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Special feature

- Climate challenges for Africa

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Foreword

The Africa Partnership Forum (APF) was established in 2003 following the G8 Summit in Evian, as a way of extending existing dialogue between G8 countries and New Partnership for Africa's Development (NEPAD) to include Africa's major bilateral and multilateral development partners. In 2005 APF members agreed to establish an OECD-hosted support unit to backstop ongoing monitoring and analytical work. The APF is a senior political forum for discussing and monitoring policy issues, strategies, priorities and commitments related to Africa's development and the implementation of NEPAD programmes, in the wider context of the Millennium Development Goals (MDGs). The APF monitors commitments and tracks progress. Its members include all African NEPAD members plus key African institutions and other major development partners, which work together as equals in the Forum and ensure synergies and coherence with other international fora.

Climate change has been a central part of the work of the Forum for the last 4 years, including a special session convened in Addis Ababa in the run-up to the UNFCCC Copenhagen Conference in 2009, and briefings by South Africa as host of the UNFCCC Conference in Durban, at both the Paris and Addis Ababa APF meetings in April and November 2011.

Its work has played a crucial role in helping to:

- (i) Focus attention on the impact of climate change in Africa – on economic growth and sustainable development, on poverty reduction, on human security, and on the prospects for achieving the Millennium Development Goals (MDGs). These impacts range from energy shortages, reduced agricultural production, worsening food security and growing malnutrition, to spreading disease, more humanitarian emergencies, growing migratory pressures and increased risk of conflict over scarce resources;
- (ii) Build greater understanding of Africa's perspectives and priorities : whilst the APF is not itself a negotiating Forum, it provides an opportunity to build a shared understanding of Africa's concerns and priorities in particular on the key issues of mitigation, adaptation, technology development and transfer, and finance, being discussed in the wider UNFCCC context;
- (iii) Highlight the importance of new and additional climate finance: Africa is the continent least responsible for climate change, and least able to meet the costs of adapting to its impacts, yet it is also the continent which receives least from current carbon finance mechanisms. The APF has provided a Forum for exchanging ideas on the different possible mechanisms for generating new sources of finance;
- (iv) Brief senior policy makers: the APF has provided a Forum for briefing senior policy makers on climate change issues, with key note speakers including Prime Minister Meles Zenawi, Lord Stern, and Dr. Pachauri – chair of the Intergovernmental Panel on Climate Change, as well as the briefing sessions this year from South Africa as the host of COP17.

APF would like to thank and acknowledge those who provided assistance, inspiration, or help at any point along the way. For more information about the APF, visit www.africapartnershipforum.org.

Climate change challenges for Africa

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Climate challenges to Africa, a call for action

By Karim Dahou, Doreen Kibuka-Musoke, Brian Ngo and Francesca Pavarini

This paper was prepared by the Africa Partnership Forum (APF) Support Unit* for discussion during Session 1 on “Environmental Issues and Climate Change” at the 10th Meeting of the Africa Partnership Forum in Tokyo on 7-8 April 2008.

“The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation. The international community has an obligation to support them in adapting to climate change. Without such support, there is a serious risk that development progress will be undermined.”

The Stern Review, 2006

* The paper was written by Karim Dahou (Health), Doreen Kibuka-Musoke (Agriculture, Forestry and Fisheries), Brian Ngo (Water, Energy, Financing), and Francesca Pavarini (Peace and Stability) under the leadership of David Batt and with editing support from Raundi Halvorson-Quevedo. The opinions expressed and arguments employed in this paper are those of the authors and do not necessarily reflect the official views of the OECD or of the governments of its member countries.

This paper and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The APF Forum Support Unit is very grateful for the comments and advice it has received from many African and international institutions, experts, and government officials in drafting the main paper and its Annexes (the six Focus Issue texts), as well as for the specific contributions, as acknowledged, to the Fact Boxes.

Executive summary

African leaders expressed their grave concern at the impact of climate change at the 8th Ordinary Session of the African Union in January 2007, calling on member states and Regional Economic Communities to integrate climate change considerations in their development strategies, and on development partners for their support. This concern was reiterated at successive meetings throughout the year, including the 8th meeting of the APF in May, and culminating in the UN Framework Convention for Climate Change meeting in Bali in December, and agreement on a 'Bali Action Plan' identifying 5 topics to be addressed in the international negotiating process over 2008-09.

Although Africa is the continent least responsible for climate change, it is acutely vulnerable to its adverse effects – on economic growth and sustainable development, on poverty reduction, on human security, and on the prospects for achieving the Millennium Development Goals (MDGs). The impacts range from energy shortages, reduced agricultural production, worsening food security and growing malnutrition, to spreading disease, more humanitarian emergencies, growing migratory pressures and increased risk of conflict over scarce land and water resources. Africa is the continent least able to meet the costs of adapting to these impacts, with the greatest need to develop its energy sources, and also with the potential to contribute to global efforts to reduce emissions through its forest resources. Yet it is also the continent which receives least from current carbon finance mechanisms.

This paper looks at the impact of climate change in Africa; at the current response; and the key priorities for both the wider international community and for Africa. It has three main components:

- A brief overview under three headings: adaptation and risk management; mitigation and clean energy development; finance and other cross-cutting issues;
- Six one-page summaries on specific focus areas: water; energy; agriculture, forestry and fisheries; health; peace and stability, and financial mechanisms;
- Ten 'fact boxes': these cover climate change scenarios, the economic impact, the impact on achieving the MDGs, trade and technology transfer, gender, the impact on small-holder farmers, National Adaptation Programmes of Action (NAPAs), a case study on Rwanda, the ClimDev Africa Programme, and the negotiating process in the UNFCCC;

The paper is supported by six more detailed annexes on the focus areas above. Its central conclusion is that urgent action is needed both by the wider international community and by African governments, acting both at national level and through their regional and continental institutions. Its main recommendations are very much in line with the Bali Action Plan, and can be summarised in ten key points:

Adaptation and risk management

- (i) Substantial additional and predictable financial support from development partners to help meet the additional costs of adaptation, including for the development of climate-related information and early warning systems;
- (ii) Strengthened action to integrate the impact of climate change into national development strategies and existing sector policies (including energy, water, land use and agriculture);

- (iii) Concerted action to build the capacity of national governments in addressing climate risks and joint efforts by Africa and development partners in strengthening regional institutions;

Mitigation and clean energy development

- (iv) Agreement globally on stronger commitments to reduce greenhouse gas emissions;
- (v) Full recognition of Africa's development needs in any future agreement on emission limitations;
- (vi) Increased support for **clean energy development**, and for **avoiding deforestation**;

Finance and other cross-cutting issues

- (vii) Facilitate and promote greater **access to the carbon market and other GHG-friendly activities for Africa**, together with the establishment of **new mechanisms** to provide additional resources from official and concessional sources and through innovative financing mechanisms;
- (viii) Continued efforts to strengthen the business environment in order to attract greater **private sector** investment, including through the Clean Development Mechanism (CDM);
- (ix) More support for **technology transfer** and implementation;
- (x) A strengthened African **voice** in future **international negotiations**.

Overview

Adaptation and risk management – ‘Managing the Unavoidable’¹

Although much is still unknown, it is already possible to identify likely changes in Africa’s climate:

- (i) Northern and Southern Africa are already warming faster than the global average. Under a medium GHG emissions scenario, Africa is projected to experience an average warming of between 3 to 4 degrees C by the end of this century compared to 1980-99 levels;
- (ii) Along with rising temperatures, there is also likely to be increased rainfall variability, more extreme precipitations, and growing water stress. By 2020 between 75 and 250 million people are projected to be at risk of increased water stress. The problem of water scarcity will be particularly acute in North Africa;
- (iii) The sea-level will rise. Projections suggest that the number of people at risk from coastal flooding could increase from 1 million in 1990 to 70 million in 2080, forcing major population movements;
- (iv) There are likely to be more intense and unpredictable weather events including the increased instance of floods and droughts, more intense tropical cyclones and stronger and more frequent storm surges.

Although Africa is not unique in experiencing these changes, it is particularly vulnerable to the effects, because of factors such as its high dependence on rain-fed agriculture, very low capacity for water storage, wide-spread poverty, existing vulnerability to humanitarian emergencies, and weak adaptive capacity. Also, compared to other regions of the world, sub-Saharan Africa is severely constrained by the lack of climate-related information without which it will be difficult to design and implement climate adaptation activities.

- (i) Climate change is likely to have a significant impact on the prospects for **economic growth**. Africa’s major economic sectors are vulnerable to climatic change and variability, in particular agriculture where yield per hectare is already on the decline and could be reduced further. Country studies also underline the significant impact of droughts and floods on GDP performance. But climate change also impacts more broadly on the availability and reliability of energy, and thus other sectors throughout the economy too;
- (ii) There is likely to be a significant impact too both on the rate of progress towards the **Millennium Development Goals**, and the long-term sustainability of this progress. Reduced economic growth will mean a slower reduction in income poverty, and reduced agricultural production is likely to exacerbate malnutrition (MDG 1). Progress towards universal primary education could be affected (MDG 2). Women are in general more vulnerable to the effects of climate change - in times of climate stress, they must cope with fewer resources and greater workloads (MDG 3). The impact of climate change is likely

¹ Terminology originally used in United Nations Foundation—Sigma Xi Scientific Expert Group on Climate Change (2007) publication “Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable” by Rosina M. Bierbaum, and others, eds. Scientific Expert Group Report on Climate Change and Sustainable Development prepared for the fifteenth Session of the United Nations Commission on Sustainable Development.
www.unfoundation.org/files/pdf/2007/SEG_Report.pdf.

to add to the pressures on already over-stretched health systems and basic water and sanitation infrastructure, affecting infant, child and maternal mortality, and the spread of climate-sensitive diseases such as malaria (MDGs 4, 5 and 6). Environmental sustainability (MDG 7) will be put at risk. More extreme weather events such as flooding and droughts are likely to lead to increasing humanitarian emergencies, presenting further risks to progress towards all the MDGs;

(iii) There are also important implications for **human security**. Increased competition for scarce water and land resources, triggered by environmental degradation, desertification, and water scarcity, and compounded by population pressures, will present increased risks to peace and stability. These factors, along with the specific risk to major settlements in coastal areas, will impact on migratory flows, generating additional pressures. The combination of resource pressures and migratory flows will also create increased risk of regional tensions.

A number of important initiatives have already been taken, including the ‘Action Plan on Climate Information for Development in Africa’ (ClimDev Africa) programme being implemented by the AU, UN Economic Commission for Africa and African Development Bank (Fact Box 9 refers); the African Climate Policy Centre being launched by UNECA; risk management schemes such as the weather-related crop insurance schemes developed in Ethiopia and Malawi; and the flood early warning systems established by Mozambique. Twenty-two countries have now developed National Adaptation Programmes of Action (NAPAs). The more detailed annexes on individual ‘focus sectors’ – water, energy, agriculture, forestry and fisheries, health, and peace and stability – identify a wide range of further sector priorities. These range from specific responses such as improved information and early warning systems, and climate risk management schemes such as weather-related crop insurance, to broader issues such as improved water storage, the application of climate resistant technologies, the strengthening of health systems, and improved emergency preparedness and response systems. The key role of regional institutions is a cross-cutting theme.

Adapting to these impacts will however impose major costs on African governments and will require significant additional support from development partners. Estimates using different approaches all indicate very large financing requirements, potentially amounting to tens of billions of dollars per annum (as described in more detail under Focus Issue 6). Given the limited domestic resources available, this underlines the importance of substantially increased external support – as well as the need to integrate adaptation strategies into broader development planning – as part of “climate-resilient development”.

MAIN PRIORITIES:

- (i) Substantial additional and predictable financial support from development partners to help meet the additional **costs of adaptation**, including for the development of climate-related **information** and **early warning systems**;
- (ii) Strengthened action to integrate the impact of climate change into **national development strategies** and existing **sector policies** (including energy, water, land use and agriculture);
- (iii) Concerted action to build the capacity of **national governments** in addressing climate risks and joint efforts by Africa and development partners in strengthening **regional institutions**.

Mitigation and clean energy development – ‘Avoiding the Unmanageable’

Strong and effective commitments to reducing global emissions, including incentives for key developing countries to cut emissions, will be essential for a post-2012 framework to address climate change. The next UN Framework Convention on Climate Change (UNFCCC) meetings in 2008 and 2009 will be a key part of this process. The European Union has already committed to cut emissions by 20% in 2020 compared to 1990 levels and by 30% for the same period if other countries were committed to meet similar targets, to reduce energy by 20%, and raise the share of renewable sources of energy by 20% of the total. At the 2007 G8 Summit in Heiligendamm, the G8 reached an understanding that they will seriously consider the decisions made by the European Union, Canada and Japan which include at least a halving of global emissions by 2050.

Africa’s specific development needs – and in particular its very low emissions and extreme energy poverty - must be recognised within any overall global agreement on emission limitations. Average *per capita* emissions in Africa are 13 times less than North America, and Africa accounts for less than 4% of total global emissions. This reflects its acute energy poverty – the rate of access to electricity is around 25% in sub-Saharan Africa – and even under the best of assumptions will only rise to 35% by 2015. Half of sub-Saharan African countries have experienced power crises over the last 2 years due to a combination of factors including changing climatic conditions that have reduced the power generation capacity of hydroelectric dams.

Developing energy capacity is thus critical – both to the prospects for sustained economic growth and diversification, and to human development. Africa’s energy resources are vast, but unevenly distributed and under-developed. There is large potential for the development of clean energy sources, including through the development of Africa’s huge hydroelectric power potential – less than 4% of which is currently utilized. African governments have begun to address both the reform of regulatory frameworks in order to attract independent power generation and issues of sub-regional river basin management. Development partners have begun to scale up their support for energy access and to mobilize private sector investment. But huge investments are needed involving at least the doubling of financing from USD 2 billion to USD 4 billion a year, and requiring not only the further scaling up of aid resources but also the leveraging of greater private sector resources. Biofuels present significant potential but will need to be carefully assessed against competition for land under food production. There is also scope for significant efficiency gains, for instance in energy-intensive industry processes such as the cement industry, and huge opportunities to reduce transmission and distribution losses in many African countries.

Compensation for avoided deforestation is another way to limit emissions. Worldwide, deforestation is responsible for around 20% of total annual emissions. Forest losses each year are equivalent to an area 4 times the size of Belgium. Brazil and Indonesia are the worst-affected countries, but 6 of the 10 largest forest losses are in sub-Saharan Africa. Several initiatives to help manage forests on a sustainable basis have been launched. Two of the better-known new initiatives are: the Congo Basin Forest Initiative managed by the Africa Development Bank, and a new Forest Carbon Partnership Facility (FCPF) which has been set up at the World Bank to pilot a system of positive incentives for reducing emissions from deforestation and degradation. Avoiding deforestation is not currently eligible under the Clean Development Mechanism but under the Bali Action Plan, negotiations of a post-2012 international framework will consider policy approaches and positive incentives to promote and support reduced emissions from deforestation and forest degradation (REDD).

MAIN PRIORITIES:

- (i) Agreement globally on stronger commitments to reduce greenhouse gas **emissions**;
- (ii) A full recognition of **Africa's development needs** in any future agreement on emission limitations;
- (iii) Increased support for **clean energy development**, and for **avoiding deforestation**;
- (iv) **Reforms of national regulatory frameworks** to allow local energy providers (of clean energy) to connect to the national power grid to promote the development of clean energy;
- (v) **Promoting a regional approach** to capture the potential of complementary investments in hydroelectric power generation and water resources, and in particular in strengthening the capacity of regional institutions.

Finance and other cross-cutting issues - 'Delivering the Achievable'

The financial resources currently available to meet the challenges of adaptation and clean energy development are limited and segmented. Although it is increasing, the proportion of ODA and concessional lending specifically directed to adaptation to climate risks remains very small. The main sources of multilateral funding for climate change adaptation are donor contributions to the Global Environment Facility (GEF) and special funds set up under the UNFCCC The Adaptation Fund, which was set up under the Kyoto Protocol and resourced from a 2% levy on proceeds from Clean Development Mechanism (CDM) projects, has yet to become operational. Together, these various funds are currently projected to deliver only USD 150 million to USD 300 million per annum compared to the much larger adaptation needs. Only the Adaptation Fund is demonstrably additional to existing and planned development partner funding. The bulk of the **carbon market** takes the form of emissions trading between committing developed countries (known as Annex 1 parties). Proceeds from CDM projects contribute to around 17% of the total carbon market. But the CDM mechanism has largely bypassed Africa – which accounted for only 3% of the US \$5billion CDM proceeds in 2006.

There is a need: firstly to explore options to allow Africa to benefit more from the carbon market and other GHG-friendly activities through, for instance, a broadening of the CDM to include land-use changes and forestry and through the development of Africa's capacity; **and secondly for action to generate substantial and predictable levels of new and additional donor funding for adaptation.** On the first point, there is an important link to the domestic investment environment and regulatory framework - in order to encourage private sector investment in carbon finance activity. On the second point, there are a number of new initiatives by bilateral and multilateral donors including new carbon facilities and, most importantly, the establishment of a new multi-donor trust fund to promote low carbon and climate-resilient economic growth and poverty reduction. Discussions have also begun on the possibility of innovative financing using donors' good credit ratings to raise funding on the capital markets to finance climate-related activities and projects.

Whilst only negotiations between governments can deliver the international framework for dealing with climate change, the involvement of the **private sector** will be essential to delivering results on the ground. More intensive efforts will be needed to identify specific ways of increasing private sector investment in adaptation, renewable energies and energy efficiency, and technology transfer. The Clean Energy and Development Framework developed by the African Development Bank and the World Bank is designed to promote private sector engagement in areas ranging from household electrification to access to clean cooking, heating and lighting fuels.

Technology development and transfer will be key to adapting to and mitigating climate change. The Bali Action Plan calls for enhanced action on the removal of obstacles to, and the provision of incentives for the acceleration and scaling up of technology transfer, along with cooperation on research and development. African countries have called for: the establishment of a new body under the Convention, the Technology Development and Transfer Board (TDTB); a Multilateral Technology Acquisition Fund (MTAF) to buy intellectual property rights; and the development of indicators to monitor implementation of the technology transfer framework. There is also active interest in explicitly identifying goods and services that are directly relevant to adaptation or mitigation and including them as climate change issues in trade negotiating agendas. The recent OECD Environmental Outlook found that the removal of tariff and non-tariff barriers can increase the diffusion of clean technologies in developing countries. A World Bank study also found large potential for promoting clean energy technology between developing countries.

All of these issues will form part of the intensive international discussions and negotiations leading up to the next UNFCCC Conferences in Poznan (Poland) in December 2008 and in Copenhagen (Denmark) in November 2009. It will be essential to make significant progress in 2008. Important meetings, in addition to UNFCCC expert meetings, where climate change issues will be discussed over the next 6 months include: the first joint annual meetings of the AU Conference of Ministers of Economy and Finance and ECA Conference of Ministers of Finance, Planning and Economic Development in March/April; the IMF/World Bank Spring meetings in April, TICAD IV in May; the OECD Ministerial Council in June; the G8 Summit in Hokkaido in July and the MDG Summit in New York in September. It is important that Africa should be equipped to speak with a strong and unified voice in international negotiations.

MAIN PRIORITIES:

- (i) Facilitate and promote greater access for Africa to the **carbon market and other GHG-friendly activities** together with the establishment of **new mechanisms** to provide additional resources from official and concessional sources and through innovative financing mechanisms;
- (ii) Continued efforts to strengthen the business environment in order to attract greater **private sector** investment, including through the Clean Development Mechanism (CDM);
- (iii) More support for **technology transfer** and implementation;
- (iv) A strengthened **African voice** in future **international negotiations**;

Focus issue 1: Water

THE IMPACT

Water is central to realizing the development potential of Africa. Safe water is critical to health and well-being; water is also an essential input into agriculture and other productive activities including the provision of hydroelectric power. Climate change, through rising temperatures and advancing desertification, is likely to affect:

(i) **Water availability:** by 2025, it is expected that 25 African countries will be subject to water scarcity or water stress. North Africa, which has heavily invested in water storage and distribution infrastructure, already sustains water demands that are substantially in excess of renewable resources;

(ii) **Rainfall variability:** patterns of precipitation and runoff are likely to change substantially: rain in fewer, heavier events will lead to more floods and dry spells while ground water recharge will diminish, making it more difficult to improve access to safe water, adding to existing pressures on water systems, and further complicating efforts of achieving basic water security;

(iii) **Economic growth:** recent country-level studies suggest that the impacts of hydrology and rainfall variability on economic development are significant. In Ethiopia, it was estimated that droughts and floods have reduced economic growth by more than one third. Annual damages in Kenya due to flooding and drought in 1998–2000 range from 10–16% of GDP. With poorly protected watersheds and more erratic rainfall, both Eastern and Western Africa have experienced below-normal reservoir levels that severely affected hydroelectric power generation, aggravating already-fragile energy sectors and forcing cash-strapped governments to invest in emergency fossil-fuels or coal-based energy generation.

THE RESPONSE

As an input into productive activities, Africa's water resources remain under-utilised. Less than 4% of potentially irrigable lands in sub-Saharan Africa have been developed. Less than 7% of Africa's hydropower potential has been exploited. African governments have, however, taken important decisions such as: i) establishing the African Ministers' Council on Water (AMCOW) to provide political leadership and policy directions in the provision, use and management of water resources; ii) adopting the Integrated Water Resources Management (IWRM) principles in the management of national and regional policies; iii) establishing collaborative agreements to facilitate the management and development of trans-boundary water resources; and iv) investing in water infrastructure and storage. Some progress has been registered under i) and iii).

