental Panel on Climate Change (IPCC),¹ more intense and longer droughts have been observed over wider areas since the 1970s, particularly in the tropics and subtropics. The frequency of heavy precipitation events has increased over most land areas, and widespread changes in extreme temperatures have been observed over the last 50 years. Recent trends show a tendency towards greater extremes: arid or semi-arid areas in northern, western, eastern and parts of southern Africa are becoming steadily drier and increased magnitude and variability of precipitations and storms.

11. Even if the concentrations of all GHGs and aerosols were kept constant at year 2000 levels, further warming would be expected. The mid-range IPCC emissions scenario projects an increase in global mean surface air temperature relative to 1990 of about 2°C by 2100. Average sea level is expected to rise by about 50 centimetres from the present to 2100. From the various scenarios of emissions, large regions of Africa and more particularly the Sahel and part of southern Africa will experience warming in the range of 3 to 6°C by 2100. Concomitant with rising temperatures, the world will also experience very significant changes in precipitations with North Africa, the Sahel and southern Africa most severely affected, with precipitations declining by more than 20% compared to levels of 1990.

12. The above projections show that most regions of the world will be affected. But Africa is particularly vulnerable to climate change because of its high proportion of low-input, rain-fed agriculture compared with other regions of the developing world. The climate change challenges to Africa are further compounded by other aggravating factors such as widespread poverty and weak capacity.

II. Commitments on climate change for Africa

13. *Until around 2000, climate discussion focused solely on mitigation.* Prevention of long-term impacts on the planet's climate systems was sought through reductions in emissions of GHGs, known as "mitigation". The first assessment report of the IPCC, which alerted the world to the problem of the runaway greenhouse effect, led to the governments of the world agreeing at the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 at the Rio Earth Summit to take measures to stabilise their emissions. In 1995, the second IPCC assessment report led to the negotiation of the Kyoto Protocol.²

14. *Since then, adaptation to climate change is increasingly recognized as a necessary complementary measure to mitigation.* The IPCC's third assessment report in 2001 alerted the world to the unavoidable impacts of climate change in the near term and raised the need to cope with climate change impacts through "adaptation". In particular, it pointed out that poor countries would be more vulnerable and would need assistance to adapt. Climate change has shifted from being perceived as an environmental issue to becoming a growing threat to development to both low-income countries that are poorly equipped to adapt to rapidly changing climatic risk and to more developed economies where sustainability would also be at risk.

¹ IPCC Fourth Assessment Report entitled "Climate Change 2007".

² The Kyoto Protocol treaty was negotiated in December 1997 and came into force February 16th, 2005. The Kyoto Protocol is a legally binding agreement under which signatories (industrialised) countries will reduce their collective emissions of greenhouse gases by 5.2 percent on average over the five-year period of 2008-12 compared to the level in 1990.

15. ***G8 countries began to discuss the impacts of climate change in Africa in Evian (2003)*** by agreeing to strengthen international co-operation on global earth observations with a view to developing fully operational regional climate centres in Africa through the Global Climate Observing System (GCOS).³ ***At Gleneagles (2005), G8 countries' action plan shifted to a broader approach of energy efficiency, clean technology and support for adaptation.*** The proposed package includes improvements to energy efficiency; harnessing funding for clean technology in developing countries; support for development of markets for clean energy technologies and to increase their availability in developing countries; and helping vulnerable communities adapt to the impact of climate change.

16. ***Progress in the implementation of G8 Commitments has been modest.*** On financing the transition to cleaner energy, the World Bank and AfDB are jointly developing a framework to accelerate the adoption of cleaner, more efficient energy production and use.⁴ The recent adoption of an 'Action Plan for Africa on Climate Information for Development Needs (or *ClimDev Africa*)' is the culmination of a multi-year effort by the GCOS-UNECA-Africa Union partnership to address gaps in mainstreaming adaptation into policy (see Section 5 for more detail). The action plan has been approved, but so far only seed money has been pledged. Tools for climate risk management are being developed and this has stimulated co-ordinated efforts between the World Bank, the AfDB and other partners; but progress has been slower than expected.

17. ***Actions are also taking place outside the G8 context on global GHG emissions.*** The European Union has recently agreed to cut GHG emissions by 20% in 2020 compared to 1990 levels. Separately, the UK proposes to set legally binding carbon emissions reduction of 60% by 2050. In the U.S., the state of California has passed new legislation to cut GHG emissions. In late 2006, fifteen U.S. institutional investors managing assets worth US\$ 1600 billion issued a statement calling for urgent and effective action by policymakers and companies to address the threats posed by rising GHGs.

18. ***The African Union is also raising climate change adaptation as a key priority*** and seeks more support for adaptation and better integration of climate in development programmes. At its January 2007 meeting, the African Union called for the integration of climate change adaptation strategies into African national and sub-regional development policies and programmes and activities. It also demanded that developed countries undertake deeper cuts in GHG emissions and implemented the "polluter pays" and "differentiated responsibilities" principles as provided for in the UNFCCC. On financing, it called for the urgent streamlining of the Global Environment Facility (GEF) funding mechanisms to ease African countries' access to GEF financial resources; and the exploration of other financial resources and mechanisms to support Africa's adaptation programmes.

III. Climate change compounding Africa's existing risks and vulnerabilities

19. ***Africa is highly vulnerable to climate change*** with the areas of particular concern being water resources, agriculture, health, ecosystems and biodiversity, forestry and coastal zones. The longer-term

³ The Global Climate Observing System (GCOS) was established in 1992 to ensure that the observations and information needed to address climate-related issues are obtained and made available to all potential users. It is co-sponsored by the World Meteorological Organisation ([WMO](#)), the Intergovernmental Oceanographic Commission ([IOC](#)) of UNESCO, the United Nations Environment Programme ([UNEP](#)) and the International Council for Science ([ICSU](#)).

⁴ The World Bank's "Clean Energy for Development Investment Framework" covers three different areas: i) energy for development and access by the poor; ii) transition to low-carbon economy; and iii) adapting to climate change. See World Bank (2007) and paragraph 32 of this document for more detail on Africa.

impacts will include: changing rainfall patterns affecting agriculture and reducing food security, worsening water security and economic growth prospects; shifting temperature affecting vector diseases; and more challenging hurdles in reaching the Millennium Development Goals (MDGs). According to the recent IPCC report, the cost of adaptation in Africa could be as high as 5 to 10% of the continent's GDP.