Development partners are also focusing increased attention on the systematic integration of climate risk management into project planning and management. A concerted effort is beginning to promote river basin co-operation and support trans-border river basin commissions. This has led, for instance, to the financing of a 10-year programme of basin multipurpose development for the Senegal River. After several years of preparation (capacity and institutional development), the Nile River Basin has entered the investment phase costing USD 400 million.

SECTOR PRIORITIES

For sub-Saharan Africa:

- (i) Develop **water storage** infrastructure. This is a key factor for de-linking economic performance and poverty reduction from extreme hydrological variability. Average storage capacity in sub-Saharan Africa at around 200m³/person/year is noticeably low by international comparison;
- (ii) Introduce innovative water management approaches including integrated river basin management combining water storage infrastructure with **hydroelectric power** development, water for **irrigation** and ancillary investments such as transport that, together, would help Africa to reduce its heavy reliance on rain-fed agriculture, to promote economic diversification and, in the process, increase its resilience to climate risks;
- (iii) **Strengthen water policies** and water resource management including enhancing the **role of the private sector**.

For North Africa

- (iv) Realign **water demand** with available supply through broader institutional and policy reform;
- (v) Further strengthen **water scarcity management** strategies, including through water-saving technologies and demand-management measures.

For Africa as a whole:

- (vi) Strengthen **disaster risk management**, particularly in relation to floods. For every USD 1 spent preparing for disasters, USD 7 is saved in the cost of post-disaster recovery and reconstruction.

Focus issue 2: Energy

CONTEXT AND OPPORTUNITIES: ENERGY AS A PREREQUISITE FOR ECONOMIC GROWTH & DIVERSIFICATION

Access to reliable energy has been systematically identified as critical to both Africa's growth and its export competitiveness. Access to electricity is also critical to making progress towards other MDGs such as health and education. With more than 550 million people without access to electricity services, energy production and consumption are expected to soar in the future. Underlying these low levels of access are the exceptionally low levels of installed generation capacity, of which 60% is in South Africa alone. Mismatch between power demand and available supply has grown, and increasing numbers of African countries have become vulnerable to power crises.

THE IMPACT

Climate change presents additional challenges to Africa – at a time when it is already hard hit by high oil prices. Climate change, through changing and more erratic rainfall, has severely affected the generation capacity of hydroelectric power dams in both Eastern and Western Africa, forcing countries to spend their limited resources on adding emergency generation capacity, relying mainly on coal- or fuel-based systems thus aggravating greenhouse gases emissions. Twenty-eight countries are or have been affected by the energy crisis in the past 24 months.

Africa is thus faced both with the challenge of increasing access to energy, and the opportunity to exploit the large potential for development of its clean energy sources. There is enormous untapped renewable energy potential – especially hydroelectric power, geothermal energy, solar and wind power, as well as more improved energy efficiency, and more efficient use of biomass. Climate change and carbon finance thus provide Africa with the incentives to develop clean energy, and in particular hydroelectric power. Greater access to finance and regional cooperation are both crucial to exploiting this potential.

THE RESPONSE

External support for the energy sector has significantly expanded. ODA commitments rose sharply from USD 1.9 billion in 2005 to USD 2.4 billion in 2006. Over 50% of that amount is for North Africa. Arab partners and India provided over USD 900 million to Africa for investments in energy generation and connections. China, which is by far the most significant player, has financed the construction of hydroelectric power stations in several countries. Private sector flows are substantial, reaching USD 1.2 billion in 2005 mostly for generation capacity by independent power producers.

Through the Clean Energy Investment Framework, the African Development Bank and the World Bank, in collaboration with other bilateral and multilateral agencies, are promoting a multi-track approach covering: improving access in urban and rural areas; upgrading national transmission grids; helping to develop efficient power-trade arrangements; promoting off-grid renewable power supply systems; and promoting sustainable household fuels. Together with other multilateral development banks (MDBs), they are exploring ways of accelerating access to appropriate and affordable technologies and to carbon finance, and of strengthening coordination between the public and private financing windows of each of the MDBs.

African countries have also begun to address these issues by developing regional energy interconnections and facilitating regional energy trade through the establishment of regional power pools in all sub-regions of Africa.

SECTOR PRIORITIES

(i) Promote **renewable energy**, both on a national and regional basis:

For **Africa**, the challenges are to:

- harness the continent's huge but as yet untapped hydroelectric power resources;
- promote other renewable energy sources such as geothermal energy, particularly where these provide cost-effective options to increase electricity service in rural areas;
- undertake and implement regulatory reforms to facilitate connections of local electricity generation to national power grids;
- promote regional approaches, building on the regional power pools already established;
- gear up to participate with a stronger voice in international discussions regarding carbon finance – revenue tapped from carbon credit trade through the CDM could effectively reduce the cost of clean energy options;

Development partners need to:

(i) help Africa overcome constraints in financing and capacity development, and to promote technology transfer;

(ii) Promote **energy efficiency** – through a combination of supply-side initiatives to improve technical efficiency, and demand-side initiatives to promote energy saving;

(iii) Promote clean household **biomass fuels**

(iv) Consider **biofuels** options – whilst keeping in perspective the importance of balancing the competition between food and biofuels for arable land, and the implications for food availability and food prices;

(v) Use available opportunities to promote **mitigation** in countries with large CO₂ emissions;

(vi) Reduce **gas flaring** – through the Global Gas Flaring Reduction Partnership (GGFR).

Focus issue 3: Agriculture, forestry and fisheries

THE IMPACT OF CLIMATE CHANGE

African agriculture is particularly vulnerable to the effects of climate change. Whilst these are likely to differ across the continent, most of Africa relies on rain-fed agriculture and is therefore highly vulnerable to changes in climate variability, seasonal shifts and precipitation patterns. Long-term projections indicate that agricultural output (without carbon fertilization) could be reduced by 28% by 2080, more than any other region. The first to be affected are likely to be those who are dependent on agriculture for jobs and income, and whose adaptive capacity is constrained the most – farmers, and particularly small-holder farmers.

Climate change impacts may increase the number of people at risk of hunger. Africa's agricultural yields are already on the decline, so the attainment of MDG 1 - eradicating poverty and hunger – could be seriously threatened. A 3°C warming could put 150 million to 550 million additional people at risk of hunger. There has also been growing concern about the impact of biofuels on the world's food supply and food prices.

Africa's forest resources can contribute to global efforts to reduce emissions. Of the 10 countries with the largest net forest loss per year in the past 5 years, 6 are from Africa. The major cause is removal for wood and fuel. Rising temperatures are also making forests drier and therefore more susceptible to fires, pests, and disease. Recognition of the importance of deforestation led to agreement at Bali on the need for new incentives to promote conservation, sustainable forest management and enhancement of forest stocks in developing countries, and thus to reduce emissions from deforestation and forest degradation (REDD). Significant new initiatives are underway including the Congo Basin Forest Initiative and the Forest Carbon Partnership Facility (FCPF).

Declining productivity of African fisheries may be exacerbated with climate change. Fish supply is already in crisis. Africa is the only continent in the world where fish supply per person is declining. Climate change is projected to exacerbate declining productivity levels for African fisheries by changing water levels, sea temperatures and ocean acidity levels which will cause a shift in the range of fish species and fish reproductive patterns. Given that significant numbers of people in Africa depend on fish for protein, impacts on the fisheries sector will also affect nutrition and health.

SECTOR PRIORITIES

On Agriculture:

- (i) Increased support for the development of **early warning systems, forecasting and climate information**, including the “ClimDev Africa” programme developed by the AU, UN Economic Commission for Africa and African Development Bank, with support from the Global Climate Observing System (GCOS);
- (ii) Increased support for the development of **climate-resilient technologies and practices**. More funds are needed for research and development, and dissemination of appropriate technology, such as drought and heat-resistant crops;

- (iii) The increased use of climate-related **insurance schemes**, as a key tool in climate risk management, building on the recent innovations in insurance contracts which have led to the initiation of weather-related insurance schemes in Africa, as well as other regions around the world;
- (iv) The adaptation of **food distribution systems**, in response to the increasing risk of food insecurity, and specifically designed to meet the needs of vulnerable communities and poor households most at risk;
- (v) Careful analysis of the implications of **biofuels** for **food availability** and **food prices**, and in particular the implications for the poorest, alongside a carbon assessment;

On Forestry:

- (vi) Increased support from development partners for forest conservation and sustainable forest management, including through the **Congo Basin Forest Initiative**, and the **Forest Carbon Partnership Facility (FCPF)**;
- (vii) Agreement that policy instruments to promote and support **Reduced Emissions from Deforestation and Degradation (REDD)** are developed and recognised within a post-2012 climate treaty;

On Fisheries:

- (viii) The expansion and intensification of **aquaculture**, including action both by African governments to integrate aquaculture into national development strategies, and increased support from development partners for initiatives such as the NEPAD Action Plan for the Development of Fisheries and Aquaculture and PROFISH.

Focus issue 4: Health

THE IMPACT OF CLIMATE CHANGE

There is growing concern at the impact of climate change on health, and increasing numbers of humanitarian emergencies linked to climatic factors. The European heat-wave of 2003 caused an estimated 15,000 deaths in France alone. For Africa the potential impact of climate change, although less well-documented, is even more serious – adding to the pressures on over-stretched health systems and basic water and sanitation infrastructure, and with a direct effect on prospects for progress towards the MDGs. Potential health impacts are through:

The spread of **climate-sensitive diseases**: increased temperatures and higher humidity will lead to the extension of malaria-transmission areas. Increased flooding will increase the spread of diseases associated with water, such as cholera and diarrhoeal diseases. Drought conditions create a higher risk of meningitis infection and epidemics. Higher temperatures aggravate air pollution, thereby increasing the risk of acute respiratory diseases;

Reduced access to **water and sanitation**, and higher levels of **malnutrition**, as described in Focus Issues 1 and 3.

(iii) More **humanitarian emergencies** triggered by extreme weather events, such as storms, floods and droughts, leading to population dislocation, lack of shelter, disease, widespread malnutrition and shortage of clean drinking water.

There is a potential impact on MDG 1: eradicating hunger; MDG 4: reducing infant and child mortality; MDG 5: reducing maternal mortality, and MDG 6: combating HIV/AIDS, malaria and other diseases.

THE RESPONSE

There have been a number of broader initiatives – from both Africa and its development partners – designed both to strengthen health systems and finance the fight against infectious diseases, and hence reducing vulnerability to the impact of climate change. In addition:

(i) **Climate-sensitive diseases**: there has been some progress in developing remote detection and early warning systems to allow governments to anticipate seasonal variations in climate and the epidemiological risks associated with these. It is clearly essential that this work be undertaken on a regional basis;

(ii) There have also been initiatives to upgrade **water and sanitation infrastructure** and improve **food security**;

(iii) **Humanitarian emergencies**: several governments have made progress in reducing the impact of extreme weather events, for instance by developing early warning systems for droughts and floods, and disaster response programmes. The international community has established the Central Emergency Response Fund (CERF). In addition there is increasing attention to the need to integrate disaster risk

reduction into development planning and practice. The African Union has adopted the AU/NEPAD African Regional Strategy for Disaster Risk Reduction.

SECTOR PRIORITIES

Action is needed on two tracks: firstly to continue to improve the capacity of health systems and basic infrastructure in order to reduce vulnerability to the potential impact of climate change; and secondly, to address specific climate-related impacts. More specifically, the priorities are:

(i) Continue and intensify efforts to improve **health systems** at all levels, from community to local government to national planning and policy, including through:

- improving the alignment of support from development partners with national health system priorities;
- integrating climate risk management into health planning and health systems, including through improved early warning systems to identify where climate change is likely to impact on the dynamics of climate-sensitive diseases;

(ii) Continue and intensify broader efforts to upgrade **water and sanitation infrastructure**, and to improve **food security**, in order to reduce vulnerability and improve resilience to the potential impact of climate change;

(iii) Reinforce **disaster risk management** through:

- enhanced preparedness and response systems, including improved early warning systems and the establishment of food stocks, together with continued efforts to ensure the necessary financial support from the international community for emergency preparedness as well as emergency response;
- combining the integration of disaster risk reduction into broader national, economic and development strategies, planning and practice. This is particularly important in the most vulnerable regions such as arid and semi-arid areas, and areas potentially subject to flooding.

Focus issue 5: Peace and stability

THE IMPACT OF CLIMATE CHANGE

Climate change has important potential implications for peace and stability, both globally and in Africa. When coupled with other pressures including resource scarcity and high population growth and density, it multiplies the risks of instability and conflict – particularly in fragile states – through:

- (i) Increased **competition for scarce land and water resources**, triggered by environmental degradation, desertification and water scarcity, and creating the potential for conflict within and between both communities and countries. UN reports have identified changes in the Sahel climate over the last 30 years as a factor in the conflict in Darfur. The high rate of population growth will further trigger competition for resources;
- (ii) Increased **migratory flows**, both internally and cross-border. The scale of the displacement and movement of people due to both gradual and sudden environmental changes is expected to rise and is likely to have a significant impact on lives and livelihoods, generating additional environmental and socio-economic pressures. A significant feature of this trend is likely to be accelerated urbanisation – adding to urban unemployment and poverty;
- (iii) An increased risk of **regional tensions** and potentially conflict, triggered by resource competition and migratory flows, as above. Although the number of conflicts in Africa has declined dramatically, there are still significant risks both of political instability and violent conflict – as in other regions. The social and economic impact of climate change can transcend borders, thereby significantly extending the geographical extent of crisis and conflict regions;

Given the importance of peace and stability to economic development and poverty reduction, this combination of effects presents real risks to progress towards the MDGs, and to the sustainability of this progress.

THE RESPONSE

The international community, as well as individual countries, have begun to address the impact of climate change on security. In April 2007, the UN Security Council (UNSC) held its' first-ever discussion specifically focused on the linkages between climate change, energy and security. The debate observed that climate change multiplies the potential for conflict, that migration is the most important stress factor, and that the emerging issue of 'environmentally induced migration' (which falls into the gap between both international refugee and immigration policy) needed to be addressed. The EU is to consider a report on the impact of climate change on international security in spring 2008.

These are however still emerging issues. Whilst there have been various discussions on the important linkages between migration and development, there have been fewer attempts to make the linkages with environment and climate change and security policy. This is reflected in approaches to adaptation at national and sub-regional level. The National Adaptation Programmes of Action (NAPA) supported by the UNFCCC, of which 22 relate to African countries, are intended to help the LDCs identify a limited

number of immediate priority adaptation projects, and as a result do not take population displacement or migration into account as a possible policy response.

SECTOR PRIORITIES

- (i) Expansion of **information and early warning systems** with particular emphasis on vulnerable regions, assessing the potential impact of increased resource scarcity and population displacement and migration, and the consequent potential risk to peace and stability. Climate change and migration indicators could thus be included within the AU's Continental Early Warning System (CEWS);
- (ii) Inclusion of land and water management and migration issues within national and sub-regional **adaptation strategies** where migration is or is expected to become a significant issue in the short- to medium-term – including possibly future National Adaptation Programmes of Action (NAPAs), and Sub-Regional Action Programmes (SRAPs);
- (iii) Increased support for **regional cooperation** on trans-boundary resource management, including current river basin initiatives (such as the Senegal River Basin, and the Nile Basin Initiative);
- (iv) **Increased attention** in the multilateral arena on the security risks related to climate change, in particular within the UN Security Council, and the G8 as well as UN specialised bodies, together with increased collaboration between the **UN bodies and agencies** working on the environment and climate change, security, and migration issues;
- (v) Further consideration of how to address the issue of **environmentally-induced migration**, including the possible need for an international legal framework.

Focus issue 6: Financing and financial mechanisms

SCOPE OF ADAPTATION NEEDS

Estimates of the costs of adaptation to climate change in developing countries using different approaches all indicate very large financing requirements, potentially amounting to tens of billions of dollars per annum. Three such approaches are: 1) estimates of the needs to climate-proof new development projects by the World Bank with recent updates by the UNDP in the 2007 Human Development Report; 2) UNFCCC's global estimates of adaptation needs by sector for both developing and developed countries; and 3) Oxfam's analysis of adaptation needs in developing countries based on extrapolation from 13 National Adaptation Plans of Action (NAPAs). While there is considerable debate as to the integrity of these figures, they provide a useful order of magnitude. Private sources of funding can be expected to cover a proportion of adaptation costs, particularly in agriculture and fisheries where privately owned assets are common; but public resources are expected to play a predominant role in all sectors.

ASSESSMENT OF CURRENT ADAPTATION FINANCING MECHANISMS

Existing funding mechanisms are very modest in relation to needs. Bilateral donors have started to support developing countries' efforts in addressing climate adaptation. At the multilateral level, funding for adaptation totalled around USD 50 million per year between 2001 and 2006, most of which are financed through the Global Environment Facility (GEF). Under the UNFCCC, three funds have been established to help cover the cost of adaptation to climate change in developing countries. They include: 1) the Least Developed Countries Fund; 2) the Special Climate Change Fund; and 3) the Strategic Priority on Adaptation that are funded by voluntary contributions and operate under the GEF. A fourth facility, the Adaptation Fund was created under the Kyoto Protocol, using a 2% levy on carbon credits generated by Clean Development Mechanism (CDM). This fund is estimated to be worth around USD 200-300 million currently and could reach USD 440 million by 2012. The Adaptation Fund is not yet operational.

THE CARBON FINANCE MARKET

In Kyoto, the developed countries, known as Annex I parties, committed to reducing their average emissions by 5.2% between 2008-12 in relation to the emissions in 1990, the baseline year. Based on its individual target, each Annex I Party is assigned a specified number of carbon dioxide equivalent (CO₂ eq) emission units. Unused emissions allowances can be traded to allow countries that exceed their allowances to meet the emissions commitments under the Kyoto protocol. In addition to the above type of transactions of emission credits, also known as the allowance-based transactions, the carbon market also covers project-based transactions in which a buyer can purchase emission credits from a project that can demonstrate, in a verifiable manner, it will contribute to GHG emission reductions compared with what would have happened otherwise. Projects implemented in developing countries (non-Annex I parties) are also known as Clean Development Mechanism (CDM) projects.

The overall carbon finance market doubled to over USD 60 billion between 2006 and 2007, representing nearly a six-fold increase from USD 11 billion in 2005. The proceeds from CDM projects were estimated to amount to USD 5.2 billion in 2006, approximately 17% of the total carbon market of around USD 30 billion in 2006. In addition to these compliance-based schemes, there is also a growing voluntary carbon

market whose participants are environmentally-aware companies. Developing countries in Asia (and particularly China) with large CO₂ emissions and proactive approaches to CDM projects have dominated the CDM market. Africa -- including North Africa -- accounted for only 3% of the USD 5.2 billion transactions in 2006. In spite of efforts to streamline the rules and procedures for small CDM projects and the possibility for programmatic CDM (whereby several small GHG-mitigation activities can be regrouped to reduce transactions costs), the various steps involving monitoring methodologies and the quantification and verification of prospective emission reductions have proven to be formidable obstacles in Africa and other low-income countries. Poor investment climates have also limited CDM activities in Africa. A number of countries including South Africa, Ghana and Tanzania, have begun to take a more proactive approach toward CDM projects. Notwithstanding the constraints described above, CDM projects and carbon finance more generally provide African countries with the possibility to generate additional resources and, at the same time, adopt more GHG-friendly activities.

Besides the above sources of financing, bilateral and multilateral donor agencies are experimenting with new funding mechanisms to help finance climate adaptation in developing countries. More recently, the World Bank has established two new facilities, the Carbon Partnership Facility and the Forest Carbon Partnership Facility.

FINANCING PRIORITIES

- (i) Facilitate and promote greater access for Africa to the **carbon market and other GHG-friendly activities**;
- (ii) Recognise that current financing available to developing countries for climate adaptation are woefully inadequate. Provide **additional resources** from official and concessional sources and through innovative financing mechanisms;
- (iii) Raise the **share of IDA resources** devoted to climate change in Africa;
- (iv) Continued efforts to strengthen the business environment in order to attract greater **private sector** investment, including through the Clean Development Mechanism (CDM);

Fact boxes

Fact box 1: Climate change scenarios: Assumptions about future trends

Although much is unknown, it is possible to identify likely changes in Africa's climate:

Temperature

1. All of Africa is very likely to warm during this century. The warming is very likely to be larger than the global, annual mean warming throughout the continent and in all seasons, with drier subtropical regions warming more than the moister tropics. In all four sub-regions and in all seasons, the median temperature increase lies between 3°C and 4°C, roughly 1.5 times the global mean response. Half of the climate models project warming within about 0.5°C of these median values¹. The warming in the Mediterranean area is projected to be largest in the summer.

Precipitation

2. Annual rainfall is likely to decrease in much of Mediterranean Africa and northern Sahara, with the likelihood of a decrease in rainfall increasing as one gets closer to the Mediterranean coast. Rainfall in southern Africa is likely to decrease in much of the winter rainfall region and on western margins. There is likely to be an increase in annual mean rainfall in East Africa. Finally, it is uncertain how rainfall in the Sahel, the Guinean Coast and the southern Sahara will evolve in this century. Compared to the average of 1980-99, mean annual rainfall for the 2080-2099 period is very likely to decrease along the Mediterranean coast (by 20%), extending into the northern Sahara and along the west coast to 15°N, but is likely increase in tropical and eastern Africa (around +7%), while austral winter (June-August) rainfall will very probably decrease in much of southern Africa, especially in the extreme west. There are, however, differences between the equatorial regions (north of 10°S), which show an increase in summer (December-February) rainfall, and those located south of 10°S, which show a decrease in rainfall associated with a decrease in the number of rain days and in the average intensity of rainfall. For the Western Sahel, there are still some discrepancies between models: some projecting a significant drying, and others simulating a progressive wetting with an expansion of vegetation into the Sahara.³

Extreme weather events

3. Finally, there is still limited information available on extreme events, despite frequent reporting of such events -- the spatial distribution and frequency of tropical cyclones affecting Africa --including their impacts. A recent study the Sahel region showed that the number of extremely dry and wet years will increase during the present century. Modelling of global drought scenarios shows drying for northern Africa that appears consistent with the rainfall scenarios outlined above and wetting over central Africa. On a global basis, droughts were also estimated to be slightly be more frequent and of much longer duration by the second half of the 21st Century relative to the present day. Other experiments indicate that in a warmer world, and by the end of the century, there could also be more frequent and intense tropical storms in the southern Indian Ocean. Tropical cyclones are likely to originate over the Seychelles from October to June. There could very probably be an increase of between 10 and 20% in cyclone intensity.³

Summary

(i) In general the drier sub-tropical regions will warm more than the moister tropics; (ii) Northern and southern Africa will become much hotter and drier in the summer, with a greater risk of drought; (iii) In eastern Africa, including the Horn of Africa, and parts of central and western Africa, average rainfall will increase; (iv) Sea levels will rise perhaps by half a metre in the next 50 years, with serious consequences in the Nile Delta and certain parts of coastal West Africa; (v) But there is also much that we don't know, such as the impact in the Sahel, or on the flow of the Nile due to a poor understanding of the drivers of the African climate poor data; and

(vii) We urgently need more capacity and research to better understand the consequences at local levels of the impact of global models and more detailed and regular climate information at the local level, particularly for central Africa

¹ International Panel on Climate Change Fourth Assessment Report, Working Group Report "The Physical Science Basis", Chapter 11: <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>

² Ibid

³ Ibid

Fact box 2: The economic impact of climate change

There is a real risk that climate change will have adverse implications for economic growth in Africa. The experience of past extreme weather events in Africa testifies to the damaging effects that an adverse climate can have on economic prospects in Africa. If climate change increases the frequency and severity of these events, as the science suggests, the economic costs on African countries will grow significantly. Climate change is likely to have damaging effects on the health and productivity of the labour force, cause losses and damage to agriculture and infrastructure, and lower the quality of investment and capital. Therefore, as the factors of production are affected, growth prospects are likely to be weaker.

A climate change reduction in GDP is likely to increase the number of people living in poverty. Given the strong correlation between growth and poverty reduction, a climate change reduction in GDP is therefore likely to increase the number of people living in poverty. According to the Stern Report, climate change could cause an additional 45 million people to be living on less than 2 USD a day because of GDP losses alone. Unfortunately, many of the countries that are falling behind in terms of MDG achievement are located in the parts of Africa where climate change impacts are projected to be worse. The effects of climate change will therefore make the achievement of MDG 1 on halving the number of people in poverty more difficult for Africa.

Africa's major economic sectors are vulnerable to climate change. Although Africa contributes only about 3.8% of total greenhouse gas emissions, its countries are among the most vulnerable in the world. This vulnerability derives from its heavy reliance on climate-sensitive sectors (such as rainfed agriculture). This vulnerability is exacerbated by existing development challenges such as endemic poverty, limited access to capital, and weak adaptive capacity. Constraints in technological access and options, limited infrastructure, information and links to markets further heighten vulnerability to climate stress. In many African countries, the expenditure requirements of dealing with the effects of climate change on their major economic sectors are beyond the capacity of governments and local communities. Improved access to carbon finance and substantial and additional external assistance will be needed.

Comprehensive estimations of the economic impacts of climate change in Africa are hard to find. The Stern Review of the Economics of Climate Change indicates that delaying response to climate change could result in losses of up to 20% of GDP, against an estimated cost of 1% of GDP for immediate actions necessary for removing much of the related risks. Major studies such as the IPCC Fourth Assessment and the Stern Review further highlight the following sectoral impacts that threaten the achievement of the MDGs and sustainable development in Africa.

Agriculture and food security: Climate change is projected to severely constrain agriculture -- the backbone of the economy of most countries - and curtail the prospects for broad-based economic growth, poverty reduction and food security in Africa. In addition to contracting the area suitable for agriculture, warming by 0.4°C over current temperatures would result in a shortening of crop growing period by more than 20% in the Sahel by 2020 and a reduction of yields from rain-fed agriculture -- the bulk of African agriculture -- by up to 50%. More frequent and severe droughts, floods and weather extremes would constrain crop and livestock production, while rising water temperatures would decrease food supplies from fisheries resources.

Water: Africa's water resources have been decreasing over time as a result of droughts, melting snowcaps, and drying lakes and rivers. Climate change will exacerbate this situation, exposing up to 250 million people to increased water stress by 2020, and increasing the area under water shortage in Sub-Saharan Africa by 29% by 2050. Decreasing water level would negatively affect water quality and intensify water-related conflicts arising from competing demands and the management of shared water resources.

Fact box 2: The economic impact of climate change (continued)

Energy: A combination of reduced water flows to major hydropower dams and worsening depletion of biomass energy resources resulting from climate change could seriously compound the already dire state of energy availability and accessibility and further impede industrial development throughout Africa.

Coastal areas: Climate change-induced sea-level rise will affect low-lying coastal areas in Africa, further degrade mangroves and coral reefs and threaten human health, infrastructure, fisheries, biodiversity and tourism industries. The resulting hardships would affect large populations, as more than 25% of Africa's population currently lives within 100 kilometres of the coast, and most of the largest cities are along vulnerable coasts.

Forests and biodiversity: Current estimates indicate that climate change could lead to loss of up to 40% of species' habitats in Africa by 2085. Along with deforestation, this spells doom for millions of people -- including two-thirds of the population of Sub-Saharan Africa -- whose livelihoods are associated with products from forests and other biodiversity resources.

Health: Warmer environments and altered temperature and rainfall patterns resulting from climate change are expected to increase incidences of vector-borne diseases in Africa. Many sub-regions of such as the Sahel, Southern and Eastern Africa would experience increased outbreaks and severity of vector borne diseases such as malaria, cholera, yellow fever, trypanosomiasis and rift valley fever, with far-reaching economic impacts.

Migrations and conflicts: Extreme climate events (e.g. floods, droughts, desertification and sea-level rise) are likely to force increasing numbers of African population to migrate from rural to urban areas, and away from increasingly arid areas, low lying coastal areas and small islands. Such massive migrations could spark violent conflicts for access to and control of key resources such as land and water within the continent, and further fuel international migration flows out of the continent.

Source: Contributed by the UN Economic Commission for Africa.

Fact box 3: How climate change threatens the MDGs

MILLENNIUM DEVELOPMENT GOAL	POTENTIAL IMPACTS OF CLIMATE CHANGE ON THE MDGs
1. Eradicate extreme poverty and hunger	Climate change is predicted to: ◆ Degrade forests, fish habitats, pastures, and crop land that many poor families depend on for their food and livelihoods. ◆ Damage poor people's homes, water supply, and health, which will undermine their ability to earn a living. ◆ Exacerbate social tensions over resource use, which can lead to conflict, destabilising livelihoods and forcing communities to migrate. ◆ Affect the operations of hydroelectric power dams. ◆ Jeopardize the eradication of hunger and malnutrition through its impact on food output
2. Achieve universal primary education	Climate change could undermine children's ability to attend school. ◆ More children (especially girls) are likely to be taken out of school to help fetch water, care for ill relatives, or help earn an income. ◆ Malnourishment and illness among children could reduce their school attendance, and impair their learning when they are in class. ◆ Floods and hurricanes destroy school buildings, and force migration.
3. Promote gender equity and empower women	Climate change is expected to exacerbate current gender inequalities. ◆ Women tend to depend more on the natural environment for their livelihoods than men do, and so are more vulnerable than men are to its variability and change. ◆ Women and girls are typically the ones to fetch water, fodder, firewood, and often food. In times of climate stress, they must cope with fewer resources and a greater workload. ◆ Female-headed households with few assets are affected particularly severely by climate-related disasters.
4, 5, 6. Reduce child mortality, improve maternal health, and combat major diseases	Climate change may increase the prevalence and spread of diseases. ◆ It will lead to more deaths and illness due to heat-waves, floods, droughts, and hurricanes. ◆ It may increase the prevalence of diseases spread by mosquitoes (such as malaria and dengue fever) or of those spread in water (such as cholera and dysentery). Children and pregnant women are particularly vulnerable to these diseases. ◆ It is likely to significantly increase the challenges and burdens placed upon African health systems. ◆ It is expected to reduce the quality and quantity of drinking water, and exacerbate malnutrition among children, particularly in sub-Saharan Africa.
7. Ensure environmental sustainability	Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged. These changes will also reduce biological diversity and compound existing environmental degradation.
8. Develop a global partnership	Climate change is a global challenge, and responding to it requires global co-operation, especially to enable developing countries to tackle poverty and inequality. It heightens the need for donors to honour their ODA commitments, and to provide additional resources for adaptation.
Source: Adapted from Oxfam (2007), Sperling (2003) and Reid and Alam (2005).	

Fact box 4: Climate change, technology transfer and trade

A new agenda where climate change, international trade, and technology transfer issues intersect has attracted increasing attention. This note highlights the issues most relevant to low-income countries.

Climate change and technology transfer¹ (TT)

The UNFCCC regime has adopted a framework on TT, established an Expert Group on Technology Transfer (EGTT) and created the Special Climate Change Fund (SCCF) to support adaptation and TT. There was also renewed attention on TT at the Bali meeting. In practice, the transfer of hard technologies has remained woefully inadequate. The lack of progress with international climate mitigation negotiations has contributed to this state of affairs. Other factors impeding climate TT are: i) the unwillingness for private companies in developed countries to share their technologies without commercial benefit, ii) weak intellectual property rights (IPR) regimes in many developing countries and iii) concerns that domestic firms would lose competitiveness to foreign competitors in countries that do not undertake strong climate mitigation efforts. While most of the concerns about TT are more applicable to mitigation technologies, they also affect technologies for adaptation that are particularly important to help Africa and other developing countries reduce their vulnerability and enhance their resilience. Promoting TT would require a number of actions both from recipient countries and their external partners:

- i) A more proactive approach in recipient countries including technology needs assessments and building the capacity to identify appropriate technologies given local conditions;
- ii) Strengthened IPR regimes and, in parallel, consider the creation of mechanisms to compensate losses from weak IPR protection for climate-friendly technology;
- iii) A more strategic use of ODA to assist in technology areas where the private sector is not active. The Canada Climate Change Development Fund, the US Climate Technology Partnership and the Netherlands' Milieu Program are good illustrations of this approach.

Climate change and international trade

Besides its potentially negative impacts on the production of traded goods and services, climate change has competitiveness implications. The basic concerns are of two types: i) stringent climate measures might disadvantage domestic producers relative to foreign competitors that do not face similar measures and ii) strong regulations could lead domestic firms to relocate to other countries (known as the leakage problem). Recent analysis has shown that these impacts are real -- but relatively unimportant. This, however, has not prevented serious consideration in both the European Parliament and the US Congress of offsetting border measures that address international competitiveness and "free rider" concerns. Rising political support for some kind of border measure provision in climate legislation may eventually have implications for African exports.

With the prominence of climate change as a global policy issue, there is active interest in explicitly identifying goods and services that are directly relevant to climate change mitigation or adaptation and including them as climate change issues on trade negotiating agendas. A recent study by the World Bank¹ found that the removal of tariff and non-tariff barriers can increase the diffusion of clean technologies in developing countries. The study also found very large trade potential between developing countries in promoting clean energy technology.

Source: Contributed by the Africa Partnership Forum Support Unit

¹ Useful references to the topics discussed in this note are: Deborah Murphy, John Van Ham and John Drexhage, *Climate Change and Technology*, International Institute for Sustainable Development, August 2005 and Thomas L. Brewer, *Climate Change Policies and Trade Policies: the New Joint Agenda*, January 2008.

² The World Bank, *International Trade and Climate Change: Economic, Legal, and Institutional Perspectives*, 2008.

Fact box 5: The effects of climate change on smallholder farmers

The debate on climate change (CC) adaptation has insufficiently focused on poverty - specifically, **rural** poverty. More than 50% of the population in sub-Saharan Africa live in rural areas, and poor smallholder farmers (farming between 1-10 hectares) constitute approximately 70% of the poor. 95% of smallholder and mainly subsistence farmers depend on rain-fed agriculture for their livelihood and income and are vulnerable to CC challenges.

IMPACT OF CLIMATE CHANGE ON SMALLHOLDER FARMERS

- **Increased likelihood of crop failure.** The most visible impact of climate change has been increased variability in rain patterns, drought and flash floods. The economic impact on smallholder farmers can be catastrophic.
- **Need for new and costly inputs.** In the face of increasingly fragile ecosystems, regional food security in arid and semi-arid areas increasingly depends on costly irrigation, new varieties, and increased fertilizer and pesticide use. Africa currently utilises less than 15% of the average fertiliser use in the rest of the developing world.
- **Increased human and animal diseases, mortality of livestock, forced sales of livestock at low prices.** The 1968-1988 period of drought in West Africa demonstrated the devastating impact that unpredictable climatic changes could have on small-scale herders and agro-pastoralists. As rainfall decreased, rangelands turned to desert. Smallholders were forced to sell livestock at a loss, increasing poverty at a time of drought.
- **Increased livelihood insecurity, resulting in asset sale, indebtedness and out-migration.** More than two thirds of the population of Africa depends on agriculture for their livelihoods. Stagnant or falling yields with variable rainfall have contributed to a growing debt burden. Smallholders often resort to selling their land and livestock and moving to cities in search of jobs, accompanied by increased pressure on urban centres and urban poverty.
- **Downward spiral in human development indicators in rural areas, such as health and education.** Climate change has had far reaching impacts on quality of life in Africa, for example increased hunger, reduced resources for health and education, and both spread and increased incidence of some diseases, for example malaria.

WHAT CAN BE DONE?

Sustainable land and natural resource management. Local, participatory approaches to sustainable land, forest and natural resource management (NRM) are essential. Within the context of the AU/NEPAD CAADP programme, adaptation is being supported within the framework of a Regional Partnership on Sustainable Land Management (TerrAfrica) and its Strategic Investment Programme (SIP). IFAD, CIRAD and ICRAF are working together to address climate change in a number of countries through sustainable NRM using innovative Smallholder Conservation Agriculture Promotion (SCAP).

Water use and management. Increasing access to small-scale irrigation and improving maintenance and equitable access to large scale irrigation schemes ensure sustainable access to agricultural water. Small-scale irrigation in Burkina Faso and drip irrigation in Senegal demonstrate the success of such approaches.

Promotion of smallholder economic and livelihood diversification to better manage risk. Support to agricultural diversification, access to market, rural finance services and off farm activities.

Crop and index-based weather insurance schemes. Climate related insurance schemes are one tool for support climate risk management, if they are viable sustainable and accessible to all rural poor.

Risk preparedness and early warning. Support to risk preparedness activities and community-based Early Warning Systems (EWS) which can disseminate information and promote response in a timely way.

Innovation and technology development. Promoting the development of and improved access to technologies, and sharing knowledge on sustainable and climate-friendly farming practices is vital. The adaptation of a new drought and pest resistant variety of rice - New Rice for Africa (NERICA) promises to increase food security and reduce poverty for many.

Fact Box 5: The effects of climate change on smallholder farmers (continued)

WHO NEEDS TO DO WHAT?

African Governments should 1) lead the facilitation of adaptation of smallholder agriculture to climate change and mitigation of impacts at the country level within the context of the AU/NEPAD CAADP programme. 2) Define the policy/programme framework to minimize risk and establish early warning systems that respond to the needs of poor smallholders and vulnerable groups - especially for women and youth.

Private sector actors can ensure the financial viability of agriculture in a context of climatic variability through 1) supporting small farmers, rural/producer organisations and private input and output suppliers 2) sharing local knowledge 3) adopting new cropping patterns 4) increase access to seed varieties and fertilisers 5) advocating for policy change.

Bilateral and multilateral donors should 1) developing national and international CC policies and approaches to ensure the involvement of the rural poor in decision making 2) develop locally appropriate adaptation and mitigation programmes 3) support innovation and adoption of new technologies and practices to combat climate change.

Source: Contributed by K.Hussein with R.Roy, C.Calvosa and Global Environmental Facility Unit, IFAD

Fact box 6: Gender and climate change

Climate change impacts directly affect the natural resources available to women and men. But the effects in women's and men's lives are different - particularly in rural communities - because of their different roles and resources in the household. Women tend to depend more on the natural environment for their livelihoods than men do, and so are more vulnerable than men to climate variability and change. It's essential to take account of these differences in planning effective adaptation.

Women are affected differently and more severely by climate impacts. Women and men have different roles in the household, and different resources to deliver them with. In providing food, fuel, water and care for the family, women have:

- more dependence on natural resources – like water, reliable rainfall, fertile land, firewood - but...
- fewer physical resources – they are unlikely to own land, lack irrigation to manage erratic rainfall, and have fewer assets (like tools, machinery, or a bicycle) to use for earning off-farm incomes .
- fewer human resources – less education, agricultural training, or access to climate information
- fewer financial resources – little savings or cash, and poor access to credit and markets
- less powerful social resources – social norms tend to limit women's mobility and authority, reinforce their household roles and prevent their voice being heard in community decision-making.

Fact box 6: Gender and climate change (continued)

The impact of climate change on agricultural yields could have a particularly negative effect on women's incomes and household food security. Women make up over 50% of the agricultural work force in Africa and are responsible for 70-80% of household food production. They are therefore key players in the agriculture sector and highly dependent on subsistence farming for livelihoods. The frequency and severity of climate extremes may leave women unable to cope due to the fact that women often have to juggle their reproductive roles and productive roles. Women's crops may also fail faster due to the fact that women typically face problems of access for the most basic resources in agricultural production, land use, agricultural inputs and tools. Women's crops are generally grown on less fertile, common land, and without irrigation so women quickly have to find alternative ways to feed their families, such as searching for wild foods.

Water scarcity may create an increased workload for women in times of climate stress. Women and girls are typically the ones responsible for collecting fuel wood and water, creating an increased workload for women in times of climate stress. Water scarcity means diseases like cholera and diarrhoea may intensify (especially for children and pregnant women) increasing caring work for women. Women in many African communities have responsibilities for collecting water, storing, cleaning, and maintaining water systems. In times of drought, women are likely to spend many more hours collecting water and caring for sick children and parents, and so also risk their own health due to fatigue.

Adaptation policies must take account of different impacts on women and men. Women may be more vulnerable to climate impacts, but they are also the key to designing successful adaptation strategies because of their intense use and knowledge of natural resources. Climate change clearly offers an opportunity to rethink gender inequities and to involve both women and men in finding 'new' avenues and solutions that can respond to today's profound environmental challenges. Some entry-points for integrating gender concerns into adaptation policies and practice include:

- The UNFCCC should invest in and promote gender-focused climate-change research, and promote gender-disaggregated indicators for national reporting to the UNFCCC.
- National Adaptation Programmes of Action (NAPAs for the LDCs) and National Adaptation Strategies for all countries should be designed to take account of the different impacts of climate change, and climate policies, on women and men.
- Finance channelled through the Adaptation Fund should be directed to the most vulnerable communities in developing countries, and should promote poverty-reducing, gender-sensitive programmes.
- Local government, donors and NGOs must ensure that any plans for adapting to climate change involve women at the heart of adaptation consultations, planning and implementation.

Within communities, women and men must be equally involved in building adaptive capacity, to ensure that both women's and men's interests – their differing roles and resources – are taken into account. In this way, adapting to climate change can help reduce gender inequalities and so promote long-term development too.

Source: Authored by Kate Raworth (Oxfam GB) and Fatima Denton (IDRC - Senegal).

Fact box 7: National adaptation programmes of action (NAPAs)

WHAT ARE NAPAS?

NAPAs provide a process for countries to identify priority activities that respond to their urgent and immediate needs with regard to adaptation to climate change. The rationale for NAPAs rests on the limited ability of Less Developed Countries (LDCs) to adapt to the adverse effects of climate change. In order to address the urgent adaptation needs of LDCs, a new approach was needed that would focus on enhancing adaptive capacity to climate variability, which itself would help address the adverse effects of climate change. The NAPAs take into account existing coping strategies at the grassroots level, and builds upon that to identify priority activities. In the NAPA process, prominence is given to community-level input as an important source of information, recognizing that grassroots communities are the main stakeholders.