20. ***Agriculture and food security at stake.*** Over 95% of Africa's agriculture is rain-fed. Agricultural production, including access to food, in many African countries and sub-regions is projected to be 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 expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020.⁵

21. ***Half of Africa will face water stress.*** Three-quarters of African countries are in zones where small reductions in rainfall could cause large declines in river water. Climate models show that 600,000 square kilometres classified as moderately water constrained will experience severe water limitations. By 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress due to climate change.⁶ The problem of water scarcity is even more acute in North Africa in view of the very high population growth rates and already high rates of water resource use.⁷

22. ***Diseases will likely spread.*** 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 warming climate has resulted in the extension of malaria to the highlands of Kenya, Rwanda and Tanzania. These factors are superimposed upon existing weak health systems.

23. ***Risk to coastal areas could force major population movements.*** Sea level rise resulting from global climate change threatens coasts, lagoons and mangrove forests of both eastern and western Africa. More than a quarter of Africa's population live 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. Local food supplies are projected to be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing.

24. ***The direct and indirect effects of climate change could further undermine peace and stability in the continent.*** Climate change impacts and their interaction with other vulnerabilities and environmental exposures will likely lead to significant population migrations internally as well as across borders with severe humanitarian impacts further undermining peace and stability. Scarce water resources are another contributor to an increased risk of conflict.

25. ***More efforts will be needed to cost the impacts of climate change and to inform and sensitize domestic audiences.*** While the impacts of climate change are becoming better known, more efforts are needed to assess and estimate their socio-economic implications; costing of the impacts will help highlight the development nature of climate change, as contrasted to a more narrow environmental issue, and thus attract attention of economists and development planners. Also, given that most adaptation efforts will take place at the local and sub-national levels, additional efforts are needed to better inform domestic audiences (e.g. mayors and local communities) on the impacts of climate change.

⁵ IPCC (2007b).

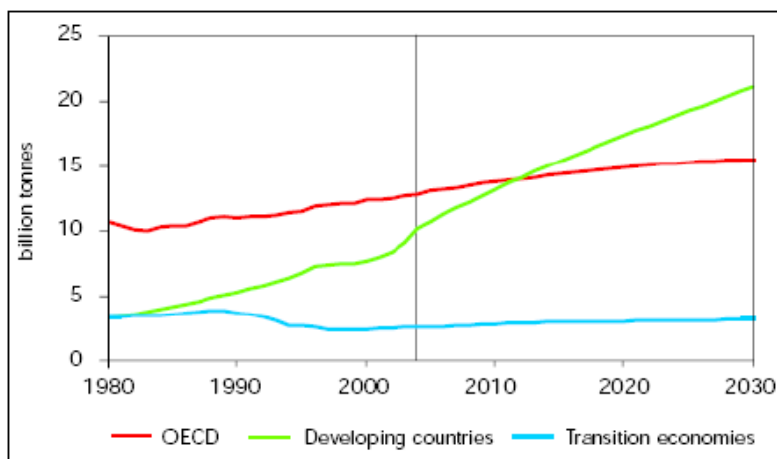
⁶ IPCC (2007b).

⁷ UNECA (2005).

IV. Mitigation efforts and clean energy development

26. ***Strong commitments to emissions reduction by the industrialised countries within the UNFCCC will be instrumental.*** While important steps have been initiated in Europe, cooperation of all major GHG emitters is needed. Without new policy initiatives by other industrialised countries, total emissions from OECD countries will continue to rise in spite of the recent EU initiative. It is thus urgent to agree on a long-term global target on GHG emissions. As shown in Figure 4.1, under the World Energy Outlook 2006 reference scenario that assumes no change in policies, global CO₂ emissions would continue to rise by an average annual rate of 1.6%,⁸ with two-thirds of the increase coming from developing countries.

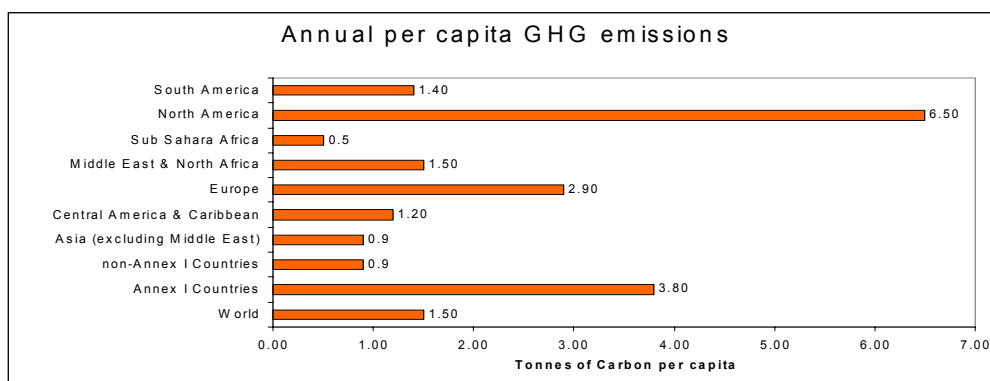
Figure 4.1: Energy-related CO₂ Emissions by Groups of Countries



Source: World Energy Outlook 2006, Figure 2.9

27. ***Africa's very low emissions and extreme energy poverty demand a more equitable allocation of carbon resources.*** More than 550 million Africans lack access to electricity. While North Africa has achieved almost universal access to electricity, the rate for sub-Saharan Africa is around 25%. As a result, an average African generates 13 times less GHGs than his counterpart in North America (Figure 4.2) and the continent accounts for less than 4 percent of the world total GHG emissions.

Figure 4.2: Annual Per Capita GHG Emissions



Source: DFID, unpublished (2007).

⁸ International Energy Agency, *World Energy Outlook 2006*.