Focus of NAPAs

The NAPAs focus on urgent and immediate needs – those for which further delay could increase vulnerability or lead to increased costs at a later stage. NAPAs should use existing information and must be action-oriented and country-driven and be flexible and based on national circumstances. In order to effectively address urgent and immediate adaptation needs, NAPA documents should be presented in a simple format, easily understood both by policy-level decision-makers and by the public.

THE NAPA PROCESS

The steps for the preparation of the NAPAs include synthesis of available information, participatory assessment of vulnerability to current climate variability and extreme events and of areas where risks would increase due to climate change, identification of key adaptation measures as well as criteria for prioritizing activities, and selection of a prioritized short list of activities. The development of a NAPA also includes short profiles of projects and/or activities intended to address urgent and immediate adaptation needs.

Africa and NAPAs

To date there are a total of 22 completed NAPAs in Africa¹ - the majority of which were completed in 2007. The endorsement of NAPAs in Africa demonstrates the commitment of African governments to combat the adverse effects of climate change.

The primary concern of the NAPAs are current climate risks and observed trends. The most common key areas that have emerged as high priority adaptation actions by African countries include, *inter alia*;

- *strengthening of early warning systems*
- *adaptation of land use practices (crops, fish and livestock)*
- *coastal erosion and storm protection, and;*
- *disaster risk reduction (e.g. drought coping strategies)*

The preparation of the NAPAs in Africa has been a country driven process based on the principle of participation and the involvement of national and local stakeholders. NAPAs therefore not only raise awareness about climate change but also hope and expectations. A number of projects have been submitted to the Global Environment Facility (GEF) for funding. Successful and immediate implementation of the set of NAPA projects will serve to demonstrate the need to integrate climate change issues into the development planning process.

The national NAPAs submitted to date are available for download at
http://unfccc.int/national_reports/napa/items/2719txt.php

Fact Box 7: National adaptation programmes of action (NAPAs) (continued)

Brief assessment: There are several barriers that may hamper the implementation of these activities, and there is need to address these for the smooth implementation of the proposed activities. Some of these include:

Inadequate financing and underestimation of adaptation costs: financial constraints are limiting the scope of governments and financing provisions are unrealistically low.

Project-based bias: Small-scale project-based interventions are designed to address the urgent needs of the most vulnerable, however effective adaptation planning needs has to be developed through national programmes.

Weak links to human development: Some NAPAs do not provide a basis for integrating adaption into national poverty strategies. NAPAs should not be regarded as an isolated action but should be integrated into sectoral development programmes and national planning.

¹ The 22 African countries that have completed their NAPAs are: Benin, Burkina Faso, Burundi, Cape Verde, Comoros, Djibouti, Eritrea, Guinea, Lesotho, Madagascar, Malawi, Mali, Mauritania, Niger, DRC, Rwanda, Sao Tome, and Principe, Senegal, Sudan, Tanzania, Uganda, Zambia

Source: Adapted from the UNFCCC website and the UN Human Development Report (20007/2008) : Fighting Climate Change: Human Solidarity in a Divided World.

Fact box 8: A case study of NAPA: Rwanda

The Republic of Rwanda has finished its report on National Adaptation Programmes of Action to climate change, "NAPA", in conformity with the guidelines prepared by the Least Developed Countries Groups of Experts (LEG) and adopted by the November 2001 Assembly of the Conference of Parties to the United Nations Framework Convention on Climate Change (Decision 28/CP.7).

The strategy for adequate response to climate change reached by NAPA Rwanda is articulated on six (6)-priority adaptation options to climate change which include:

An Integrated Water Resource Management – IWRM; Setting up an information system to early warning of hydro-agro meteorological system and rapid intervention mechanisms; Promotion of non agricultural income generating activities; Promotion of intensive agro-pastoral activities; Introduction of species resisting to environmental conditions; Development of firewood alternative sources of energy.

From these priority options, 17 projects have been identified from which 7 high priority projects, hence urgent and immediate, have been selected and their profiles developed.

In order to speed up the next phase which is implementation of the NAPA and to facilitate its integration in the EDPRS - Economic Development and Poverty Reduction Strategy and consequently in the wider GoR's budgetary process, a national consultant was hired to develop the projects profiles in detail. To be ready for implementation on ground, detailed stakeholder and gap assessments, risk and barrier assessments, activities and budget, logframe and monitoring and evaluation plan were developed.

The detailed projects are the following:

1. Land conservation and protection against erosion and floods at the level of Districts of vulnerable regions to climate change (duration - 5 years; estimated budget: USD 1.45 million)
2. Establish the mastering hydro meteorological information and early warning systems to control extreme phenomena due to climate change: - Installation and rehabilitation of hydrological and meteorological stations (duration - 4 years; estimated budget: USD 1.9 million)
3. Development of irrigated areas by gravity water systems from perennial streams and rivers in often vulnerable zones to prolonged droughts (duration- 4 years; estimated budget:: USD 750,000)
4. Support districts of vulnerable regions to climate change in planning and implementing measures and techniques related to conservation and water harvesting and intensive agriculture, and promoting existing and new resistant varieties of crops adapted to different bioclimatic soil (duration-4 years; estimated budget: USD 560,000)
5. Increase adaptive capacity of grouped habitat "Imidugudu" located in vulnerable regions to climate change by the improvement of drinking water, sanitation and alternative energy services, and the promotion of non agricultural jobs. (Duration: 4 years; estimated budget: USD 1.65 million)
6. Increase food and medicine modes of distribution to respond to extreme climate change and sensitize to stocking and conservation of agriculture products (duration: 2 years; estimated budget: USD 850,000);
7. Preparation and implementation of woody combustible substitution national strategy to combat the deforestation and erosion as well (duration - 4 years; estimated budget: USD 950,000).

As indicated in the official gazette of the Republic of Rwanda, the law determining the state finances for the 2008 fiscal year has taken into account the NAPA priorities which are also included in the EDPRS by planning, for example, the following but not exhaustive activities:

- a) Master plan of land use management (RWF 700,000,000);
- b) Rehabilitation and protection of river banks and lakes shores (RWF 910,000,000);
- c) Detailed studies on Nyabarongo watershed management (RWF 27,000,000);
- d) Weather forecasting (Expand hydrometeorological stations network & data bank modernisation and management system.

Source: Contributed by Rwanda Environmental Management Agency, Government of Rwanda.

Fact box 9: The ClimDev Africa Programme

Africa's political leaders have expressed explicit commitments to tackle the climate change challenge. At the 8th Ordinary Session of the African Union held in January 2007, African Heads of States and Government expressed grave concern on the vulnerability of Africa's socio-economic and productive systems to climate change. In their decision and declaration on climate change, they called upon Africa's cooperation partners to support the member States and Regional Economic Communities (RECs) to effectively integrate and implement adaptation and mitigation measures into their development plans.

The African Union Commission (AUC) was requested to work with the United Nations Economic Commission for Africa (ECA) and the African Development Bank (AfDB) to develop and implement a major plan on climate change and development in Africa: **Climate Information for Development in Africa (ClimDev Africa)**. In April 2007, the Fortieth session of the ECA Conference of African Ministers of Finance, Planning and Economic Development adopted a Resolution engaging African Member States and development partners to support the implementation of the same plan.

What is ClimDev Africa?

ClimDev Africa is an African development programme to integrate Climate Risk Management (CRM) into pertinent policy and decision processes through the continent. It will be implemented under the direction of the joint AUC-ECA-AfDB Secretariat with support from a number of sources. ClimDev Africa aims to enhance economic growth and progress towards the MDGs through mitigating climate variability and climate change, and to ensure that development achievements are climate-resilient in the longer term. It is envisaged to run over a period of 6 years and result in the development and integration of long-term CRM strategies into national development plans.

The overall purpose of ClimDev is to strengthen the climate-resilience of economic growth and the MDGs through main-streaming climate risk management in sensitive sectors. This fits with national poverty reduction strategies (PRSS) in Africa oriented towards the MDGs. It also accords with AU/NEPAD plans for improved agriculture and food security, disaster risk reduction and environmental action, and the global programme on adaptation to climate change agreed at COP12 in November 2006. ClimDev Africa is thus meant to respond to the needs for an integrated approach and collective action to address issues of climate-related data and observation, information services, policies and risk management practices in building climate-resilience capacity.

Expected outputs/outcomes

The expected outcome from the Programme is improved availability, exchange and use of quality climate information and services addressing the needs of local, national and regional scale decision-makers and stakeholders, in support of sustainable development and achievement of the MDGs, particularly in critical climate-sensitive sectors and areas in Africa. This would include tangible results in:

- a) **Policies:** Political engagement of African States in developing and implementing policies that integrate CRM into climate-sensitive sectors to ensure best adaptation to climate change;
- b) **Practices:** Enhanced CRM practices and long-term CRM strategies in priority climate-sensitive sectors such as agriculture and food security, water resources, health, energy and environment, from local to regional scale in Africa;
- c) **Information Services:** Improved sectoral CRM decision-making and community responses to climate risk through the provision of adequate information services on CRM practices to relevant stakeholders (public sector, private sector and civil society) at national and regional levels;
- d) **Observations, Data and Infrastructure:** Improved availability of, and access to, climate-related data and analytical products for a) sectoral CRM, b) monitoring climate variability and c) detecting climate change, with strengthened observation networks and service centres in Africa; and
- e) **Local Community Engagement:** Enhanced capacity of local communities to adapt to climate change through access to useable information packages.

Fact box 9: The ClimDev Africa Programme (continued)**The African Climate Policy Centre**

As part of the ClimDev Programme Policy component, the ECA has committed to establishing an African Climate Policy Centre. The purpose of the Centre is to create a capacity hub to generate, assemble and administer an adequate base of knowledge to strengthen efforts and capacities of African countries to address the challenge of climate change. The Centre will contribute to enabling African countries to a) mainstream climate-related concerns in their development policies, frameworks and plans, b) better manage resources in a sustainable manner and c) participate more effectively in international discussions on climate change that will influence their economic and social development.

Financing

The G8 countries have noted the importance of climate monitoring and undertaken to work to strengthen existing climate institutions in Africa with a view to developing fully operational climate centres in Africa. ClimDev-Africa is specially designed for multi-donor engagement, and is predicated on major donor support. The estimated budget for the programme is USD 830 million.

Sources: ECA/AU Commission Report on Climate Change: African Perspectives for a post 2012 Agreement (March 2008) and UNECA website (www.uneca.org/eca_programmes/sdd/climate.htm).

Fact box 10: The road to Copenhagen

The Road to Copenhagen in 2009 – the negotiation process from now to the 15th meeting of the Conference of the Parties (COP15) to the UN Climate Change Convention (UNFCCC) in Copenhagen in December 2009.

At the 13th UNFCCC-conference in Bali in December 2007, the Parties adopted the Bali Action Plan as the roadmap for the negotiation process towards the conclusion of a new, post-2012 climate change agreement. The Bali Action Plan defines a negotiating framework for consultations between the Parties in 2008 and 2009. The outcome of these consultations shall be presented for adoption at the 15th Conference in Copenhagen in December 2009.

The Bali Action Plan provides a comprehensive framework for all the topics to be considered as part of the negotiations. It identifies five topics, which must be addressed as part of the negotiation process: a common vision, enhanced action on mitigation, on adaptation, on technology development and transfer, and on provision of financial resources.

The negotiation process after Bali has only just begun. A complex and difficult process lies ahead. It is important to keep a firm focus on the process already established in the UN-framework.

The Bali Action Plan includes a calendar for the negotiation process in 2008. The calendar envisages that all topics will be considered in parallel at the ordinary and extra-ordinary sessions. In addition to the ordinary meetings among the Parties in June and December 2008, two extra-ordinary meetings (inter-sessional meetings) among the Parties will be convened in April and August/September.

The first session of the *Ad-Hoc* Working Group on Long-Term Co-operative Action, a new body established at COP 13 at Bali, will take place from 31 March – 4 April in Bangkok. The purpose of the meeting will be to develop the Group's work programme. A more detailed time-table for the negotiations for each of the five topics may be adopted at this meeting. (Access to the meeting's agenda at: http://unfccc.int/meetings/intersessional/awg-ica_1_and_awg-kp_5/items/4288.php). The 5th session of the *Ad-Hoc* Working Group on further commitments for Annex I parties under the Kyoto Protocol will also be held at the same time.

The 28th sessions of 2 UNFCCC subsidiary bodies are scheduled to take place from 2-13 June 2008 in Bonn (the Subsidiary Body for Implementation and the Subsidiary Body for Scientific and Technological Advice). It is expected that the 2nd meeting of the first *Ad-Hoc* Working Group above, and the resumed 5th session of the second *Ad-Hoc* Working Group will also be held.

Various other meetings are also scheduled. The 28th session of the Inter-Governmental Panel on Climate Change will take place in Budapest from 9-10 April. The Panel will make recommendations on key elements of the future IPCC work programme, and in particular working group structure, main types of reports, and timing of future reports. A number of key meetings will also be taking place in Africa throughout the year, including the Conference of African Ministers of Finance Planning and Economic Development in March/April.

During the course of 2008 agreement should be reached on a range of issues for adoption at the COP14 meeting in Poznan in Poland in December 2008. Depending on the status of the negotiations, the Parties may decide at the Poznan-meeting to further intensify the negotiation process in a number of extra-ordinary meetings during 2009.

All countries – not least countries that are particularly vulnerable to the effects of climate change – have a strong interest in a successful outcome in Copenhagen in 2009. Countries need to be actively involved in international negotiations and initiatives regarding climate change issues. Denmark is committed to facilitate the involvement of African countries in the international negotiation process.

Source: Contributed by the Government of Denmark. Additional material from the UNFCCC website.

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FOCUS ISSUE 1: WATER

1.1 Water and the MDGs in the context of Africa

Water is central to realizing the development potential of Africa. Safe water is critical to the health and well-being of households (MDGs 4 to 6); water is also an essential input into agriculture and other productive activities, including the provision of hydropower (MDG 1). It is also essential for the long-term sustainability of ecosystems (MDG 7). In all these areas, progress in sub-Saharan Africa has been inadequate. Despite advances in recent years, only 56% of the population have sustainable access to safe drinking water. The situation is significantly worse in rural areas, where safe water is available to only 42% of the population. Conditions are considerably better in North Africa where access rates exceed 90%.

The two major geographical regions in Africa face significant – yet sharply contrasting -- challenges in water management. In North Africa, perennial and extensive water scarcity has triggered substantial infrastructure investments to increase water storage and to develop sophisticated irrigation systems. But rapidly expanding urban populations and irrigated agriculture – which resulted in excessive use of water due in part to the practice of water subsidies -- have exhausted groundwater sources, reduced water quality and necessitated rationing of water supply and irrigation services. And excessive investments in water storage infrastructure, together with increased variability in precipitation, have also reduced the fill rates of dams in Morocco to less than 50% on numerous occasions during the past decade. In sub-Saharan Africa, Southern Africa and the Sahelian region receive minimal rainfalls². In contrast, the central part of the continent has a much wetter climate with several rivers having catchment areas in excess of 100,000 km. But the lack of water storage capacity has meant minimal irrigation -- less than 4% of potentially irrigable lands in sub-Saharan Africa as a whole have been developed – and a very weak utilisation of the continent's large hydropower generation potential -- less than 7% of the hydropower potential has been developed.

Both North and sub-Saharan Africa suffer from hydrological variability and extremes as well as long-term reductions in runoffs. If climate change affects weather and precipitation patterns as predicted, both regions may see more frequent and severe droughts and floods. Also, increased average temperatures may result in higher evaporation from dams and reservoirs. At current rates of population and economic growth, available water resources will not be enough to sustain people and production in the future. Clearly something has to change. Across Africa continuing efforts to improve water policies and innovative water management approaches – including integrated river management, flexible water rights, water trading mechanisms, and demand side management – will be important. But while efforts in sub-Saharan Africa will need to focus on additional investments for water storage and the provision of services North Africa will have to focus more on integrated water management and regulation rather than further expanding the provision of services.

1.2 Expected impacts of climate change

Climate change will accentuate existing pressures on water resources. As mentioned above, Africa's climate is characterized by significant variability and extreme climactic events. According to the fourth

² In these two regions a large decrease in runoff is projected by the IPCC by 2050.

assessment report of the IPCC, the main implications of climate change³ in the water sector are projected to be:

- i) By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress;
- ii) By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%;
- iii) By 2080, a possible increase of 5-8% of arid and semi-arid land in Africa; and
- iv) Toward the end of the 21st century, sea-level rise will affect low-lying coastal areas with large populations.

While there is still high uncertainty in predicting future climate developments, observed phenomena appear to indicate that climate change will not only induce a gradual change in annual mean temperature levels but as well, an intensification of the hydrological cycle. As a consequence, climate extremes are expected to increase substantially. Water scarcity and rising variability particularly in the case of sub-Saharan Africa, strengthen the case for undertaking ‘no regrets’ actions such as improving water storage.

Climate change will have different impacts on water resources and uses in Africa. As regards access to safe water, rising temperatures and advancing desertification in both the Sahelian zone and Southern Africa will most likely accentuate water scarcity. By 2025, it is expected that 25 African countries will be subject to water scarcity or water stress, making it more difficult to achieve the MDG target of providing access to clean water to 78% of the population by 2015. In North Africa, heavy investments in water storage and distribution infrastructure have helped make the region less sensitive to water shortage in the short- to medium-term. It is expected, however, that sewage treatment will become an increasingly more important challenge.

The projected impacts of climate change on water **as an input into agricultural and food production** will be important in both sub-Saharan and North Africa. African economies remain largely dependent on rainfed agriculture and thus are very vulnerable to climate risks. Recent country-level studies suggest that the impacts of hydrology and rainfall variability on economic development are significant. In Ethiopia, it was estimated that droughts and floods have reduced economic growth by more than one-third. Costs associated with flooding and drought in Kenya over 1998–2000 range from 10–16% of GDP. In North Africa, it is expected that irrigated agriculture – which has expanded greatly in recent years -- will suffer the greatest consequences of reduced precipitation levels.

As an input into hydropower generation, the challenge brought about by climate change and the need to increase water storage in sub-Saharan Africa provides renewed incentives to consider more holistic approaches e.g. multi-purpose water resources development including power generation, irrigation, and water for basic human consumption. Climate change will, however, render this process more complicated: more erratic and extreme precipitations will require much more care in the design of reservoirs and dams. In North Africa, rising temperatures could result in higher evaporation from dams and reservoirs and could lead to lower hydropower generation if dam fill rates fall below the optimal levels.

³ It must be noted, however, that these projections are subject to huge uncertainty, especially for the Sahel-Sudan and GHA where different models do not agree.

1.3 What has been the response to hydrological variability and more rapidly changing climate conditions?

In spite of the important role played by water in several of the MDGs, the link to climate change and climate variability issues has not been made either systematically or often enough, including the UN Secretary-General's Advisory Board on Water and Sanitation Compendium of Actions (also known as the Hashimoto Action Plan) that was issued in March 2006. One of the reasons for this state of affairs is the lack of operational instruments to deal with climate risks and the absence of climate considerations in the implementation agenda for the MDGs.

Most of the policy discussions regarding water have focused on access to clean water, African governments have taken important decisions such as: i) establishing the African Ministers' Council on Water (AMCOW) to provide political leadership and policy approaches in the provision, use and management of water resources; ii) adopting the Integrated Water Resources Management (IWRM) principles for organising national and regional policies and institutional frameworks; iii) establishing collaborative frameworks and agreements to facilitate the management and development of shared/trans-boundary water resources; and iv) investing in water infrastructure and storage in sub-Saharan Africa. Some progress has been registered under i) and iii). The Hashimoto Action Plan mentioned above provides a rather complete set of actions that cover financing, sanitation, integrated water resources management, water and disaster, and the role of water operators.

Development partners are also focusing increased attention on the water sector and -- more importantly in the context of climate change -- the systematic integration of climate risk management into project planning and management. In terms of financing, support for water and sanitation -- which declined throughout the 1990s -- has begun to recover in the last few years but the financing gap both from external partners and from country domestic budgets remain very significant. There have been some initiatives, including the creation of a new Pan African Investment Fund whose focus is on financing regional projects, but its impact in terms of mobilising additional resources is not yet clear.

A concerted effort to promote river basin co-operation in Africa and support trans-border river basin commissions is gaining momentum. This has, for instance, led to the financing of a 10-year programme of multipurpose development for the Senegal River involving four countries in West Africa. After several years of preparation (capacity and institutional development with support by bilateral donors), the Nile River Basin has entered the investment phase involving USD 400 million. Other trans-boundary initiatives such as the Zambezi River Basin in Southern Africa or the INGA project in the Congo River Basin are too recent to show results.

Donors are involved in 17 of Africa's 59 river basins with primary support to large, well established river basins with dense populations: Nile, Senegal, Niger and Zambezi. There remains, however, a large number of unsupported river basins, particularly those in or bordering fragile states. Germany is leading an effort to develop the capacity of regional economic communities and regional technical bodies (e.g. river basins, power pools) involved in water management and related activities.

1.4 What are the principal initiatives that need to be taken?

Given the vastly different conditions and challenges regarding water in sub-Saharan and North Africa, priorities for future action are presented separately below for these two sub-regions of Africa.

For sub-Saharan Africa:

a) *Develop water storage infrastructure and improve the operations of existing systems*

In order to increase the coping capacity of developing countries in sub-Saharan Africa and decrease their vulnerability to climate extremes such as floods and droughts, water storage capacity is an important element of long-term national development strategies. Currently, the average storage capacity in sub-Saharan Africa is about 200 m³/person/year, very low by international measures. Water storage infrastructure is a key factor for successfully de-linking economic performance and poverty reduction from extreme climate variability. In addition, water infrastructure must also take climate projections and other socio-economic considerations such as displacement of people and their resettlement into account (Box 1).

Box 1: Water infrastructure - The need for “climate smart” infrastructure

Historically, societies have responded to hydrologic variability with investments in infrastructure, such as water storage. Water storage allows water to be saved during wet periods for use during dry periods. Recent insights regarding the non-stationary nature of climate call into question traditional approaches to infrastructure design.

While previously it was believed that water systems could be designed to provide a specified degree of reliability, changing climate conditions could undermine the validity of such deterministic approaches. For this reason, methods that combine infrastructure with the flexibility of responsive management systems may be the best means for mitigating future climate variability.

In this way, “climate smart” infrastructure addresses the full range of climate risks in a holistic fashion through a portfolio of infrastructure, management systems and policy to create the needed resilience to adapt to changing climate and social conditions.

Source: IRI (2007).

While developing more water storage is indeed an important option for Africa, other infrastructure-related options such as the retrofit of existing systems or the rehabilitation of hydro projects are equally important and would most likely, be cheaper. Also water storage does not necessarily mean large structures but can take many forms including on-farm and community-level structures, rainwater harvesting, local irrigation ponds, small check-dams as well as large multipurpose storage reservoirs. Different approaches are needed depending on the climatic zones, variability, intended land and water uses etc.

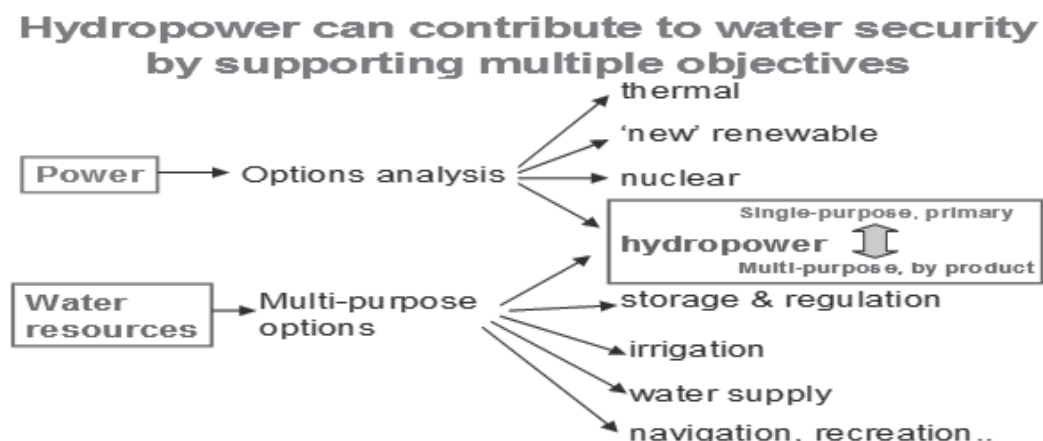
b) *Complement water security infrastructure with hydropower development and water for irrigation to help build economic resilience*

Given Africa’s considerable untapped hydropower potential, a more integrated approach to water management combining water supply (sanitation and irrigation), clean energy generation and other ancillary infrastructures (such as roads) would enable countries to reduce their dependence on rainfed agriculture and diversify their economies, which is the more sustainable approach for enhancing overall economic resiliency to climate risks (Figure 1). This approach would involve:

- Promoting regional approaches to water and hydro-power development.
- Building strategic regional partnerships regarding knowledge, capacity and financing, with carbon finance playing an important role through cleaner energy.

In addition to improving the physical infrastructure, continued effort on strengthening water policy and management will be needed.

Figure 1: Water in its various dimensions



Source: World Bank presentation

Also, because almost all river basins in Africa encompass multiple countries and have trans-boundary features, implementing this priority would necessarily involve a regional approach and the development of collaborative frameworks and arrangements to facilitate the management and development of shared water resources including water-shed cooperation and transboundary water agreements. Capacity support to regional technical bodies will need to be further strengthened.⁴

c) *Improve resiliency*

In most cases, the uncertainty and scale of climate change projections are not amenable to planning and decision-making. 'No regrets' investments, which provide benefits regardless of climate change, are an important part of responding to climate change (see Box 2 on Ethiopia for more detail). They include measures affecting both water demand and water supply such as:

- Increasing awareness of water-related climate risks and their avoidance/reduction/management.

⁴ Germany is leading a 2007 G8 initiative to help build the capacity of the RECs and other regional organizations (institutional mapping being carried out by ICA Secretariat) and to help develop the capacity needed to undertake the RECs' work programmes over the next 2-3 years. €2 million has so far been committed by Germany

- Strengthening the capacity for water resources development and management including, in particular, hydrological monitoring capacities.
- Instituting a flexible and functioning system of water rights including the introduction of market instruments for water sharing/trading
- Further exploring an enhanced role for the private sector in the sector (see Box 2 in the Energy Annex regarding private sector participation in small-scale hydropower dams).

Box 2: Managing water resources in Ethiopia

Hydrology and economy-wide performance. More so than most other African countries, Ethiopia faces more extreme hydrological variability and seasonality. The heavy reliance on rainfed subsistence agriculture, extremely low levels of hydraulic infrastructure and limited water resources management capacity leave Ethiopia's economic performance virtually hostage to its hydrology. According to a recent study, hydrological variability currently costs the economy over one-third of its growth potential (see Figure 3 above). In addition, poor market access and costly transportation services have created a highly fragmented economy, which amplifies drought and flood shocks by hampering trade between surplus and deficit regions in the country.

Building climate resilience requires new strategic focuses. It is estimated that artificial reservoir storage in Ethiopia is about 43 cubic meters per capita. To achieve South Africa's benchmark of water security of 750 cubic meters per capita – still low relative to other regions of the world-- Ethiopia would need to invest five times its annual GDP (USD 35 billion) just to achieve improved access to water. In order to de-link economic performance from rainfall and enable sustained and diversified growth, several strategic shifts appear necessary. Major investments in water resources storage, institutions and capacity to manage flows must be a high development priority. But, in addition, investments in water infrastructure should be multipurpose and link irrigation, hydropower, roads and other market infrastructure investments, using a co-ordinated, 'co-located' programme of investments to fully leverage their growth potential. There are obvious synergies. Climate change with its likely impacts on the frequency of floods and droughts is purported to double the return to irrigation investments in Ethiopia. Raising the very low access to electricity warrants major efforts on (clean) hydropower generation.

Attractive as this may be, a fuller understanding of the issue of balance and sequencing within the context of specific country circumstances is needed: a principled and pragmatic approach to management while putting greater emphasis on concurrent infrastructure investments. In addition, while the Nile Basin Initiative (NBI) offers considerable potential for large-scale hydropower and irrigation development in Ethiopia, the management and development of international rivers is particularly challenging and calls for a renewed resolve to strengthen regional arrangements and institutions.

Source: World Bank (2006), *Ethiopia: Managing Water Resources to Maximize Sustainable Growth*, A World Bank Water Resources Assistance Strategy for Ethiopia.

For North Africa:

a) *Realigning water demand with available supply*

This will require substantial institutional and policy reforms addressing the water sector proper, as well as other areas influencing water usage such as agriculture, urban development etc. Implementing the necessary reforms would go much beyond the scope of this paper. The example of how water can be

allocated under the constraints of increasing climate variability using futures options in the case of Metro Manila in the Philippines (Box 3) could provide a useful illustration of possible practices.

Box 3: Metro Manila's shared water system

Decision-making by water managers and planners in shared water systems with limited or stressed resources often proves very challenging. Competing demands and potentially conflicting interests lie at the heart of water supply allocation. While water rights or priority systems may facilitate decision-making, they do not ensure that water is being allocated to its highest economic use. Changing demands, such as population growth and increased agricultural land, further confound the issue. And climate change will likely add more challenges to allocation policy. Increasing storage may reduce vulnerability but comes with a high price tag, and may still not ensure against deficits in excessively dry years. Demand-side management (e.g. conservation, high efficiency uses) cost substantially less, but may not produce enough supply, with all sectors losing to some degree.

A scheme being elaborated in the Philippines to construct and implement a contract-based sharing of water between Metro Manila, the capital city of the Philippines and farmers provides an interesting approach. While Metro Manila holds priority rights to water allocation, according to Philippine law transfers from agriculture to urban sectors should involve compensation. This has led to the development of a conceptual management system focused on options contracts at a mutually agreed price to compensate agriculturists while ensuring reliability of water to the urban center when necessary in very dry years. While option contracts have not yet been explicitly adopted for Metro Manila, a series of workshops have been held to promote implementation of such a system.

Source: IRI (2007)

b) *Further strengthen water scarcity management strategies*

This would involve:

- demand management measures such as improving water use efficiency, recycling and water re-use;
- water saving technologies including the modernization of irrigated agriculture; and
- other institutional measures in the non-water sector and increased accountability in the provision of water services such as for instance, rates of access, utility cost recovery, unaccounted water and efficiency of water use in agriculture.

For Africa as a whole:

a) *Strengthen disaster risk management, particularly as concerns floods and drought*

In terms of risk management, there should be a shift from post-disaster re-construction to better disaster preparedness. Recent studies indicate that disaster preparedness is highly predictable: for every USD 1 spent on preparing for disasters, USD 7 is saved in the cost of recovering from it. The example of Mozambique's flood early warning system is worth careful attention.

Droughts require long- and short-term water management plans and drought warning systems like planting early, choosing a drought resilient crop, adopting water conservation techniques, and/or selling animals. Food storage needs to be organized in advance. These may be complemented by special programs to provide people with employment during droughts when they cannot survive on subsistence agriculture.

Box 4: Mozambique's long-term challenge is to learn to live with floods

In Mozambique, that is prone to flooding, the flood early warning system plays an important role. Ahead of the rainy season, in October, the seasonal forecast informs a meeting of water resources experts, who assess preparedness for the predicted weather. This provides forecasts of flood risk, detects and monitors flooding, and puts out flood warnings when necessary. A high-level committee of ministers chaired by the Prime Minister becomes the overall decision-making body in the event of a disaster. But Mozambique cannot address its water-related climate challenges alone, since weather events outside the country often largely determine the internal situation. Regional cooperation is therefore critical. This cooperation, which comes under the umbrella of SADC and its specialized agency SARCOF, facilitates information exchange in the 15 SADC member states. In addition, Mozambique now has a tropical cyclone warning system, distinct from the flood early warning system. This informs people of the probable arrival of a tropical cyclone at least 48 hours in advance.

A flood risk analysis has been carried out in Mozambique's major river basins, to identify vulnerable areas and people. Between 2004 and 2006, the hydro-meteorological network was strengthened from 6 to 14 stations and from a 1-month time lag (between data collection and analysis) to information now available on a daily basis. The system also involves vulnerable communities in flood preparation, and educates them about the risks. Appropriate, clear, and timely messages during a flood situation are also vital. Thus the important role played by the local media.

Source: Helmuth et al. (2006).

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FOCUS ISSUE 2: ENERGY

2.1 Energy as a prerequisite for economic growth and diversification (MDG 1)

The lack of or unreliable energy has been systematically identified as a major impediment to both Africa's growth and its export competitiveness. At the same time, access to electricity is fundamental to meeting basic needs (health services, education, and access to information) and to achieve Africa's development goals as captured in the MDGs. Underlying low access rates are the exceptionally low levels of installed generation capacity in sub-Saharan Africa -- of which 60% is located in South Africa alone. The mismatch between power demand and available supply has grown, with increasing numbers of African countries now vulnerable to power crises. Twenty-eight countries are being, or have been affected by energy crises in the past 24 months -- an unprecedented situation. With more than 550 million Africans without access to electricity, energy production and consumption are expected to soar in the future on the continent. This energy scarcity, compounded by high fuel prices, has resulted in high costs for transport, industrial and commercial sector operations in most African countries.

In North Africa, universal access to electricity has nearly been attained thanks to significant public investments by state-owned power utility operators. The challenge is now to make sure that the financial viability of utilities is secured over the long run. Key challenges include reforming existing energy price subsidies, developing adequate incentives to stimulate investments in energy efficiency and implementing frameworks to mobilize public as well as private investment in additional generation, transmission and distribution infrastructure. Strengthening power interconnections among countries and connecting to the European power grid through the Mediterranean Sea, including exporting renewable energy to Europe are currently under consideration.

Large hydropower sources dominate the energy mix in most African countries, followed by oil and natural gas -- particularly in Nigeria, Ivory Coast, Sudan, Senegal, Kenya, Ghana, and Tanzania. Southern Africa, on the other hand, relies heavily on coal as a source of power. As a result of this energy mix, CO₂ emissions from the energy sector in Africa are modest. Land use and deforestation contribute a much larger share of total GHG emissions on account of the heavy reliance on biomass use for cooking and heating. There are three exceptions to this basic premise.

- South Africa, which relies heavily on coal-based energy, contributes to more than 65% of sub-Saharan Africa's total GHG emissions -- making it the 11th largest emitter in the world;
- Nigeria -- as a result of gas flaring and oil production -- is the second largest emitter in sub-Saharan Africa, and
- North Africa has experienced one of the highest global rates of growth in emissions -- attributable to oil producers such as Egypt and Algeria and to rapid urban growth.

The potential for hydropower remains very large. Concerns over the environmental and social effects of building large dams have, until recently, slowed investments in hydropower. The remaining hydropower potential in developing countries and most particularly, in sub-Saharan Africa is very large. Several developing countries are focusing again on this source of electricity, driven by rising demand for electricity. As described in the Water Annex, there is a growing consensus that countries should follow an integrated approach in managing their water resources, planning hydropower development in co-operation with other water-using sectors.

Africa has emerged as an important oil and gas producer and is expected to continue providing an important share of oil and gas to the world market. According to the International Energy Agency, outside OPEC, conventional crude oil production in aggregate is projected to peak by the middle of the next decade and decline thereafter. In the longer term, only Russia, Central Asia, Latin America and sub-Saharan Africa will achieve any significant increases in conventional oil production. Thus, while facing high energy poverty, the outlook for energy sector development in Africa looks encouraging.

Box 1: The Impact of the Oil Price Shock

Oil prices have tripled in the past five years to record nominal highs of above USD 100 per barrel. But the shock occurred against a backdrop of rapid economic growth and strong demand for other commodities whose prices have also risen, partly neutralizing the impact for several oil-importing developing countries. Several resource-scarce countries will see oil price increases exacerbated by sharply rising food prices. Countries with the largest terms-of trade losses from food and commodity price changes (registering at least 5% of GDP) included: Lesotho, Eritrea, Togo, The Gambia, Swaziland, Cape Verde, Seychelles, Malawi, Mauritius, Burkina Faso, Mozambique, Madagascar, Ethiopia, Niger, and Benin.

The impact will be particularly severe on poorest segments of the population - the urban poor are especially vulnerable. Since the pass-through of international oil price increases to domestic petroleum prices is now a common practice in most of sub-Saharan Africa, there is little impact on the fiscal balance. But several countries will experience significant worsening of their balance of payment position.

Low income oil-importing countries have a number of **policy responses** to oil shocks. In the short term, governments have tried to adjust taxes and subsidies and to keep diesel and kerosene prices lower to help the poor. External financing options including supplementary IDA/World Bank financing and the IMF exogenous shock facility (ESF) can provide short-term relief. In the longer run, governments should encourage fuel switching, energy efficiency as well as new investment in energy production, transportation and delivery.

Source: World Bank, unpublished briefing notes

2.2 What have been the impacts of climate change?

Climate change presents additional challenges to Africa, which has already been hit hard by high oil prices (see Box 1 above). As a result of more erratic rainfall patterns, climate change has severely affected power generation capacity of hydro-power dams in both Eastern (Tanzania and Uganda) and Western (Ghana) Africa, forcing these countries to spend their limited resources to add emergency generation capacity, most of which relies on coal- or fuel-based systems -- thus aggravating greenhouse gas emissions. The impact of climate change on large hydropower projects will mean that future investments in this area will need to be designed with more attention given to hydrological variability.

Africa is faced with the dual challenge of increasing access energy while simultaneously making maximum use of clean energy options. Africa has a number of options for clean energy development, in view of its enormous untapped renewable energy potential -- especially hydro-power, geothermal energy, solar and wind power -- as well as more efficient use of biomass and improved energy efficiency. Regional co-operation in energy development -- --in particular in the context of river basin water resources management, refer to Water Annex-- -- will be required and ancillary challenges must be overcome. The combination of i) greater access to carbon finance and ii) necessary adaptation to climate change in the water sector can provide Africa with the opportunity and incentives to develop cost-

effective options to developing clean energy, in particular hydropower. Thus, much greater access to energy (and to water) could help propel Africa to a higher, more diversified economic growth path.

Large and rising oil and gas production also bring about associated environmental and climate challenges. Since 2003, the World Bank-led Global Gas Flaring Reduction partnership (GGFR) has been working with major flaring countries and the oil industry across the world to raise awareness and address gas flaring in partner countries through demonstration projects and best practice dissemination of policies and regulation. Adoption of these practices has been slow and efforts will need to be further strengthened. There is also the problem of CH₄ leaks from oil pipelines. Overall, there is a need for oil and gas infrastructure, including foreign oil companies, to be developing according to stricter, more climate-friendly standards.

2.3 What has been the response to date?

External support for the energy sector has significantly expanded. ODA commitments for the energy sector rose sharply from USD 1.9 billion in 2005 to USD 2.4 billion in 2006. Over 50% of that amount is destined for North Africa. Arab partners and India provided over USD 900 million to Africa for investments in energy generation and connections. China, which is by far the most significant player, has financed the construction of hydroelectric power stations in several countries. Private-sector flows are substantial, reaching USD 1.2 billion in 2005, mostly for generation capacity by independent power producers.

Through the Clean Energy Investment Framework, the African Development Bank and the World Bank are promoting a multi-track approach covering:

- Accelerating access to electricity in urban areas and rural electrification;
- Extending, upgrading, and interconnecting national power transmission grids;
- Integrating national electric power supplies and helping to develop efficient power trade arrangements;
- Promoting off-grid renewable power supply systems; and
- Promoting sustainable household fuels.

Together with other multilateral development banks, the African Development Bank and the World Bank have completed a report to explore synergies, identify gaps and agree on joint activities that would facilitate and accelerate access of developing countries to appropriate and affordable technologies and to carbon finance and to strengthen co-ordination between their public and private financing windows .

African governments have also begun to address these issues. Progress has already been made in developing regional energy interconnections and facilitating regional energy trade. The establishment of the regional power pools are notable examples, although much work is still to be done to broaden and deepen these energy markets. With the exception of Uganda, Madagascar and Eritrea, all the other countries of Africa are covered through a network of sub-regional power pools.

2.4 Looking into the future

a) *Promote renewable energy, both on a national and regional basis*

For Africa:

Harnessing the continent's huge but yet largely untapped hydropower resources. Less than 7% of Africa's hydropower potential is currently utilized. At the same time, these hydro resources are unevenly distributed; hence, regional power trade becomes increasingly important to energy policy in Africa. This would require the development and implementation of legal, policy, and regulatory frameworks required to attract the private sector and a stronger commitment in regional co-operation including joint efforts with the private sector to fulfill the large financing gaps for regional hydropower projects.

Promoting other renewable energy. New renewable energy sources not only can help mitigate climate change, they also offer options for providing electricity services to remote rural areas. However, as for hydropower, most renewable energy resources remain untapped in Africa. For instance, less than 5% of the geothermal energy potential in the Rift Valley is being utilized, primarily in Kenya while the total potential is known to account for a significant proportion of known worldwide geothermal energy resources. Small hydropower constitutes another potentially important source of renewable energy (see Box 2). Serious considerations should be given to allow connections and to facilitate the sale of electricity from small renewable energy projects to the national grid. Given its large potential in renewable energy, African countries will also need to be more involved in discussions and research on new technologies for renewable energy. Africa could also learn from discussions on gas flaring and methane from pipelines.

Further exploring options to allow Africa to benefit more from the carbon market and other GHG-friendly activities through, for instance, the CDM. Revenue tapped from carbon credit trade through the CDM could effectively reduce the cost of various clean energy options. The experience of North African countries and of South Africa -- where a CDM Business Association has been established -- should better be tapped to help sub-Saharan Africa take greater advantage of international carbon trade opportunities and the financing available under the CDM. Improving the domestic investment environment and regulatory framework in order to encourage private sector investment in carbon finance activity will need to be further encouraged. Examples of public-private partnerships to join forces in developing renewable energy projects have begun to develop in Eastern (Uganda) and Southern (Zengamina mini-hydro scheme in Western Zambia) Africa.

Box 2: Uganda's West Nile Electrification Project

The West Nile Region with a population of approximately 1.5 million people is in the border area and has no access to electricity due in part to political instability and military conflict. Because the possibility of extending the national grid was considered too risky due to rebel attacks, the option of a combination of a small-scale hydropower (3.5 MW) and a fuel fired generator (1.5 MW) was chosen. This project was registered as a Clean Development Mechanism project generating over 760 thousand tonnes of CO₂ equivalent over a period of 21 years. Reduced emissions come from clean hydropower replacing diesel-fuelled generators and reducing demand and emissions from imported diesel fuel.