28. ***Assisting Africa's development of its largely unexploited hydropower potential would help to meet its objective of increasing energy access while limiting GHG emissions.*** Less than 4% of Africa's hydropower potential is currently utilized. To help unlock this potential will require actions on several fronts. At the national level, changes in regulatory frameworks to facilitate the connection of small local electricity grids to larger national grids would encourage the development of small-scale, run-of-the-river hydro-schemes. At the sub-regional level, there is the need to further encourage cross-border energy trading as illustrated by regional power-pools. At the international level, larger official development assistance (ODA) from development partners together with foreign and local private sector participation is needed. A major effort in developing Africa's hydropower will help achieve the objective of improving energy access, but care must be taken to consider the implications of large hydro projects on water resources and river basin management. Run-of-the river hydropower projects avoid some of the drawbacks of larger dams and thus may be preferable where this option is available.

29. ***Compensating for avoided deforestation is another way to limit GHG emissions.*** Deforestation is responsible for 20% of annual global CO₂ emissions and constitutes the main source of GHG from many developing countries. According to the Food and Agriculture Organisation, around 130 thousand square kilometres—equivalent to four times the size of Belgium--of forest areas are lost each year. Brazil and Indonesia are the worst affected countries but six of the ten largest forest losses are in sub-Saharan Africa.⁹ Avoiding deforestation is currently not eligible either under the Clean Development Mechanism (CDM)¹⁰ or the multi-billion-Euro European carbon market. The past decade has also witnessed a sharp reduction in ODA directed to the forestry sector that reached an all-time low in 2004 of only 0.3% of total ODA.¹¹

30. ***Larger aid would help but financial incentive schemes would be needed to reduce deforestation.*** A better understanding of what is driving deforestation and the economic incentives for landholders to clear forests could help to entice them to conserve forests. Much deforestation takes place to convert forest areas to relatively low return uses. This suggests that financial incentives may not need to be very high to reduce deforestation very significantly. Financial incentive schemes would need to be designed carefully and be accompanied by a package of measures to address poverty and protect the vulnerable.¹²

31. ***Promoting clean cooking and heating and biofuels are other approaches to limit GHG emissions.*** Switching from traditional biomass to kerosene, LPG or biogas would, in addition to helping the environment, produce significant positive health effects. Acute respiratory diseases are among the largest 'killers' in developing countries. Botswana offers useful lessons of large-scale substitution from firewood to LPG. Biofuels--transport fuels derived from biomass--may play a role in a small number of countries such as Mauritius and Zimbabwe that have developed successful and potentially important biofuels based on large sugarcane production. But overall, the prospects of biofuels in Africa remain modest under current technologies.

⁹ They are Congo Democratic Republic, Nigeria, Sudan, Tanzania, Zambia, and Zimbabwe.

¹⁰ See Section 6 for more detail on the CDM.

¹¹ Falling ODA to forestry projects is in great part attributed to the sharp shift in ODA toward social sectors, and in particular to the health sector. As a share of total ODA, support for the forestry sector has been severely reduced, along the lines of similar trends in support to agriculture and the productive sectors.

¹² See Grieg-Gran (2006) for simulations based on works done in Costa Rica and Mexico. In Costa Rica, landowners enrolled in the national payments for environmental services scheme are paid USD64 per ha for conserving their forest. In Mexico, communities which protect their forest are receiving USD\$27 per ha or USD36 if they have cloud forest.

Box 4.1: Priorities for Tropical Forests

A recent World Bank policy research report by Chomitz, *"At Loggerheads? Agricultural Expansion, Poverty Reduction and Environment in the Tropical Forests"* provides a comprehensive framework that integrates sustainable forest management into the global strategy for mitigating climate change and preserving biodiversity.

The report identifies three types of forests and distinct priorities for each. In frontier and disputed areas, sorting out and guaranteeing forest rights is critical to mitigate deforestation, reduce conflicts, and improve rural livelihoods. In areas beyond the agricultural frontier, such as the Amazon and Congo basins, quick actions to head off the social and environmental impacts of future agricultural expansion is the main challenge. For mosaic lands that are often overlooked and where forests and more intensive cultivation co-exist, payments incentives--such as for example GEF-sponsored projects in Colombia, Costa Rica, and Nicaragua that pay farmers to maintain their forests and shift cattle from degraded pastures to agro-forestry systems--offer carbon and biodiversity benefits. New institutional arrangements and technologies can help poor people to counterbalance powerful competing interests that tend to capture forest resources. Costa Rica has nearly eliminated deforestation by making it illegal to convert forest into farmland. In the Cameroon, forestry reforms include transparent allocation of forest concessions and royalties, and the employment of independent observers who use low-cost satellite imagery to detect illegal logging.

Global carbon finance could be a powerful incentive to stop deforestation. Under the Kyoto Protocol, a group of developed countries have accepted obligations to reducing GHG emissions. They may meet those obligations in part by assisting developing countries to realize GHG emissions reductions through e.g. shifts to cleaner energy sources (cleaner energy production or re/afforestation). While the Protocol allows credit for some types of afforestation and reforestation, it does not recognize avoidance of deforestation as a source of emissions reductions for a number of technical issues related to the verifiability and risk of non-permanence of the carbon credits (in case of forest fires). However, the UNFCCC is now discussing the possibility of incorporating avoided deforestation into the global climate mitigation system through carbon credits.

32. The Clean Energy and Development Investment Framework constitutes the main effort to help developing countries increase access to energy services, to control GHG, and adapt to climate risk. The World Bank, together with the African Development Bank, the Africa Infrastructure Consortium and the European Investment Bank are working with other partners to raise Africa's energy access from the current 25 to 35% by 2015 and to 47% by 2030, moving along five parallel tracks: (1) scaled-up programs of household electrification; (2) additional generation capacity (including regional projects) to serve newly connected households and demand from enterprises, public facilities and other users; (3) provision of energy services for key public facilities such as schools and clinics; (4) provision of stand-alone lighting packages for households without electricity service; and (5) access to clean cooking, heating and lighting fuels. Besides ODA, the framework is designed to increase private sector participation in each of these areas. Results will be reviewed at the International Gleneagles Dialogue on Climate Change in September under Germany's G-8 presidency, ahead of the World Bank's annual meetings.

Recommendations on mitigation

For all countries

- To agree on a long-term global stabilisation goal and a means of allocating the effort equitably and in line with the common but differentiated responsibilities of the UN Framework. Strong commitments to emission reductions by developed countries and other major emitters will be key both to minimising the negative impact of climate change on Africa and to mobilising greater flows of carbon finance.