Private-public partnership was key to the success of this operation: by providing project finance support and technical support through its Rural Electrification Fund and by lowering barriers to entry, the Government of Uganda has made it possible for the private sector to provide a commercially viable solution to the power crisis in the West Nile Region of Uganda.

Source: West Nile Rural Electrification Company Limited (WENRECo), Kampala, Uganda.

For development partners:

Helping Africa overcome constraints in financing and capacity development. Setting a course for low-carbon transition requires large frontloaded investments in new technologies, some of which are still in the early stages of commercial application. The combination of large capital cost, higher risk and increased demands on technological capabilities represents an obstacle to early deployment.

Promoting technology transfer: The massive new investments required in developing countries' energy sectors over the next 30 years provide a window of opportunity for technological transformation, involving technological transfer accompanied by the development of knowledge, capabilities in areas such as maintenance, and the development of national capacities to climb the technology-ladder. This is an area in which international cooperation – including South-South cooperation – has an important role to play (see Box 3).

Box 3: An analysis of technology transfer from CDM projects

According to Haites et al's analysis, projects involving technology transfer account for around two-thirds of emissions reductions achieved under the CDM. The plans for technology transfer vary significantly by project type and host country. In India, for example, only 7.3% of CDM projects plan to involve some element of technology transfer compared to 55.1% in China and as much as 83.3% in Malaysia.

This suggests that host country approval processes can increase the rate of technology transfer under the CDM – under the CDM, host country governments must approve potential projects that both conform to host country laws as well as national priorities. These results also suggest that local technology is preferred for some types of emissions reduction projects. Given the expanding role of the CDM in the future global climate regime, more detailed analysis of host country approval processes for CDM may provide useful insights on how the CDM can concretely promote more technology transfer.

Source: Haites, E. et al. (2006).

Negotiations on the post-2012 Kyoto Protocol framework provide an opportunity to put in place architecture for international cooperation that links climate change mitigation to sustainable energy financing.

b) *Promote clean household biomass fuels*

Traditional biomass is the predominant fuel source for cooking and heating in SSA, which results in serious indoor air pollution and deforestation. To date, three types of solutions have been attempted to address this issue: (1) improved stoves; (2) fuel substitution with liquid and gas fuel alternatives such as LPG, kerosene, and natural gas; and (3) sustainable forestry management. These measures can not only reduce GHG emissions, but also preserve forests. However, the results have been mixed. The higher costs of improved stoves and alternative fuels, as well as efforts to manage the complicated multi-sector institutional arrangements involved, are among the major challenges.

c) *Promote energy efficiency*

Improving energy efficiency is a “win-win” solution to mitigate climate change and address power shortages. Improving energy efficiency and encouraging energy conservation are fundamental pillars of strategies to switch to low-carbon development and poverty reduction paths. With minimal capital

investment by Africa's power utilities, supply-side initiatives to increase technical efficiency could boost electricity supply by 20% or more, in a fraction of the time required to build and to commission an equivalent power plant. On the demand side, governments need to encourage and reinforce a culture of energy saving in homes, enterprises, and public institutions. Significant power savings can be realized by encouraging a switch to energy-saving lights. In Uganda, distribution of 600,000 CFLs⁵ with less than USD 1 million investment cut peak demand by 30 MW. ESKOM in South Africa is planning to disseminate 35 million CFLs, which can cut peak demand by 1,750 MW.

d) Consider biofuels options, keeping in perspective the importance of balancing the food-biofuels competition for arable lands (see also Annex on Agriculture)

Faced with mounting energy crises, many African nations are experimenting or have already invested in projects to produce biofuels. These include South Africa, Nigeria, the Democratic Republic of Congo (DRC), Ethiopia; Mozambique and other southern African countries, including Swaziland, Zambia and Zimbabwe). For example, in recent years, jatropha, a low-cost plant growing on marginal land, has shown promise as feedstock for biofuels production. However, more assessment of feasibilities of domestic production is necessary (see Boxes 4 and 5).

Box 4: Biofuels in the context of global energy

Interest in biofuels – transport fuels derived from biomass – is soaring due in part to higher oil prices that have made biofuels more competitive. Almost all biofuels currently produced are either ethanol – produced from sugar and starchy crops, such as cereals, or biodiesel – produced mainly from oil-seed crops. The World Energy Outlook 2006 projects an average rate of growth of biofuels production of 7% per annum: by 2030, biofuels are expected to meet 4% of world road-transport fuel demand, up from 1% today. The biggest increases in biofuels consumption will occur in the United States, currently the biggest biofuel consumer, and Europe. About 14 million hectares of land are currently used for the production of biofuels – about 1% of the world's available arable land. Rising food demand, which will compete with biofuels for existing arable and pasture land, will constrain the potential for biofuels output.

Conventional corn-based ethanol production can result in a net saving of over 30% in greenhouse-gas emissions compared to regular gasoline. The emission savings from ethanol production in Brazil are considerably higher because fossil-fuel needs for processing are lower and the crushed stalk of the plant (known as bagasse) can be used in the production process. As a result, CO₂ emissions from sugarcane-based ethanol are at about 10% of those of conventional gasoline. Research is currently focusing on new processes to extract fermentable sugar not only from the starchy part of the plant but also from the ligno-cellulosic material contained in the waste seed husks and stalks. In the case of corn, a much larger portion of the plant could then be used to produce fuel.

Several African countries currently have, or are planning to introduce, active biofuels policies. While future developments will have to take into account risks associated with food security and water scarcity, biofuels do offer the opportunity to diversify the agricultural sector and agro-business sector as well as to promote substitution for imported oil. With the EU's target of sourcing 10% of transport energy from biofuels by 2020, export possibilities are real: South Africa and the Democratic Republic of Congo are already exporting small quantities of ethanol to Europe. And while relatively small, the demand from Africa is projected to rise at a rapid rate, albeit from a small base. Much more analysis will be needed for the formulation of biofuels action plans in the context of a sustainable development framework, including preferably on a regional basis.

Source: World Energy Outlook (2006) and IISD, Report on First High-Level Biofuels Seminar in Africa, August 2007.

⁵ A compact fluorescent lamp (CFL), also known as a compact fluorescent light bulb is designed to replace an incandescent lamp. Compared to general standard incandescent lamps giving the same amount of visible light, CFLs use less power and have a longer rated life.

Box 5: Jatropha: The Little Shrub that Could – Maybe

In 2003, India's Planning Commission recommended a national initiative on biofuels, a two-phase project for widespread cultivation of jatropha on wasteland across much of India. The first phase of the plan aims to plant 500,000 hectares of jatropha on government land across the country.

Biodiesel would be produced primarily by local governing bodies at the village level, coordinated at the national level through a consortium of government departments. Should the first phase go according to plan, India's central government would embark on the second phase of the mission – planting a total of 12 million hectares of the plant and privatizing the production of jatropha biodiesel.

India is not alone in its hopes for the shrub. In February 2007 China, which claims to have 2 million hectares of jatropha already under cultivation, announced plans to plant an additional 11 million hectares across its southern states by 2010. Neighbouring Myanmar (Burma) has plans to plant several million hectares; and the Philippines, as well as several African countries, have initiated large-scale plantations of their own. Although there is reason to be enthusiastic about jatropha's potential as a biodiesel feedstock in India and beyond, there is one rather sobering concern: despite the fact that Jatropha grows abundantly in the wild, it has never really been domesticated. Its yield is not predictable; the conditions that best suit its growth are not well defined and the potential environmental impacts of large-scale cultivation are not understood at all.

Source: Fairless, D. (2007), "Jatropha – The Little Shrub that Could – Maybe", *Nature*, Volume 449, 11 October.

e) *Promote mitigation in South Africa and in North African countries*

A climate change mitigation strategy in the energy sector in SSA has to treat South Africa separately, as two-thirds of CO₂ emissions in SSA come from South Africa. Under a "business as usual" scenario, CO₂ emissions are projected to increase four-fold by 2050. The priority mitigation options lie in the electricity, synthetic fuel, industrial, and transport sectors, which are the top contributors to CO₂ emissions now, and will likely account for the fastest growth of CO₂ emissions in the future. Therefore, priority mitigation measures include industrial energy efficiency, nuclear, imported hydro, renewable energy, clean coal technologies, vehicle fuel efficiency improvement, and transport modal shift.

f) *Reduce and ultimately eliminate gas flaring*

Flaring and venting of natural gas in oil wells is a significant source of greenhouse gas emissions. Its contribution to greenhouse gases has declined by three-quarters in absolute terms since a peak in the 1970s. But according to the World Bank, over 100 billion cubic metres of natural gas are flared or vented annually. This flaring is highly concentrated: 10 countries account for 75% of emissions; the largest flaring operations occur in the Niger Delta region of Nigeria. In spite of a ruling by the Federal High Court of Nigeria (that forbade flaring) in 2005, 43% of the gas retrieval was still being flared in 2006. It will be prohibited by law as of 2008. The Global Gas Flaring Reduction (GGFR), a public-private partnership established at the World Summit on Sustainable Development in 2002, supports national governments and the petroleum industry in their efforts to reduce gas flaring and venting of gas associated with the extraction of crude oil. Algeria, Angola, Cameroon, Chad, Equatorial Guinea, Gabon and Nigeria are partners of the GGFR.

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FOCUS ISSUE 3: AGRICULTURE, FORESTRY AND FISHERIES

3.1 The impact of climate change on African agriculture

Even without climate change there are already serious concerns about agriculture in Africa. African agriculture is one of the most under-capitalised and has the slowest record of productivity increase in the world, and the lowest share of irrigated cropland of any major region in the developing world. Africa is the world's only region where food output per capita has been stagnant since the 1980s - a direct consequence of stagnating technology coupled with declining availability of land due to population growth. Public spending on agriculture, as a share of agricultural GDP, also remains low for much of the continent. Moreover, widespread poverty and tight governments' budget constraints limit capacities to invest in adaptation to climate change.

But agriculture remains the backbone of most African economies. Agriculture accounts for more than 40% of total export earnings. The sector is the largest domestic producer across the continent and employs between 70% and 90% of the total labour force. In addition, agriculture supplies up to 50% of household food requirements and up to 50% of household incomes.

Most of Africa relies on rain-fed agriculture. As a result, African agriculture is highly vulnerable to changes in climate variability, seasonal shifts, and precipitation patterns. With climate change, the area suitable for agriculture, the length of growing seasons and yield potential - particularly in margins of semi-arid and arid areas - are all expected to decrease.⁶ As a result, pronounced shifts in regional cropping patterns are expected to be observed while trade-offs in land allocation between agricultural sub-sectors (e.g. crops and livestock) may have to be made. This would further adversely affect food security and exacerbate malnutrition on the continent (IPCC, 2007). The current climate is already marginal with respect to precipitation in many parts of Africa, therefore climate change is projected to increase the vulnerability of African agriculture as rainfall variability increases.

Table 1: Estimate of world agricultural productivity by 2080

	Without carbon fertilisation %	With carbon fertilisation %
World	-16	-3
Industrial countries	-6	8
Developing countries	-21	-9
SSA	-28	-17
Asia	-19	-7
MENA	-21	-9
Latin America	-24	-13

Source: World Bank (2007)

By global comparison, sub-Saharan Africa is particularly vulnerable to the effects of climate change. Agricultural output is projected to be reduced by 28% by 2080 (without carbon fertilisation)⁷. Temperatures in Africa are already generally high. Any amount of warming may therefore be devastating

⁶ Warming by over 0.4 degrees Celsius may result in a shortening of crop growing period by more than 20% in the Sahel by 2020 [IPCC, 2007].

⁷ Studies suggest that an increase in atmospheric carbon dioxide may be beneficial to tree growth. The elevated carbon dioxide concentrations enhance photosynthesis rates with increased utilisation of carbon dioxide. This is called the carbon fertilisation effect

for agriculture on the continent, particularly for production. In terms of revenue, the IPCC (2007) estimates agricultural losses of between 2 and 7% of GDP by 2100.⁸

The effects of climate change on agriculture, however, are different across the African continent due to highly variable precipitation across sub-regions. Africa accounts for 30% of global land degradation and the land actually used contains inadequate nutrients and has little capacity to retain water. According to a UNFCCC 2006 report, as a consequence of climate change, Africa may face severe water limitations on as much as 600,000 square kilometres of agricultural land that is currently classified as moderately water constrained.

It is estimated that large areas of the dry sub-humid zone could lose 5-20% of its growing season length, with the Sahel possibly experiencing a greater-than-20% loss in the length of the growing season. Some loss of arable land area is expected to occur within 30 years in Northern Africa and in the Great Lakes region of equatorial East Africa (Lotsch, 2007). A reduction in cereal production is expected in Southern Africa, with half of the semi-arid and dry sub-humid areas being at a moderate to high risk of desertification (Easterling et al, 2007). The maize crop in Southern Africa already experiences drought stress on an annual basis and, according to a recent DFID study, it is estimated that this will get worse and extend further southwards.

3.2 Climate change and small-holder farmers

The effects of climate change will create new challenges for African farmers. Agriculture is at the core of environmental, social and economic vulnerability, and so the first to be affected by any climate variability are the farmers who are dependent on agriculture for jobs and income and whose adaptive capacity is constrained the most. The evidence from the IPCC is that the most vulnerable people will be affected first and foremost, and that subsistence farmers are expected to experience the most negative effects of climate change.

According to a recent IFAD (2008) paper, there are some indications of the ways in which climate change may affect farmers. These include:

- Increased likelihood of crop failure;
- Increase in disease and mortality of livestock, and/or forced sales of livestock, at disadvantageous prices;
- Increased livelihood insecurity, resulting in assets sale, indebtedness, out-migration and dependency on food aid; and
- Downward spiral in human development indicators, such as health and education.

Vulnerable populations have only limited capacity to protect themselves from environmental hazards, but they also bear the brunt of the consequences of environmental damage. In the short-term policy makers will therefore need to cope with the increased risk of frequent shocks to their economies, which will affect the welfare of their most vulnerable populations. Over the long-term, policy-makers will need to manage the effects of climate change on the underlying production structures of the economies, with those countries dependent on agriculture most heavily hit.

⁸ It is important to note that economic conditions vary significantly across the continent. In Northern and Southern Africa, agriculture represents only 11-15% of GDP, whereas for the rest of Africa agriculture counts for 35-40% of GDP. All these factors suggest that every region in Africa will experience some negative climate change impacts, but that some regions will be more vulnerable than others.

Box 1: Examples of crop insurance schemes for farmers

As climate risk imposes increasing burdens on small-holder farmers in Africa, it is essential to develop tools to directly address this threat, tools that can adapt with the climate and that underpin other adaptation strategies.

Recent innovations in insurance contracts have led to the initiation of several weather-related insurance activities in Africa. Index insurance, for example, depends on an established relationship between lack of rainfall and crop failure. As the season progresses, if rainfall turns out to be low (below an agreed trigger point), the farmers receive payouts. 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. 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.

Ethiopia, for example, is subject to recurrent drought with thousands of family farmers at risk of not being able to cultivate crops for food and income. In 2006 AXA Re (now Paris Re) set up the first insurance programme for humanitarian emergencies, providing USD7 million in contingency funding in a pilot scheme to provide coverage in the case of a severe drought during Ethiopia's 2006 agricultural season. It was the first time an insurance cover transferring risk to financial players was used for protecting people against the consequences of severe drought.

In Malawi farmers can now purchase index insurance to guarantee loans for agricultural inputs that would have otherwise been unavailable because of the threat of drought. For example, thousands of groundnut farmers have purchased a packaged product in which index insurance is bundled with a loan that provides access to quality groundnut seeds that are high yielding and specifically bred to be productive in the local climate. As climate change exacerbates risks, farmers will be able to utilise the improved varieties and index insurance to be able to extend/enhance the opportunities available.

Sources: Hellmuth and Osgood (IRI); Browyn Cousins (WFP), and Jean Christophe Garaix (Corporate Communications).

As climate risk imposes increasing burdens on smallholder farmers, it is essential to develop tools to directly address this threat, tools that can adapt with the climate change and that underpin other adaptation strategies. Insurance, for example, is an important tool in risk management which has led to the initiation of several weather-related insurance activities in Africa. Because insurance covers the risk of droughts for years that are forecast to be wet, farmers can protect themselves from the uncertainty of imprecise forecasts. If climate change is likely to lead to substantial damages from extreme events, it is important to establish a widespread market for insurance schemes across Africa.

3.3. Climate change and food security in Africa: implications for MDG 1

Africa's agricultural yields have already been declining, and it is estimated that Africa's food supply will need to quadruple by 2050 to meet people's basic calorific needs. The Stern Review (2007) projects that at 3° Celsius warming there would be 150 million to 550 million additional people at risk of hunger. Attainment of MDG 1, eradicating poverty and hunger, in the face of climate change is, therefore, seriously threatened for the continent.

Climate change is not the only cause of food insecurity. Other economic factors will interact with it to *multiply* its effect. Some of these factors include:

- Africa's strong dependence on agriculture - (in 2050 agriculture is predicted to represent 38.1% of GDP);

- Africa's low integration in the world market – the possibility for the economy to substitute domestic cereals by imports is low;
- Africa's low use of modern inputs – low fertiliser and use of irrigation techniques;
- Africa's high population growth vis-à-vis food supply (this situation will be exacerbated by the process of urbanisation and land degradation) and;
- Other stress factors such as HIV/AIDS - which may reduce the labour force in agriculture and thus food production.

All these factors will have a devastating effect on the ability for African countries to reach MDG 1 by 2015. The potential impact of climate change on food security therefore needs to be understood not only in terms of its impact on food production but within a wider context of how climate change interacts with other social, environmental and economic factors that determines vulnerability and the capacity to adapt.

Some recent analysis suggests that increasing biofuels production may further hurt subsistence farmers and heighten the risk of food insecurity in Africa by diverting crop cultivation away from food production whilst increasing price pressures on agricultural products. Regardless of how effective biofuels may be, their benefits quickly diminish if they are competing with the use of land for food staples or if carbon-rich tropical forests are being destroyed for biofuel production, thereby causing vast greenhouse-gas emissions.

However, biofuel production does need not compete with food production. The priority should be to ensure that any rural land acquired for biofuel production has not been previously used for growing food crops. The choices of biofuel crops are diverse – ranging from corn to rapeseed and jatropha. Jatropha, in particular, is a fast-growing biofuel source that can be planted in poor soil and arid conditions e.g. land that is unsuitable for food production and that doesn't need irrigation. Some biofuel sources, such as jatropha, can also be intercropped with other crops such as coffee, sugar, fruit and vegetables.⁹ The benefits of intercropping are many and diverse. It enables farmers to protect themselves against crop failure, land use is maximised, and farmers are better able to cope with price variability.

Biofuel production and food production are therefore well reconcilable and could have an important place in the development of rural areas if they are approached carefully and with consideration of the needs of smallholder farmers.

3.4 Climate change and sustainable forest management in Africa

Deforestation and forest degradation are the second leading cause of global warming, responsible for about 20% of GHG emissions. Forests, therefore, have a critical role to play in mitigating climate change. The UN Framework Convention on Climate Change (UNFCCC), which has been ratified by over 160 nations, calls on all nations to protect and enhance the reservoirs of carbon, such as forests.

The estimated forest area for Africa in 2005 was 635 million hectares, accounting for about 16% of global forest area (FAO, 2007). Forests are a major contributor to GHG emissions on the continent and, according to a recent FAO publication, more than half of global deforestation happened in Africa between 2000-2005. The net annual forest loss between 2000-2005 was about 4 million hectares, and it is estimated that nearly half of the deforestation in Africa is due to removal of wood for fuel. Other major drivers of deforestation and forest degradation are agricultural expansion, charcoal supply, logging activities and fires. Insecure land tenure can also contribute to deforestation and act as a disincentive for

⁹ Intercropping involves growing two or three crops in alternate rows in the same place and at the same time.

long-term forest management. Of the top 10 countries with the largest net forest loss per year (roughly 8.2 million hectares) in the past five years, six are from Africa – Democratic Republic of Congo, Nigeria, Sudan, Tanzania, Zambia and Zimbabwe (FAO, 2007).

African forests are, in turn, impacted by climate change, and estimates indicate that this could lead up to a loss of up to 40% of species' habitats in Africa by 2085. Rising temperatures are making forests drier and therefore more susceptible to fires, vulnerable to pests and diseases, and changes in botanical composition.

The REDD Initiative

An international mechanism for Reduced Emissions from Deforestation and Degradation (REDD) could be designed to allow tropical forest nations to claim for compensation if they reduce national rates of deforestation and degradation through the management of natural forests below an agreed reference level. The contribution of tropical deforestation to global carbon emissions has prompted active considerations of climate change policy to include REDD. REDD prominently featured as an important action for mitigation at the UN Climate Conference in Bali in December 2007 and is widely expected to be a crucial part of a post-2012 climate agreement. In the meantime, UNFCCC parties are invited to support capacity building and technical assistance, explore actions, and undertake efforts including demonstration activities to the REDD initiative and the sustainable management of forests.¹⁰

Until now, forest carbon trading has been possible only in a limited way through the Clean Development Mechanism (CDM) of the Kyoto Protocol of the UNFCCC.¹¹ But such CDM projects are limited to afforestation (planting new forests) and reforestation (replanting severely degraded forests) projects only, not avoided deforestation projects. Yet some analysis suggests that reducing deforestation is a highly cost-effective way to reduce greenhouse emissions – and one that can be implemented immediately if the drivers of deforestation are understood and addressed strategically.