For development partners

- To ensure that the necessary funding is available to support the full implementation of the Clean Energy and Development Investment Framework being developed by the World Bank and the African Development Bank.
- To develop urgent plans to reduce deforestation, recognising the importance of conserving Africa's rainforests as a global public good, and reviewing in particular the treatment of 'avoided deforestation' under the Clean Development Mechanism (CDM).
- To work with African governments and other stakeholders on helping to fight deforestation combining institutional changes, technologies and carbon credit mechanisms.

For Africa

- That Africa, with support from its partners, take a more pro-active approach to the preparation of the next UNFCCC Conference of Parties in Bali (December 2007) with respect of the leading proposals for global emissions control, by evaluating these through the lens of equitable access to carbon finance.
- To work with the international community and other stakeholders to facilitate progress in reducing deforestation in Africa.
- To continue to improve the environment for investment to encourage private sector investment in carbon finance.

V. Mainstreaming adaptation in development: challenges, gaps and lessons

33. Africa has the lowest GHG emissions, yet is hit hardest by climate change. Adaptation to the unavoidable impacts of climate change will need strong support by the international community and involve all stakeholders including the private sector. Adaptation to climate change should be understood as a continuous process which addresses both current climate variability and extremes and future climate risks. In Africa and in developing countries in general, actions by local communities that are most directly affected play a very important role. Linking climate change adaptation and disaster risk management thus becomes a logical first step. But there is the urgent need for African governments to recognize that future climatic conditions may be much different from present ones--and thus the need to anticipate rapid changes through improved forecasts and planning and to develop new coping strategies. Lastly, climate change adaptation is complex and given the many constraints facing Africa such as low institutional and technological capacity and the lack of reliable climate information, major support by the international community will be needed.

34. *The Africa Union together with UNECA¹³ and GCOS launched "ClimDev Africa",¹⁴ a plan of action on climate information aimed at mainstreaming climate information into decision-making for African development.* The 10-year, 3-phase programme addresses four principal gaps in integrating climate into development policy: (i) the gap in raising awareness for broad ownership, support and communication to adapting to climate variability and change; ii) the gap in climate risk management for strategic planning and disaster risk reduction; (iii) climate-based services support to governments, the private sector and civil society; and (iv) observations, data management and infrastructure to provide

¹³ United Nations Economic Commission for Africa.

¹⁴ "The Climate Information for Development Needs: An Action Plan for Africa".

essential data to cover the first three gaps. In spite of the G8 commitment and strong support by key African institutions including the Africa Union, UNECA and regional economic communities (RECs), funding of the program, besides pledges by the UK and the Netherlands, has yet to be realized.

35. Integrating climate change adaptation must start with raising awareness that more variable and more intense climatic conditions are expected and encourage policy changes that reflect this change. The lack of strategic leadership by central governments is reflected in weak sectoral planning and policies. Raising the awareness of development planners and others and augmenting their ability to respond efficiently by means of appropriate training and support will facilitate integration of National Adaptation Action Plans (NAPAs) into national development strategies.

36. ***Integrating climate risk management into development practice.*** While agriculture has traditionally been the focus of attention on climate change impact, nearly every sector is sensitive to climate change and will need to adapt to future conditions. Adaptation must be approached cross-sectorally and should no longer be perceived as only the responsibility of the environment ministry. Involving the Ministry of Finance is crucial to reflect adaptation efforts in the budget. One key element in integrating climate risk management into development practice is reaching people at the level of communities. Integrating climate information into the risk management strategies of communities with climate-sensitive livelihoods depends on effective use of communication infrastructure and networks to support dialogue with users, to facilitate awareness and education campaigns, and to receive feedback so that users can influence the services they receive.

37. ***Climate observations and data management play pre-eminent roles in disaster management and climate adaptation.*** Awareness raising within National Meteorological and Hydrological Services and the climate community of broader development issues as well as specific information needs such as those of agricultural extension workers and rural communities have proved to play a critical role as shown in the case of Mali for weather-related agricultural information to farmers and drought-related information to other stakeholders.

38. ***In linking climate change adaptation and disaster risk management, it is crucial at the local level to build in more systematic efforts to address climate variability.*** In particular, it is important to recognise the specificity of different sectors and activities. For example, planting practices can change from season to season to adapt to climate variability. Climate change, which has imposed in part of Southern Africa, shifts in crop mix--such as moving from water-intensive corn cultivation to more traditional crops--require more preparations. Given the long life of major infrastructure such as dams, greater consideration of changes in the next 20, 30 or 50 years is needed.¹⁵ Also, field-level experiences show that climate adaptation measures are easier to approach from the perspective of programmes rather than through individual activities, thus highlighting the importance of cross-sectoral approaches.¹⁶

39. ***Practical implementation of climate change adaptation requires a deeper understanding of the barriers, motivation, and incentives (or lack thereof) to adaptation*** both by African governments and the donor community. For governments, the main barriers may be, among others:

- the lack of adequate human and institutional capacity to deal with uncertainty,
- lack of guidance and political will,
- conflict with competing agendas, often driven by external partners,
- aversion to change, and

¹⁵ Works on the inter-linkages between disaster risk management and adaptation to climate change is being carried by the Vulnerability and Adaptation Resource Group (VARG). For detail, see Sperling and Szekeley (2005).

¹⁶ See UNFCCC (2007).

- difficulties in working with non-state bodies and local communities.

40. ***Learning from good experiences.*** In the case of Mexico, the creation of an Inter-sectoral Commission on Climate Change as the leading agency, new legislation that favours the preservation of wetlands over tourism development and an integrated framework led by the central and state governments but providing strong local autonomy for implementation has helped better prepare the country to disaster management.¹⁷ The examples of Mozambique after the severe flood of 2000 and of Ethiopia after the famine of 1983-84 also show that major catastrophes have helped mobilise the political will to improve disaster preparedness. The Ethiopian Disaster Prevention and Preparedness Agency intervenes in three main areas: disaster prevention, preparedness, and response. Prevention and response activities are more traditional roles. Preparedness activities aim both to reduce the impacts of disasters and to allow the response to be more effective. This is where climate information plays an important part, within the national early warning system.

Box 5.1: Climate Adaptation – Lessons from Six Country Case Studies

The International Research Institute for Climate and Society (IRI) of Columbia University (New York City) highlighted how incorporating appropriate climate information into development decisions allows small farmers to manage climate risk. See Hellmuth et. al (2007) for more detail:

1. Climate adaptation is most effective when meteorological (among other) information is oriented towards achieving development outcomes: Mali's Meteorology Directorate launched a project some 25 years ago with external funding, to provide climate information to farmers. Over the years, the project has evolved into an extensive and effective collaboration between government agencies, research institutions, media, extension services, and representative farmers that has resulted in better decisions and higher yields.
2. Reducing climate-related risks requires multi-level stakeholder coordination and communication. Institutional innovation must be encouraged; Mozambique's collaboration to predict flood hazard as discussed above).
3. Weather information must be credible. Information and communication technologies, the media, and extension services are vital components of improved information systems: Ethiopia has responded to the challenges of its climate with an early warning system that enables mitigation measures to be put in place before drought-related disaster strikes. Early warning helps the country and development partners to assess the need for emergency relief and to be prepared to deliver when it is needed.
4. Innovations for managing climate related-risks are being developed and deployed with private sector participation: in Malawi, a private sector initiative that bundles insurance based on an established relationship between lack of rainfall and crop failure and a loan to help farmers purchase seeds and fertilizers have received strong support by farmers. With more variable and intense climate, weather-related crop insurance may have more limited prospects.
5. More efforts are needed to assess the socio-economic impact of adaptation and the value of meteorological information.

41. ***Development partners also face similar barriers and motivation in their effort to help mainstream adaptation.*** An analysis of six developing countries by the OECD¹⁸ shows that donor projects and programs potentially affected by climate risks can be as high as 50 to 65% in the case of Nepal. Yet, specific references to climate change risk are very sparse due to the lack of detailed climate information at the local level, the complexity in projecting climate extremes and analytical challenges. Existing environmental guidelines consider only the impact of a project or activity on the environment but not the impact of the environment and climate risk factors on the project. More sophisticated screening tools and approaches are needed. It is hoped that the joint declaration by OECD development and environment

¹⁷ See Levina (2007) for more detail.

¹⁸ OECD (2005).

ministers in 2006 for improving the integration of climate change in developing activities undertaken with partner countries will raise the exposure of the interplay and help to prioritise the needed response.

42. Operationally, both the WB and AfDB are gearing up to assist countries with climate risk management through: i) raising awareness about climate risks within the two institutions; ii) experimenting with climate proofing of existing projects using GEF funds (in Kenya, Malawi and Madagascar); iii) consolidating disaster management (ex-post rebuilding/rehabilitating) and climate risk management--the WB has recently set up a new global facility for disaster risk management--; and iv) developing new tools to screen development projects for climate risk management and to climate-proof them. Among the internal procedures being considered to address climate risks, the two institutions propose to begin due diligence review for climate-proofing, starting with 5-10 percent of the portfolio and gradually increasing the coverage.

43. Adaptation is projected to cost developing countries many billion of dollars a year, increasing pressure on development budgets. Changing climatic conditions make it increasingly difficult to extrapolate the costs of adaptation from past practices. The World Bank has estimated the additional costs necessary to “protect” all new investments (financed by ODA, foreign direct investments and domestic funds) in developing countries from climate change risks at between US\$ 4 to 37 billion with the wide range accounted by climate risk uncertainty on domestic investments. This estimate was calculated by assuming that 20% of ODA funded projects (US\$ 100 billion/flow per year), 10% of foreign direct investment (FDI) projects (US\$ 160 billion) and between 2 to 10% of domestic investments (US\$ 1500 billion) are climate sensitive and that the costs of adaptation range from 5 to 20% of project cost. The total cost of adaptation is of course much larger. These figures must be used with care and are only useful order-of-magnitude estimates; more work in this area is needed.¹⁹

44. The costs posed by the need for Africa to adapt to climate change makes it more urgent that international assistance for adaptation be given highest priority. Besides ODA and various commitments to scale up aid, there are several funds developed under the UNFCCC to support developing countries.²⁰ These will be discussed in the next session. Other financing options such as levies on Joint Implementation projects²¹ should also be considered. Finally, international private financing either separately or through FDI projects to meet host country regulatory requirements can play a significant role. Through public-private partnership, ODA can be used to promote the development of climate-related insurance.

45. Funding is critical but implementing adaptation by developing countries will need other types of support from external partners and sub-regional initiatives. The second African regional workshop on adaptation²² that took place in Accra last September highlighted the importance of capacity support (e.g. in using general circulation models or GCMs at national levels to project possible future climate change) and the transfer of low-carbon technologies to Africa where very limited engagement by the private sector and continuing concerns about intellectual property rights have severely restricted technology transfer. The promotion of regional co-operation efforts was generally recognized as highly desirable in the areas of surveillance and early warning systems, sharing of experiences, and the development of transboundary adaptation projects involving water-sharing of Africa's 50 river basins.

¹⁹ Sierra Leone, which is in the Gulf of Guinea and one of the worst hit coastal areas in sub-Saharan Africa, is projected to suffer significantly from sea levels rise (up to 95 cm by the year 2010). Full protection of all its vulnerable shores will require US\$ 1.2 billion, equivalent to 17 percent of GDP. See UNFCCC (2007), p. 10.

²⁰ At the Accra African regional meeting, several countries cautioned that ODA funding for adaptation should not only be considered in the context of a donor-recipient relationship but be perceived in the context of partnership in which the “polluter pays” for a global problem caused mainly by the North.

²¹ Similar in concept to the 2% levy on CDM projects that finances the Adaptation Fund.

²² UNFCCC (2006 and 2007).

Recommendations on adaptation

For development partners

- To close by the end of 2007 the current financing gap for the 10-year 'ClimDev Africa' programme developed jointly by the African Union, the UNECA and GCOS, in order to help address gaps in climate risk management.
- Fulfil their 2005 agreement to develop and implement good practice guidelines for screening and assessing climate change risk in their development projects and programs in climate-sensitive sectors.
- To identify specific ways of increasing private sector investment in energy production, energy efficiency, technology transfer and climate change adaptation, at the Gleneagles Dialogue on Climate Change in September, under the auspices of the G8 Presidency.