Financial mechanisms for REDD would be based on the concept of providing farmers payments for the carbon storage capacity of their lands and the human and institutional capacity to manage forests on a sustainable basis, thereby giving them an incentive to preserve forests. However, this needs to also counter the economic drivers of deforestation in Africa (e.g. conversion to agriculture or for agro-fuel plantations). The REDD initiative will, if designed right, clearly benefit biodiversity conservation – and give Conventions Parties a new and powerful incentive in forest conservation and sustainable forest management.

The Congo Basin Forest Fund

The Congo Basin Forest is the world's second largest tropical forest, covering 700,000 square miles in six countries, and containing a quarter of the world's remaining tropical forest. The forest hosts a wealth of biodiversity and is home to over 50 million people who depend on the forest for their livelihoods. These livelihoods are under threat from the continued loss of forest through logging and the clearing of land for agriculture – some 1.5 million hectares of forest are lost each year.

¹⁰ There remain, as was the case for afforestation and reforestation, major methodological issues including the need for accurate acreage of forests, to demonstrate that effective (and lasting deforestation) was avoided. The methodology issues are still under discussion.

¹¹ This Kyoto Protocol arrangement allows industrialised countries to support approved emission reduction projects in developing countries as an alternative to meeting their industrial emissions reduction targets at home.

Congo Basin Fund (CBF) is aimed at taking early action to protect the forests in the region from deforestation. The African Development Bank will act as the implementing agency for the CBF and plans to invest over 800 million USD overall in biodiversity conservation and natural resource management in Central Africa's Congo Basin. The CBF aims to develop the capacity of people and institutions in the Congo Basin countries to manage their forest and help local communities find livelihoods that are consistent with the conservation of forests.

The Forest Carbon Partnership Facility (FCPF)

The Forest Carbon Partnership Facility (FCPF) is a pilot programme that was launched by the World Bank at the UNFCCC in Bali in December 2007. The FCPF aims to help build experience regarding how to reduce emissions from deforestation and forest degradation by providing compensation for greenhouse gas emissions via Emission Reduction Programmes targeting the drivers of deforestation and forest degradation (in some cases, forest-dependent indigenous peoples and other forest dwellers).

The FCPF will assist countries in their efforts to implement incentives for REDD by financing capacity building and piloting different approaches to introducing incentives payments for reducing emissions from deforestation. Payments will be made to countries that achieve measurable and verifiable emissions, and grants will be provided to assist countries to set up systems and processes to monitor and govern their forests. Currently USD 165 million of the proposed USD 300 million Facility has been pledged by governments and corporations to kick-start the 10-year initiative.

Voluntary Carbon Markets

Carbon markets are a prominent feature of the response to climate change (for a more detailed description of carbon markets, refer to Annex on Financing). According to the World Bank, the overall carbon market in Africa saw an increase in volume to 1.4% in 2006 and accounted for almost 11% of transactions in 2006 (5% in 2005).¹² However, though Africa's overall carbon market has increased, the numbers are still a very small share of the global market. At the beginning of 2007, Africa accounted for less than 3% of the CDM market.

Given the high degree of land degradation in many African countries and the heavy dependence on wood resources for energy, afforestation and reforestation projects (forest sink projects) make intuitive sense. Some African countries have led the way in finding innovative ways to sequester carbon through sink projects that also deliver strong local community, environmental and economic benefits. The Green Belt Movement in Kenya is an example of a small-scale CDM project that will reforest 1,800 hectares of indigenous species within the Mount Kenya and Aberdares regions of Kenya (World Bank, 2006). The reforestation is expected to sequester carbon dioxide,¹³ as well as benefit local farmers through carbon payments.

Given the low technology requirements to grow trees, this type of project should be very accessible, even to rural communities. However, there are major barriers to carbon finance in Africa. Essentially, the CDM is a market-driven mechanism and therefore carbon finance in Africa faces many of same constraints as other forms of investment -- notably a lack of finance, capacity, and know-how regarding

¹² Carbon transactions are defined as "purchase contracts whereby one party pays another party in return for greenhouse gas (GHG) reductions or for the right to release a given amount of GHG emissions, that the buyer can use to meet its compliance – or corporate citizenship – objectives vis-à-vis climate change mitigation" (World Bank, 2007).

¹³ Around 0.375 million tons of carbon dioxide equivalent by 2017 (World Bank, 2006).

the CDM mechanism. As a consequence of these constraints, African farmers have been largely bypassed by the emerging and rapidly expanding carbon market.

Box 2: CDM Project: Afforestation/Reforestation of Mountain Range in East Africa

Steady population growth and increasing pressure of humans and livestock on the mountain highlands in East Africa have had to a serious impact on land use and ecology. The cultivation of marginal lands along the steep slopes and shallow soils, cutting of trees and bushes, reduction of fallow periods, and overgrazing have inevitably resulted in severe soil erosion.

It is expected that the afforestation and reforestation activities undertaken during the implementation of the CDM project will stabilize climatic variability and act as a carbon sink -- hence addressing climate change. As part of the rehabilitation project, there are plans to develop the carbon sequestration potential of the area through a Reforestation/Afforestation project of 62,000 ha using indigenous tree species.

The CDM project in Ethiopia, which is to be rolled out over 10 years, is not only aimed at rejuvenating and rehabilitating the flora and fauna of the area but also to improve the livelihoods of the community through i) diversification and specialization of specialized commodities and ii) accelerated private sector development by facilitating entrepreneurship skills through integrating smallholder agriculture in agro industry supply chains. While the carbon credits for the project will provide the finance for the afforestation/reforestation of the area, the project will also ensure necessary support for the local population through additional income-generating activities.

Source: Africappractice (2008).

Given the reliance of many African countries on wood resources for energy and other day-to-day needs, it is a challenge to find eligible forestry activities that can be truly additional and not displace existing land-use practices important to people's livelihoods or shift related emissions elsewhere.

3.5 The impact of climate change on fisheries in Africa

According to the WorldFish Centre, approximately 30-45 million people in Africa depend on fish for their livelihoods and, of Africa's 800 million people, more than 200 million regularly eat fish. Africa's inland and marine fisheries therefore play a critical role in supporting the livelihoods and food security of millions of people across the continent. Small-scale fisheries provide income to rural communities where alternative employment opportunities are scarce or non-existent. Fisheries also provide a safety-net against the effects of agricultural product price volatility or harvest failures. Fish has also become a leading export commodity, with an annual export value of USD 2.7 billion in 2001.

Fish supply in Africa is already in crisis. Africa is the only continent in the world where fish supply per person is declining - a result of a levelling off of fish production and a growing population. If population growth continues as projected, Africa will need about 61% more fish per year in 2020 just to maintain current consumption levels. Concurrently increasing competition for water and space will be a major challenge for these fisheries, in both inland and marine areas

Table 2: Countries with the highest projected indices of vulnerability of fisheries to climate change under two different IPCC future climate change scenarios

Rapid Development, High Emissions Scenario (IPCC A1F1)		Local Development, Lower Emissions Scenario (IPCC B2)	
Angola	81.97	Mauritania	83.10
Mauritania	81.18	Angola	82.15
Niger	79.24	Zimbabwe	79.32
Congo, Dem Rep	78.82	Niger	78.95
Mali	78.01	Congo, Dem Rep	76.0
Sierra Leone	77.09	Mali	75.92
Burkina Faso	76.01	Mozambique	75.13
Burundi	74.96	Russian Federation	74.33
Mozambique	74.86	Sierra Leone	73.61
Zimbabwe	74.55	Senegal	73.31
Senegal	73.70	Botswana	72.96
Guinea-Bissau	72.97	Zambia	71.78
Cote d'Ivoire	71.18	Burundi	71.68
Sudan	70.68	Burkina Faso	71.57
Russian Federation	70.57	Peru	70.98

Source: DFID (2005)

The effect of declining productivity in the fisheries sector in Africa is likely to be exacerbated by climate change, with direct impacts on food security, incomes and livelihoods. The table above shows that it is African countries whose fishery sector and fishers are most vulnerable to climate change, and that semi-arid countries with significant coastal or inland fisheries will be most vulnerable.

Climate change will have direct and indirect impacts on fisheries. Fisheries will be affected by changing water levels, flooding events and sea temperature changes which will cause a shift in the range and distribution of fish species and disruption to fish reproductive patterns. Fisheries will also be affected by the shrinking of ponds and lakes due to the combined effects of land degradation and sand-dunes encroachment on water resources. This is likely to reduce access to livelihood opportunities and natural capital through changes in fisheries productivity (OECD, 2006). An increase in the frequency of extreme events may also cause an increase in the vulnerability of fishing communities through damage to infrastructure and threats to human health (DFID, 2005, OECD 2006).

Aside from the social and economic impacts of climate change on the fisheries sector in Africa, there are direct environmental impacts. These include mangrove loss and marine diseases (OECD, 2006). Due to rising sea-levels, mangroves could experience problems which could affect important fish nursery areas. Climate warming, in addition, can increase disease transmission and thus affect marine pathogens, including coral diseases and oyster pathogens (Harvell et al, 2002).

African Aquaculture

Fish play a key role in health and income generation in Africa. The continent's wild capture stocks however are being increasingly threatened in many coastal states due to overfishing and inadequate fisheries management (FAO 2007). Therefore, aquaculture is likely to become an important means of adding significantly to overall protein supply to meet current and future needs.

Box 3: WorldFish Centre Small-Scale Integrated Aquaculture Project in Malawi

Fish have traditionally been an important part of the diet in Malawi. But an expanding population and declining catches have cut annual per capita consumption from 14 kg in the 1970s to 4.2 kg in 2005, and contributed to the overall decline in food security.

Climate change represents a potentially important threat to fish-dependent communities in African countries such as Malawi and may severely undermine fisheries due to changes in sea surface temperatures, rising sea levels, and changes in inland water temperatures. Aquaculture presents numerous opportunities for Malawi's farmers. When the right technologies are applied to integrated aquaculture farming systems, farmers can use these to cultivate fish, recycle water and nutrients from the fish ponds, and improve overall farm productivity.

The WorldFish Center, in collaboration with Malawi's Department of Fisheries, implemented a project in 1995 which emphasized the concept of integrated aquaculture–agriculture (IAA) as a strategy for adaptation to climate change. The project has had a marked impact at the national level. In 1986, total annual fish production from fishponds was 90 tonnes compared to 1,000 tonnes in 2004. Much of this increase is due to IAA dissemination since 1995, with the average annual growth in production increasing to 22% after 1995, from 2.4% previously.

Through the project, WorldFish and its partners have demonstrated the viability of aquaculture in dry areas of southern Africa and its capacity to improve resilience in times of drought. A major reason for Malawi's success has been its bottom-up approach i.e. direct engagement with farmers. The experience in Malawi can serve as a model for developing and disseminating IAA technologies elsewhere.

Source: Daniel Jamu, WorldFish Center, Malawi, www.worldfishcenter.org.

However, in many cases, aquaculture in Africa today is still a subsistence activity taking place on small farms. Around the world, almost 50% of global fish supplies come from aquaculture (FAO), but African aquaculture production amounts to less than 0.2% of the world's total, and will have to grow by some 10% annually across the region if it is meet expected needs. Recent developments have shown that there is both interest and possibilities for investment and growth

The importance of aquaculture cannot be underestimated. It is an important means of diversifying and improving food security in Africa. Whilst there is a pressing need for strategic investments to improve natural fish stocks management and to enhance Africa's fish trade at every level, further development of aquaculture may be key to achieving and sustaining the requisite level of future fish protein supply.

Maintaining or enhancing the productivity of fisheries is an important development challenge. However, particularly in view of the impact of climate change, fisheries management must move from seeking to maximise yield to increasing adaptive capacity. Research is needed to find innovative ways to further improve the existing adaptability of fishers and aquaculture producers. Integrated aquaculture-agriculture (IAA), for example, could help fish farmers cope with drought and aid farmers to diversify their marine-based livelihoods in the face of possible climate change-related difficulties.

3.6 Recommendations

Considerable efforts are needed to help agriculture, forestry and fishery systems to adapt to climate change. Success depends on factors relating to biology, ecology, technology, information and management regimes. African countries with limited economic resources and insufficient access to technology will be least able to keep up with the necessary changes.

- i) **Support for REDD:** Attention to-the development of policies and the financial incentives underpinning the REDD initiative provides potentially a powerful impulse for forest conservation and sustainable forest management. The international community should continue to support initiatives that ensure REDD is recognized within a post-2012 climate treaty. Given the significance of deforestation in Africa, national policy makers – supported by development partners – should advocate for the inclusion of AFOLU (Agriculture, Forestry and Other Land Use) in future climate regimes and collectively work to ensure that there is a common basis for decision-making (i.e. improved national monitoring of forest areas and inventories of emissions).
- ii) **Support for “climate-tuned” agriculture:** Risk-coping production systems are good options to increase the capacity of the most vulnerable to adapt to climate change. Weather-based index insurance and conservation agriculture are potential adaptive responses to climate fluctuations that should be supported. However, such techniques should also be supported by credit and production inputs, more accessible regional markets and trade capacity to empower vulnerable farming populations, and efforts to foster innovation.
- iii) **Bio-fuel production and land-use:** Bio-fuel production in Africa needs to be carefully managed. A key factor affecting biofuel efficacy is whether agriculture or natural ecosystems are being destroyed to produce the biofuels. However, if handled well, biofuels could increase incomes and employment in rural areas and improve rural energy in ways that could offset the losses. Achieving food security as well as energy security is a double challenge facing Africa, and therefore biofuels provide an opportunity to harness Africa’s vast biomass resources. More research on higher-yielding crops, production methods, and use is needed.
- iv) **Climate-resilient technologies and practices:** Governments should allocate more funds for research and development and dissemination of appropriate technology such as drought-resistant crops, heat resistant crops and water-proof crops. African agriculture is facing declining productivity, therefore access to modern inputs is needed to increase output and encourage farmers to diversify. Wider adoption of improved genetic varieties, expanded irrigation and careful application of agro-chemicals are essential in meeting the current food requirements as well as responding to future demands.
- v) **Expansion and intensification of aquaculture:** African governments should develop national aquaculture strategies for the expansion and intensification of aquaculture production and link aquaculture investors in the private sector to national and regional enterprise programmes. International investment in support for the NEPAD Action Plan for the Development of Fisheries and Aquaculture – the NEPAD “Fish For All” Initiative - is crucial. African governments would also benefit from assistance through the World Bank PROFISH programme to implement strategies for sustainable fisheries policies and implementation.
- vi) **Early warning systems, forecasting and climate information:** Climate information is a crucial component of climate change adaptation. Understanding the patterns of variability of current and projected climate and seasonal forecasts is therefore critically important. The ability to anticipate shock and losses through forecasting enables external agencies to provide targeted assistance. Grassroots communities should also be educated in the dissemination of climate information and traditional approaches to weather forecasting. The AU/UNECA ClimDev Programme needs to be supported to improve the availability of climate information and services on the continent.
- vii) **Integrating adaptation into development process and agricultural strategies:** Incorporating climate change adaptations into long-term development planning and agricultural programmes is key. National policymakers and planners have a crucial role to play in formulating policies that increase national and community adaptive capacity to climate change.

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FOCUS ISSUE 4: HEALTH

4.1 Principal health effects of climate variability

a) Climate variability has an impact upon the dynamics of infectious diseases

Over recent years, *progress has been made in understanding the relationship between climate fluctuations* (including extreme weather events) *and the dynamics of infectious diseases*.¹⁴

Increasing amounts of scientific evidence confirm that *many African ecosystems are associated with specific risks of epidemics linked to climate conditions*: inhabitants of the East African savannah living below an altitude of 1500m are exposed to malaria epidemics; those living along the banks of the Indian Ocean and the Great Lakes run the risk of cholera infection, while those living in the Sahel and other regions with low humidity run the risk of meningitis.

Climatic events that are the most likely to create or aggravate the dynamics of epidemics include rising atmospheric temperatures as well as natural disasters such as droughts or floods.

- *Atmospheric warming*

Atmospheric warming combined with air pollution caused by solid-fuel and exhaust gases impacts upon *acute respiratory diseases*. It may also affect the spread of *malaria*¹⁵, potentially extending transmission areas to the highlands of East Africa (Ethiopia, Kenya, Burundi and Rwanda). The health consequences of such an expansion could be aggravated where the lack of protective genetic modifications among newly-infected populations increases the frequency and impact of epidemics. For example, an epidemic in Rwanda caused a quadrupling of cases of malaria in pregnant women and a quintupling of maternal fatalities caused by the disease¹⁶.

- *Flooding*

Flooding aggravates the pressure on sanitation systems, which are already particularly inadequate in Africa, thereby stimulating the development of diseases associated with water:

- This is the case with *cholera*, which is linked to water and foodstuffs and which is on the rise in Africa. A *rise in water surface temperatures* can also stimulate the development of cholera around tropical lakes and seas. For example, during the passage of El Niño in 1997-98, the rise in surface water temperatures and flooding seemed to have fanned the cholera epidemics that were observed in Djibouti, Somalia, Kenya, Tanzania and Mozambique – all of whom border the Indian Ocean¹⁷.

¹⁴ IPCC (2007), Climate Change 2007, Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

¹⁵ IPCC, *Ibid*.

¹⁶ Hammerich, A., O.M.R. Campbell and D. Chandramohan (2002), *Unstable malaria transmission and maternal mortality: experiences from Rwanda*. *Trop. Med. Int. Health*, 7.

¹⁷ WHO (1998), “El Niño and its health impacts”, *Weekly Epidemiological Record*, 73 (20).

- Floods are likely to provide breeding grounds for malaria vectors: a strong correlation has been noted between excessive rainfall and malaria epidemics in semi-arid areas.¹⁸
- Flooding also seriously aggravates *diarrhoeal diseases*, since it pollutes rivers, wells and other sources of water supply for rural areas. Flooding arising from extreme weather events such as El Niño has been associated with an increased prevalence of diarrhoea.¹⁹
- Exhaustive research on the mosquitoes that act as vectors for *Rift Valley fever* in Kenya has shown a clear connection between the prevalence of that disease and flooding.²⁰

- ***Drought***

Drought can also have an impact upon diseases such as *meningitis*, as low humidity creates a predisposition to infection and to epidemics.

Box 1: Climate variability, the spread of meningitis and response strategies

With a population at risk of around 350 million and the potential for devastating regional epidemics involving hundreds of thousands of cases and tens of thousands of deaths, meningococcal meningitis is one of the most feared infectious diseases in Africa. Current prevention and response strategies based on temporary protection through vaccination are widely considered woefully inadequate. New efforts are underway to provide long-term protection through an effective conjugate vaccine which targets the dominant strain (Group A) of the bacteria which causes meningococcal meningitis and is associated with epidemics. Such efforts may, however, be hampered by a lack of adequate resources (only 30-40 million doses of the new vaccine will be produced each year) and by the extension of transmission areas under changing climatic conditions.

While identifying which populations are most at-risk will be increasingly important, this may become difficult because of changes regarding the geographical distribution of meningitis epidemics. In the late 1980s and 1990s many countries experienced new epidemic waves, and some outbreaks were reported from unusual sites, suggesting an extension of transmission areas caused by environmental changes. This hypothesis seems to have been substantiated by a review of 222 epidemics occurring between 1950 and 1975 and from 1975 to 1999, before and after the severe drought that occurred in the region in the mid-1970s: the areas affected after 1975 were located further south than previously. Districts in the southern margins of the Sahel and in East and Southern Africa (bordering the Rift Valley and the Great Lakes) were exposed to more frequent epidemics. These changes had a clear geographical pattern, which is compatible with climate and environmental changes.

b) *An aggravating factor: the impact of climate fluctuations upon access to water, agricultural output and malnutrition*

Above and beyond its impact on the dynamics of infectious diseases, climate variability is also likely to increase the gravity, scale and/or lethality of disease due to its impact on water quality and access, agricultural output and malnutrition.

Rising sea levels may have dramatic consequences due to saltwater intrusion in water supply sources for agricultural areas and human settlements, particularly on coastal plains – often the most fertile and densely populated areas.

¹⁸ IPCC, *Ibid.*

¹⁹ WHO, *Ibid.*

²⁰ Linthicum JK et al (1999), “Climate and satellite indicators to forecast Rift valley fever epidemic in Kenya”, *Science*, 285.

Flooding or drought can also disrupt the supply of drinking water and food to areas and populations affected. It is worth noting that 50% of food crises originate from natural disasters.²¹ Furthermore, the mortality risks associated with natural disasters are much higher in areas that face emergency food shortages.²² In fact, malnutrition aggravates health problems and the probability of contracting infectious diseases, particularly among immunodeficient people, young children, pregnant women and the elderly.

c) *Disasters associated with the climate have a direct impact upon health and mortality*

Extreme weather events such as heat waves, floods and storms have an immediate and direct impact upon health conditions and mortality burdens for areas affected. They cause disease, disability and death; disruptions to healthcare provision, and destruction of infrastructure – which aggravates the health consequences of disasters.