For Africa

- To integrate climate issues into economic planning and management at both the national and regional levels, including through high-level inter-ministerial co-ordination at national level and an increased role for Regional Economic Communities, and to review progress in this area in a further discussion at the African Union in 2008, following its Summit of January 2007.
- To make stronger efforts to assess their development projects and programmes in their sensitivity to current and future climate risks.
- To continue to improve the environment for investment to encourage private sector investment in carbon finance activities.
- To improve access of local communities to weather and climate-related information and to the knowledge of best coping strategies.

VI. More resources and support are needed for climate risk management in Africa

46. *Coping with climate change in Africa requires support for mitigation, adaptation and for low-carbon cleaner energy.* While Africa is the hardest hit continent by climate change and has the weakest coping capacity, resources to help Africa manage disaster risk and adaptation to climate change are limited and segmented. The insufficiency of technology co-operation and limited action to reduce deforestation were discussed earlier. The equally important issue of helping Africa overcome its energy poverty is not discussed here.²³ This section discusses more specifically constraints of financial resources designed to help Africa participate in carbon emissions trading and adapt to climate change.

47. *Carbon finance has the potential to generate tens of billion of dollars per year of investments in developing countries.* Through the purchase of carbon credits from low-GHG projects, carbon finance can help leverage additional investments, strengthen capacity in developing countries and encourage political engagement to address climate change. As mentioned earlier in the text, ensuring that the carbon market plays a meaningful role in the transition to a low-carbon economy will require long-term emission targets for the large emitters.

²³ See Africa Partnership Forum (2007) and World Bank (2007) for more detail on financing energy in Africa.

48. *Where emissions reduction is easily harvested, greater use of carbon finance for development purposes are numerous.* There has been significant progress in implementing the CDM as shown by the large number of new CDM projects. In the case of China, the CDM fund provides an illustration of how a country can further maximize the utilization of carbon revenues beyond specific projects to finance future climate-friendly investments.²⁴ But the CDM has so far by-passed Africa. While there is strong demand from African countries to benefit from this mechanism, only 15 out of 500 CDM projects that have been reviewed and accepted by the UNFCCC Executive Board are being implemented in Africa. And most of these projects are in South and North Africa.²⁵

49. *The CDM mechanism favours large projects.* The development potential of transactions under the CDM is constrained by a number of factors. Host-country governments face the dilemma of setting demanding sustainable development criteria and running the risk of losing investments to other developing countries with less demanding standards, or setting less stringent standards and thus generating little benefit at the local level. This is compounded by the fact that concluding deals under the CDM in low-income countries can be more expensive, time-consuming and risky than buying carbon credits elsewhere. Thus most CDM credits tend to be large end-of-pipe industrial projects or ones reducing emissions of landfill gas to be concentrated in a few large developing countries. Many of the countries most vulnerable to the impacts of climate change such as the least-developed countries have received very few CDM projects so far. Small-scale projects which have more potential for local livelihood benefits are less likely to be targeted because of their high transaction costs. Bundling small projects into a programme of activities should help to reduce transactions costs and promote CDM projects in low-income countries.

50. *African countries should be helped to better tap their CDM potential.* This will involve action on many fronts, including improving their domestic investment framework. This must be accompanied by efforts to raise awareness about the potential benefits of CDM in helping African countries develop new sectors such as renewable energy and support by external partners for capacity development to elaborate and certify CDM projects. In addition to removing domestic barriers to CDM project development, international barriers must be identified and reduced. Other considerations for the post-2012 framework such as other land use and bio-energy activities should also be reviewed.

51. *Resources for adaptation are woefully inadequate and need to be scaled up.* Only a tiny portion (less than 1%) of ODA and concessional lending is specifically directed to adaptation. The Adaptation Fund, resourced by a 2% tax on CDM transactions, is a new source of funding for adaptation distinct from ODA. But its resources are uncertain, as it depends on the extent of use of the CDM and carbon prices, and financing are estimated at between US\$ 100 million to US\$ 500 million though to 2012. An assessment of the current financial instruments shows that while they are technically adequate to respond to the challenge of achieving climate resilient development, the sums of money flowing through these instruments need to be substantially increased. The main financial instruments for financing adaptation through donor contributions to the GEF and from a tax on the CDM through the Adaptation Fund are currently projected to deliver only US\$ 150 million to US\$ 300 million per year compared with climate

²⁴ The Chinese Government has introduced a levy on CDM revenues and uses the proceeds to promote clean energy development.

²⁵ One of the reasons Africa has not benefited from the CDM mechanism is its very low level of CO₂ emissions. High investment climate risks also make Africa less attractive to potential investors. A recent study by the OECD (Ellis and Kamel, 2007) identifies different barriers that can impede the development of CDM projects. These include national-level barriers not related specifically to the CDM such as electricity-related regulations that constrain generation by independent power producers. Others obstacles are project-related including little or no availability of project finance and country-related risks. Then there are international-level barriers such as constraints on project eligibility, available guidance and decisions. A combination of factors is thus needed to drive growth in a country's CDM activity. This includes the presence of attractive CDM opportunities, a positive investment climate, and an enabling policy and legislative framework.

adaptation needs estimated at roughly 10 times this amount. Only the Adaptation Fund is demonstrably additional to existing development partner funding and its sources of finance will need to be expanded through a wider tax or revenue base if it is to be a significant instrument of additional funding.

Box 6.1: Carbon Finance and the Clean Development Mechanism (CDM)

Carbon finance is defined as the general term applied to resources provided to purchase GHG emission reductions. Carbon finance is driven either by mandatory regulatory structures or by voluntary actions aimed at limiting the right to emit GHG into the atmosphere. Carbon finance permits governments, companies, or other organisations such as NGOs or private foundations to generate, sell or buy emissions reduction credits. There are two kinds of carbon trading. The first is *emissions trading* (sometimes called 'cap-and-trade') whereby a company with savings in emissions (below specified quota) can sell its surplus allowances to another company that is short of its target. The second is *trading in project-based credits* where companies in developed countries can invest in projects abroad, mostly in developing countries, which 'reduce' emissions of carbon dioxide 'below what would have happened otherwise'.

By providing additional incentives for investment in developing countries, when such foreign investments "count" towards meeting the Kyoto commitments of the countries from which they originate, the Clean Development Mechanism could provide a valuable source of finance for climate-friendly investments in developing countries, for example in power generation. CDM is one of two project-based mechanisms designed to promote investment in projects that reduce or sequester emissions of GHG in developing countries and is founded on the basic assumption that 'creating' emissions reductions abroad is cheaper--due to low labour costs, a plethora of dirty factories in these countries, and subsidies provided under carbon funding by the World Bank and other agencies covering part of the costs of building the projects--than implementing costly new technologies and upgrades to reduce domestic emissions in the developed countries. CDM projects might include growing crops to produce bio-fuels that can substitute for oil; installing machinery at a chemical factory to destroy GHGs; or building a wind power generator. CDM could be an important tool for creating sustainable development now that small-scale projects (less than 15 megawatts) and afforestation and reforestation projects are accepted. Joint Implementation projects are similar to CDMs, but are set up in other industrialized countries, in practice mostly in Eastern Europe.

52. *Additional resources for adaptation are needed.* ODA could play an important role to enhance the capacity of Africa to adapt to climate change but the resources must be additional. The management of the Adaptation Fund, as well as its policies, programme priorities and eligibility criteria will need to be settled as early as possible. The automatic nature of the replenishment of the Adaptation Fund makes it a very attractive source of funding climate risk adaptive activities.

53. *Administrative issues regarding their management need to be settled.* Two other funds for adaptation under the UNFCCC (namely the Least Developed Countries Fund and the Special Climate Change Fund) became operational under the Marrakech Accords and are managed by the Global Environment Facility (GEF). At the Conference of the Parties (COP) of the UNFCCC and Meeting of the Parties to the Kyoto Protocol in December 2005 and May 2006, making the Adaptation Fund operational was discussed but there was no agreement. One of the main sticking points is the role given to the GEF in managing the UNFCCC Funds.

Recommendations on carbon finance

For development partners

- To review the CDM mechanisms and GEF procedures to make them more easily accessible to Africa.
- To expedite decisions on the policies, programmes and eligibility procedures concerning the Adaptation Fund to provide additional resources required by Africa for climate adaptation.

- To scale up financial support and in collaboration with private sector financing (through the CDM and Adaptation Fund) for the development and sharing of low carbon technology and energy efficiency with Africa.

For Africa

- To evaluate the various carbon finance options (access rules and procedures) in preparation for a more pro-active positioning at the next UNFCCC COP meeting in Bali, Indonesia in December 2007.
- To continue efforts to improve the enabling environment and encourage private sector investment in carbon finance activities.

Africa Partnership Forum

**8th Meeting of the
Africa Partnership Forum
Berlin, Germany
22-23 May 2007**

Expert Meeting on Climate Change and Africa

20 February 2007 ♦ Ouagadougou, Burkina Faso

A meeting of African and international experts was organised jointly by the APF Support Unit and the NEPAD Secretariat in Ouagadougou on 20 February 2007, as part of the process of developing this paper. We are grateful for the comments and advice received at this meeting. The full list of institutions represented is below.

INTERNATIONAL AND AFRICAN INSTITUTIONS

African Development Bank (AfDB)

Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel (CILSS)

Economic Community of Central African States (ECCAS)

Intergovernmental Authority on Development (IGAD) – Climate Prediction and Applications Center

Organisation for Economic Co-operation and Development (OECD)

United Nations Economic Commission for Africa (UNECA)

World Bank

CIVIL SOCIETY ORGANISATIONS

Christian Aid

ENDA Tiers Monde

PRIVATE SECTOR REPRESENTATIVES

Africappractice

MABUCIU, Burkina Faso

GOVERNMENTS

Burkina Faso: Conseil National pour l'Environnement et le Développement Durable (CONEDD)

Republic of Congo

Denmark

List of Acronyms

AfDB	African Development Bank
CDM	Clean Development Mechanism
CGOS	Global Climate Observing System
COP	Conference of the Parties (in the context of UNFCCC)
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
HFC	Hydro chlorofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
MDGs	Millennium Development Goals
NAPA	National Adaptation Action Plan
ODA	Official Development Assistance
RECs	Regional Economic Communities
UNECA	United Nations Economic Commission for Africa
UNFCCC	United Nations Framework Convention on Climate Change
VARG	Vulnerability and Adaptation Resource Group

Glossary of Technical Terms

Adaptive capacity: The ability of a system to adjust to potential damages brought about by climate change (including climate variability extremes), to take advantage of opportunities, and to cope with the consequences.

Afforestation: Planting of new forests on lands that have not been recently forested.

Anthropogenic Emissions: Emissions of greenhouse gasses resulting from human activities.

Annex I Parties: The 40 countries plus the European Economic Community listed in Annex I of the UNFCCC that agreed to try to limit their GHG emissions: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, European Economic Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, The Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United States.

Bubble: An option in the Kyoto Protocol that allows a group of countries to meet their targets jointly by aggregating their total emissions. The member states of the European Union are utilizing this option.

Carbon Dioxide (CO₂): CO₂ is a colourless, odourless, non-poisonous gas that is a normal part of the ambient air. Of the six greenhouse gases normally targeted, CO₂ contributes the most to human-induced global warming. Human activities such as fossil fuel combustion and deforestation have increased atmospheric concentrations of CO₂ by approximately 30 percent since the industrial revolution. CO₂ is the standard used to determine the "global warming potentials" (GWPs) of other gases. CO₂ has been assigned a 100-year GWP of 1 (i.e., the warming effects over a 100-year time frame relative to other greenhouse gases).

Carbon Sinks: Processes that remove more carbon dioxide from the atmosphere than they release. Both the terrestrial biosphere and oceans can act as carbon sinks.

Carbon Taxes: A surcharge on the carbon content of oil, coal, and gas that discourages the use of fossil fuels and aims to reduce carbon dioxide emissions.

Certified Emissions Reduction (CER): Reductions of greenhouse gases achieved by a Clean Development Mechanism project. A CER can be sold or counted toward Annex I countries' emissions commitments. Reductions must be additional to any that would otherwise occur.

Chlorofluorocarbons (CFCs): CFCs are synthetic industrial gases composed of chlorine, fluorine, and carbon. They have been used as refrigerants, aerosol propellants, cleaning solvents and in the manufacture of plastic foam. There are no natural sources of CFCs. CFCs have an atmospheric lifetime of decades to centuries, and they have 100-year "global warming potentials" thousand of times that of CO₂, depending on the gas. In addition to being greenhouse gases, CFCs also contribute to ozone depletion in the stratosphere and are controlled under the Montreal Protocol.

Clean Development Mechanism (CDM): One of the three market mechanisms established by the Kyoto Protocol. The CDM is designed to promote sustainable development in developing countries and assist Annex I Parties in meeting their greenhouse gas emissions reduction commitments. It enables industrialized countries to invest in emission reduction projects in developing countries and to receive credits for reductions achieved.

Climate change: Refers to any change in climate over time that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Usage of the term varies between the IPCC that refers to any change in climate, whether due to natural variability or as a result of human activity and the UN Framework Convention on Climate Change that only refers only to natural variability causes.

Conference of the Parties (COP): The supreme decision-making body comprised of the parties that have ratified the UN Framework Convention on Climate Change. It meets on an annual basis. As of February 2003, it is comprised of 188 countries.

Emissions Cap: A mandated restraint in a scheduled timeframe that puts a "ceiling" on the total amount of anthropogenic greenhouse gas emissions that can be released into the atmosphere. This can be measured as gross emissions or as net emissions (emissions minus gases that are sequestered).

Emissions Trading: A market mechanism that allows emitters (countries, companies or facilities) to buy emissions from or sell emissions to other emitters. Emissions trading is expected to bring down the costs of meeting emission targets by allowing those who can achieve reductions less expensively to sell excess reductions (e.g. reductions in excess of those required under some regulation) to those for whom achieving reductions is more costly.

General Circulation Model (GCM): A computer model of the basic dynamics and physics of the components of the global climate system (including the atmosphere and oceans) and their interactions which can be used to simulate climate variability and change.

Greenhouse Effect: The insulating effect of atmospheric greenhouse gases (e.g., water vapour, carbon dioxide, methane, etc.) that keeps the Earth's temperature about 60°F warmer than it would be otherwise.

Greenhouse Gas (GHG): Any gas that contributes to the "greenhouse effect."

Hydro fluorocarbons (HFCs): HFCs are synthetic industrial gases, primarily used in refrigeration and semi-conductor manufacturing as commercial substitutes for chlorofluorocarbons (CFCs). There are no natural sources of HFCs. The atmospheric lifetime of HFCs is decades to centuries, and they have 100-year "global warming potentials" thousand of times that of CO₂, depending on the gas. HFCs are among the six greenhouse gases to be curbed under the Kyoto Protocol.

Intergovernmental Panel on Climate Change (IPCC): The IPCC was established in 1988 by the World Meteorological Organization and the UN Environment Programme. The IPCC is responsible for providing the scientific and technical foundation for the United Nations Framework Convention on Climate Change (UNFCCC); primarily through the publication of periodic assessment reports (see "Second Assessment Report" and "Third Assessment Report").

Joint Implementation (JI): One of the three market mechanisms established by the Kyoto Protocol. Joint Implementation occurs when an industrialised country invests in an emissions reduction or sink enhancement project in another industrialised country to earn emission reduction units (ERUs).

Kyoto Mechanisms: The Kyoto Protocol creates three market-based mechanisms that have the potential to help countries reduce the cost of meeting their emissions reduction targets. These mechanisms are Joint Implementation (Article 6), the Clean Development Mechanisms (Article 12), and Emissions Trading (Article 17).

Kyoto Protocol: An international agreement adopted in December 1997 in Kyoto, Japan. In the Kyoto Protocol, a target is the percent reduction from the 1990 emissions baseline that the country has agreed to. On average, developed countries agreed to reduce emissions by 5.2% below 1990 emissions during the period 2008-2012, the first commitment period.

Land Use, Land-Use Change and Forestry (LULUCF): Land uses and land-use changes can act either as sinks or as emission sources. It is estimated that approximately one-fifth of global emissions result from

LULUCF activities. The Kyoto Protocol allows Parties to receive emissions credit for certain LULUCF activities that reduce net emissions.

"Polluter Pays" Principle (PPP): The principle that countries should in some way compensate others for the effects of pollution that they (or their citizens) generate or have generated.

ppm or ppb: Abbreviations for "parts per million" and "parts per billion," respectively - the units in which concentrations of greenhouse gases are commonly presented.

Reforestation: Replanting of forests on lands that have recently been harvested.

Renewable Energy: Energy obtained from sources such as geothermal, wind, photovoltaic, solar, and biomass.

Sequestration: Opportunities to remove atmospheric CO₂, either through biological processes (e.g. plants and trees), or geological processes through storage of CO₂ in underground reservoirs.

Sinks: Any process, activity or mechanism that results in the net removal of greenhouse gases, aerosols, or precursors of greenhouse gases from the atmosphere.

Thermohaline Circulation (THC) also known as the Gulf Stream: A three-dimensional pattern of ocean circulation driven by wind, heat and salinity that is an important component of the ocean-atmosphere climate system. In the Atlantic, winds transport warm tropical surface water northward where it cools, becomes denser, and sinks into the deep ocean, at which point it reverses direction and migrates back to the tropics, where it eventually warms and returns to the surface. This cycle or "conveyor belt" is a major mechanism for the global transport of heat, and thus has an important influence on the climate. Global warming is projected to increase sea-surface temperatures, which may slow the THC by reducing the sinking of cold water in the North Atlantic. In addition, ocean salinity also influences water density, and thus decreases in sea-surface salinity from the melting of ice caps and glaciers may also slow the THC.

United Nations Framework Convention on Climate Change (UNFCCC): A treaty signed at the 1992 Earth Summit in Rio de Janeiro that calls for the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The treaty includes a non-binding call for developed countries to return their emissions to 1990 levels by the year 2000. The treaty took effect in March 1994 upon ratification by more than 50 countries. The United States was the first industrialized nation to ratify the Convention.

Vector-borne disease: Disease that results from an infection transmitted to humans and other animals by blood-feeding arthropods, such as mosquitoes, ticks, and fleas. Examples of vector-borne diseases include Dengue fever, viral encephalitis, Lyme disease, and malaria.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

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