Extreme temperatures can cause potentially fatal conditions (e.g. heatstroke) and can increase the mortality caused by heart diseases. Seasonal flooding causes increased incidence of diarrhoeal diseases, respiratory infections, dermatitis and snakebites. Rises in sea level and tsunamis can provoke salt contamination, while extended flooding threatens agricultural output and may lead to large-scale food aid. The strong winds and heavy rainfall caused by tropical storms also cause death and disease. Lastly, inadequate water and sanitation infrastructure, overcrowded living conditions, poverty and malnutrition heavily increase the impact of natural disasters on health and morbidity.

d) *Impact upon the health-related Millennium Development Goals (MDGs)*

The effects of climate change on human health are likely to hinder efforts being undertaken to meet the Millennium Development Goals, in particular MDG 4 (reducing child mortality) and 5 (improving maternal health). In practice, children and pregnant women are especially vulnerable to malaria, diarrhoea, pneumonia and malnutrition, which in turn are highly sensitive to climate variations.

In addition, climate change also increases the difficulty of meeting MDG 6 – to combat the great pandemics, starting with malaria. The fight against HIV/AIDS is also likely to be complicated by the impact of climate change upon agricultural output and infectious diseases, which could increase the incidence of opportunistic diseases (diarrhoea, pneumonia etc.) among immunodeficient and malnourished people.

Lastly, the impact of climate change on food output and malnutrition could jeopardise the eradication of hunger (MDG 1).

4.2 Principal efforts made to tackle climate risks and their consequences for health

a) *Monitoring of climate-sensitive diseases*

African countries have made progress in analysing and anticipating epidemiological risks associated with climate conditions. Various remote detection and early warning systems allow them to anticipate seasonal climate change and associated epidemiological risks. An advance warning system for Rift

²¹ World Bank (Dec. 2006), *World Bank's Strategic Framework to assist countries at risks prepare for the future*, New Delhi.

²² World Bank, *Ibid.*

Valley Fever epidemics in Kenya, based upon satellite epidemiological data, was first proposed in 1990.²³ The Drought Monitoring Centre of the Southern Africa Development Community (SADC) and the International Research Institute for Climate and Society held a forum on regional epidemiological prospects, focused on developing an early warning system for malaria.²⁴ As a result, Botswana is currently using such a system as part of its national malaria prevention programme.²⁵

Box 2: Applications of remote sensing technology to monitor the impact of climate change

Satellite sensors developed in the United States, Europe, Canada, Japan, India and other emerging countries by the remote sensing community have contributed to a better understanding of how climate is impacting the environment and affecting diseases, food security and natural disasters.

Thanks to 30 years of successful research and the availability of internet in many countries, applications of remote sensing to monitor the risks of malaria, Rift Valley Fever, food security, and natural disasters have started to have an impact on policy and practice with respect to operational control and mitigation in many affected countries. Recent availability of free images and processing tools has enabled the rapid development of applications using remote sensing and Geographical Information Systems for operational purposes.

Many user communities such as Ministries of Health, Agriculture and Environment are using satellite information to monitor rainfall, vegetation growth, flood areas, dust storms, snow cover and droughts. Remotely-sensed images are now routinely used in Human Health Early Warning Systems to predict malaria, meningitis and Rift Valley Fever outbreaks. Satellite images are provided free of charge to the user community via the Internet. Specific tools are also created to analyze the images in real-time and extract information into time series.

Source: <http://portal.iri.columbia.edu/portal/server.pt>

b) Access to water and food

A number of initiatives to promote sustainable land and water management have emerged in Africa over the past decade. NEPAD has drawn up an ambitious agricultural development strategy (CAADP) that includes, as a priority, the sustainable management of land and water resources. The Economic Commission for Africa (ECA) and the African Development Bank (ADB) have developed a pan-African framework for land policy designed, under the aegis of the Regional Economic Communities (RECs), to facilitate the harmonisation and improvement of land resource management systems. The ADB and the African Council of Ministers for Water have launched the Rural Water and Sanitation Initiative.

c) Combating disasters associated with the climate

Faced with the proliferation of climate disasters (drought, flooding, storms etc.) and their consequences for health, African governments have begun to dedicate more attention to disaster prevention and risk management in an effort to attenuate their impact.

Certain governments have already accumulated many years of experience in this field. Mozambique, in particular, has established an early warning system that has allowed it to keep the impact of recent

²³ Roll Back Malaria/World Health Organisation (2002), "Malaria Early Warning Systems".

²⁴ Pan American Health Organisation (PAHO), April 2005, "Early warning for climate-related diseases", PAHOtoday. www.paho.org/English/DD/PIN/ptoday16_apr05.htm

²⁵ World Meteorological Organisation (2007), "Climate information for adaptation and development needs". www.wmo.ch/pages/publications/showcase/documents/WMO_1025_web_E.pdf

climate disruption (Cyclone Flavio in 2007 and flooding in 2008) to levels well below the devastation wreaked by the floods of 2000 and 2001 (see Box 3).

Box 3: Preparation for natural disasters: the early warning mechanisms in Mozambique

The Mozambican coast marks the western edge of an extremely active cyclone belt (the south-western area of the Indian Ocean) which accounts for almost 10% of the tropical cyclones recorded on the surface of the globe. These come with torrential rains that have previously caused major flooding and severe impediments to growth (particularly in 2000 and 2001). Since then, Mozambique has adopted a number of measures that have considerably reduced the impact of recent climatic disasters (including Cyclone Flavio in February 2007).

- The government and the National Meteorology Institute have established an early warning system that mobilises information and capacity to deal with extreme weather events.
- The system relies on alerting village communities via national radio stations in national languages.
- As part of this programme, the Mozambican Red Cross has established local committees in many villages and has trained volunteers in each community. These volunteers are equipped with radios enabling them to pass government information on to local residents. Roofs have been secured in order to withstand heavy winds, and evacuation routes have been prepared to enable people to quickly escape from flood areas.
- Following Cyclone Flavio, the International Federation of Red Cross Societies sent an emergency response unit specialised in healthcare together with specialists in water supply and sanitation, aid, logistics and telecommunications.

Source: International Federation of Red Cross and Red Crescent Societies (IFRC), www.ifrc.org/fr/docs/news/07/07060501/.

Africa has approved the “AU/NEPAD African Regional Strategy for disaster risk reduction”, developed under the aegis of the African Union Commission and the NEPAD Secretariat with support from the African Development Bank, UNDP-BCPR (Bureau for Crisis Prevention and Recovery), the World Bank and the UN/ISDR Africa.²⁶ This strategy seeks to integrate disaster risk reduction into development. The African Union has also adopted a programme of action for its implementation. It is based upon greater political commitment to act, better identification and greater awareness of risks, as well as better governance and the integration of risk reduction into emergency response efforts.²⁷ Several countries (Uganda, Kenya, Mali, Senegal and Niger) have set up national institutions responsible for risk reduction as part of efforts to implement this strategy.²⁸ Lastly, the international community has created the Central Emergency Response Fund (CERF).

²⁶ UN/Inter-Agency Secretariat of the UN International Strategy for Disaster Reduction (ISDR), November 2004, “Disaster Risk Reduction”, ISDR Informs No. 4.

²⁷ AU (16th– 21st January 2006), Report of the Ministerial Conference on Disaster Risk Reduction, Khartoum.

²⁸ UN/ISDR (July 2005), “Disaster Reduction in Africa”, ISDR Informs No. 5.

4.3 Principal obstacles to the attenuation of health risks associated with climate change

a) *Lack of access to water and sanitation*

Almost 80% of diseases in developing countries are associated with water, and they cause about 1.7 million deaths every year.²⁹ In addition, much disruption associated with the climate, such as drought or flooding, rising sea levels and melting glaciers could affect access to drinking water and sanitation (c.f. above) and could thereby increase the impact of water-borne diseases. Because Africa is the continent most threatened by climate disasters and also the one with least access to water and sanitation, it is likely to face the most devastating health consequences of climate change, in particular as regards vulnerable groups such as children, women and the elderly (children account for 90% of deaths attributable to unclean water).

Increased investment, including private investment,³⁰ in water and sanitation infrastructure would seem to be a matter of urgency, particularly in rural areas (just 42% and 27% of people living in rural areas of sub-Saharan Africa have access to clean water and sanitation, respectively).

b) *Weak institutional capacity for land and water management*

The weakness of institutions, particularly those involved in the management of land and water resources, could aggravate the health impact of climate disruption.

- The *development of spontaneous human settlements*, particularly on *flood plains*, exposes inhabitants to increased risk. Yet, in sub-Saharan Africa, slum residents constitute 70% of the urban population (UN Habitat). These populations, which are already over-exposed to health risks (since mortality among children aged under 5 is twice as high in slums as it is in “normal” urban areas), seem especially vulnerable to climate disasters such as flooding caused by storms, or even rising sea levels or storm surges in coastal towns.
- Deforestation associated with uncontrolled agricultural development and urbanization also increases the risks of flooding, as well as their direct and indirect impact upon public health.
- While there is an upward trend in the frequency of drought episodes, unregulated drilling and the diversion of watercourses is undermining river basin management.
- In a context of growing water stress, the absence (or non-implementation) of regulations covering the use of waste water or contaminated water is increasing the risk of the transmission of water and vector-borne diseases.

What is the way forward?

a) *Integrating climate risk into strategies designed to bolster health systems at the national and international level*

²⁹ Angel Gurria, (December 2007), *Water—A Global Challenge and a Priority for the OECD*, Water Resources Development, Vol. 23, No. 4.

³⁰ While private involvement in infrastructure is increasing more rapidly in Africa than on other continents, the proportion for the water and sanitation sector (over the period 1990-2003) was under 1%.

Climate-sensitive diseases (malaria, malnutrition, diarrhoea and pneumonia) and climatic disasters feature among the main causes of death in Africa. Thus, climate change is likely to significantly increase the challenges and burdens placed upon health systems that are already unable to cope. Under these circumstances, it becomes essential to accurately evaluate the health impact of climate risks and to prepare strategies for adaptation.

- African governments should evaluate the threat that climate change poses to health, assess the additional burden placed upon health systems and implement strategies for adaptation.
- The international community should prepare an action plan for the reinforcement of WHO technical support given to the evaluating and adapting to the health impact of climate change.

b) *Improved management of land and water resources*

Many measures liable to attenuate the health impact of climate disruption fall outside the field of health. Land resource management measures that reduce deforestation and protect the integrity of catchment basins and coastal areas can limit the health consequences of flooding and mudslides – particularly contamination associated with overflowing drainage networks. Rigorous land occupation plans, adequate town planning codes and the construction of dykes and dams can also limit the damage caused by floods or gales. The propagation of infectious diseases can also be reduced by reinforcing the regulatory framework designed to ensure the safe use of additional water resources -- wastewater, domestic waste water and foul water.

- *African health ministries should co-ordinate their work with other ministerial departments* and involve them in efforts to evaluate the health impact of climate change and implement adaptation strategies. On a regional level, *the pan-African land policy framework should be strengthened*.
- The development partners should take further action in the field of access to water and health, including using ODA as a catalyst to increase private sector investment in this area. *Support for the Rural Water and Sanitation Initiative should be increased*.

c) *Early warning systems against climate and health risk*

Africa now possesses various systems for monitoring seasonal climate change and warning against the risk of flooding or drought. These systems have traditionally been used for agricultural planning. The task now is to adapt them and to ensure that they are used more widely to prevent and reduce disasters risks and to monitor diseases associated with the climate, particularly malaria, Rift Valley fever and cholera.

- ***African governments should establish warning systems against disasters and epidemics***, as some countries have already done. ***Sub-regional organisations could support the collection and sharing of climatic, environmental and health data, as well as the definition and implementation of adaptation programmes***, along the lines of the work carried out by the SADC. Clim-Dev Africa (the climate information programme for development established by the AU, ADB and ECA) and the new African Centre for Climate Policy Studies should play a major role in bolstering regional and sub-regional capacities in this field.
- ***Development partners should focus their support in this field at the regional level***, facilitating the pooling of the technical resources needed to develop climate-related environmental and health risk prevention programmes. ***Support for Clim-Dev and the African Centre for Climate Policy Studies constitute priorities.***

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FOCUS ISSUE 5: PEACE AND STABILITY

5.1 The social impact of climate change in Africa

Global attention is beginning to focus on the repercussions climate change may have on peace and security in Africa. African leaders first expressed their grave concern about the impact of climate change on the development of their continent at the African Union Summit in January 2007. Three months later, the UN Security Council (UNSC) held its first-ever discussion specifically focused on the linkages between climate change, energy and security. UN Secretary General Ban Ki-Moon told the Council that projected climate change will not only have serious environmental, social and economic impacts, but also implications for peace and security. The debate came in the wake of the second of four reports by the Intergovernmental Panel on Climate Change (IPCC), which warned of the potentially destructive impact of global warming, especially in the poorest and most vulnerable regions.

According to the most-recent IPCC report, “Africa is one of the most vulnerable continents to climate change and climate variability, a situation aggravated by the interaction of “multiple stresses” occurring at various levels and low adaptive capacity”.³¹ These stress factors -- poverty, unequal access to resources, food insecurity, weak institutions, very high demographic trends, conflict and a high incidence of disease -- will further undermine Africa’s capacity to adapt to climate change. At the same time, climate change may trigger or deepen social tensions by increasing competition for scarce land and water resources and by augmenting migration flows. As a consequence, risks to peace and stability will increase -- particularly in fragile states. The dynamics of these destabilizing factors, particularly as they relate to peace and security, are briefly set out below.

a) Increased competition for limited natural resources

Water is already a scarce commodity in Africa. At the present time approximately 25% of Africa’s population faces high water stress:³² this number may well increase due to climate change.³³ The World Bank forecasts that some 600 million people will be affected by water shortages by 2025 due to a combination of high demographic trends,³⁴ increases in water consumption, changing rainfall and evaporation patterns linked to climate change and inadequate adaptation efforts.

Already in 1999, the UN Environmental Program (UNEP)³⁵ warned that the main source of conflict in Africa during the next 25 years could be over that most precious of commodities – water.³⁶ Episodes of violence have already happened in a number of countries in Africa, including:

³¹ Climate change 2007, impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change . (Cambridge University Press, 2007), pp 433-67 at p.435.

³² The term water stress describes a situation in which each person in a country has access to less than 1,500 cubic metres of water every year. In cases of water scarcity, this amount is reduced to 1,000 cubic metres.

³³ Cf. note 1

³⁴ The UNFPA State of World Population 2007 asserts that the total African population will grow from 945.3 million people to 1.937 million in 2050.

³⁵ UNEP Press release: <http://www.worldwaterday.org/wwday/1999/press.html>

³⁶ BBC Reportage <http://news.bbc.co.uk/1/hi/world/africa/454926.stm> 1999.

- The Marsabit district of northern Kenya, where long-running disputes among two pastoralist communities over water and pasture lands turned violent between May and August 2005, killing hundreds of people and displacing thousands³⁷.
- In northern Nigeria³⁸ and Kenya,³⁹ where rising desertification caused by climate change e.g. longer dry seasons and shorter rainy seasons is reducing the availability of cultivable land, leading to increasingly violent clashes between herders and farmers over land and water resources.

The June 2007 report “*Sudan: post-conflict environmental assessment*” by the United Nations Environment Programme (UNEP)⁴⁰ concluded that the conflict in Darfur has, in part, been driven by changes in the Sahel climate over the last 30 years, as well as environmental degradation. The scale of climate change as recorded in Northern Darfur is almost unprecedented: the resulting desertification has added significantly to the stress on traditional agricultural and pastoral livelihoods

Finally, climate change mitigation entails a shift towards new fuels for energy production. This may have consequences for security: new resources such as uranium may attain strategic status, and this could result in new conflicts over access to and control over these resources. At the same time, renewable resource fuels such as bio-ethanol may compete (or be perceived as competing) with food production for scarce resources such as land and water. Such competition could well result in resentment and/or conflict in marginalized groups.

b) Adverse spillover effects related to migration and population displacement

Increasing environmental pressures, linked to conflict and/or resource constraints, have already been linked to migration on the continent. Already in 1990, the IPCC warned that the greatest single impact of climate change will be on human migration.⁴¹

Environmentally induced migration is projected to increase substantially, which will place significant new burdens on migrant-receiving areas, generate additional environmental and socio-economic pressures in both sending and receiving areas, and could contribute to conflict in particular areas. In the Sahel region, environmental factors contribute to patterns of vulnerability that exacerbate migration. Desertification and decreasing soil fertility lead to decreased farm yields and decreased household incomes. Outward migration, mostly by young, healthy males seeking additional livelihood opportunities in areas with less environmental problems, changes the lives of those remaining in the source areas. Elderly people, children, and women remain behind. Women are left to manage both livelihoods and maintenance of the family – some women in the Sahel must walk up to 25 kilometers a day to fetch

³⁷ United Nations University-Environmental and Human Security Institute (UNU-EHS).

³⁸ Human Development Report 2007/2008 – Occasional paper, Climate Change and forced migration: Observations, projections and implications Oli Brown 2007/17, page 8. As the desert advances in Northern Nigeria, farmers and herders are forced to move, either squeezing into a shrinking area barely viable, or into already overcrowded cities.

³⁹ Oxfam relates climate change to drought and conflict in northern Kenya, in turn leading to conflict between the Turkana pastoralists and their neighbours.

⁴⁰ June 2007 report “*Sudan: post-conflict environmental assessment*” by the United Nations Environment Programme (Nairobi : UNEP, 2007).

⁴¹ According to the International Organisation for Migration (IOM), the current global migrant population amounts to 192 million people, or 3 percent of the world’s population.

water.⁴² Many children are unable to attend school – they are needed (especially in the absence of men who have migrated) to work at home. Women and children left behind, human rights experts have noted, are more vulnerable to human trafficking and other patterns of forced migration. Thus, worsening environmental conditions interact with complex underlying factors and migration in ways that pose a threat to human security in Africa⁴³.

Box 1: Field research as part of European Commission funded Environmental Change and Forced Migration Scenarios (EACH-FOR) project

Preliminary findings of research on environmental migration suggest a correlation between water-related factors and migration.

- In **Egypt**, water shortages are a major environmental challenge. Historically, migration resulting from desertification and water shortage was inter-generational, occurring over long periods of time. This migration affected sharecroppers and poorer people: landowners resisted migrating even if environmental conditions were poor. Today, however, most people affected by desertification are displaced by government fiat, becoming 'environmental migrants'. Without the government, there is little option for poorer households to afford leaving affected zones.
- In **Mozambique**, where flooding is a significant environmental concern, aid-supported government programs resettle people in accommodation centers away from flood plains, where flooding endangers human life. Accommodation centers provide food, basic infrastructure and essential health services but they often face water shortages. After resettlement, displaced people face two principle challenges: livelihoods and water scarcity. The flood plains are the source of livelihoods for the predominantly agrarian population of the area. Depending on the distance to their fields, some farmers travel daily to their plots; others stay 4-5 days during the week, and some remain for several months. This worker flow from resettlement centers to the field is composed mainly of young women and men who typically leave their children and elderly relatives behind.
- By comparison, in the **Mekong Delta of Vietnam**, where multiple natural and man-made environmental stresses interact in fragile ecosystems, people cope in a number of ways. Preliminary research about these migration-related coping mechanisms indicates that during the seasonal flood season, people migrate towards urban centers to bolster livelihoods. Successive flooding events leading to destruction of crops on more than one occasion can drive people to migrate elsewhere in search of an alternative livelihood. The government is currently undertaking planned resettlement of people living in vulnerable zones along river banks, as part of a flood management and environmental sanitation strategy.

Source: UNU-EHS, Institute for Environment and Human Security.

⁴² Human Development Report 2007/2008 – Occasional paper, Climate Change and forced migration: Observations, projections and implications Oli Brown 2007/17, page 8.

⁴³ The *Stern Report* predicts that 200 million people will migrate by 2050 due to environmental causes. This figure is based on a figure calculated by Norman Myers. In 1995, Dr. Myers suggested that between 150 and 200 million people would have to permanently leave their homes because of climate change (Norman Myers and Jennifer Kent, *Environmental Exodus*, Climate Institute, 1995). This was quoted last year in the UK Government's *Stern Review on the Economics of Climate Change*, which described the estimate as being based on "conservative assumptions". Dr. Myers now believes that the true figures will be closer to 250 million "Christian Aid interview", 14 March 2007. Estimates of the number of environmentally displaced people in the coming decades range from 24 million to almost 700 million. However, it is important to note that those figures have not been rigorously tested.

While natural disasters triggered by climate change such as floods, droughts and violent storms⁴⁴ may displace large numbers of people for relatively short periods of time, the steady impact of climatic drivers are likely to permanently displace many more people in a less visible way. For example, a sea level rise (from melting polar icecaps) of just one meter in the Nile Delta of Egypt -- one of the most densely populated areas of the world -- may gradually, yet inexorably, displace up to six million people and flood 4,500 square km of farmland.⁴⁵ Even smaller rises in sea level could result in sea-water intrusion into freshwater deltas and coastal groundwater reservoirs, making living and farming difficult or unviable in some of Africa's great and densely populated deltas.

Box 2: FINCA/AIG: Providing microcredit-based life insurance for vulnerable populations in Uganda

The context/problem Climate change impacts from floods, droughts, crop failure or desertification greatly increase the risks that already vulnerable populations fall deeper into poverty. In particular, the death or disability of a breadwinner from disease can devastate a family's livelihood. In developed nations, life insurance is a tried and true mechanism to relieve this financial burden, providing cash benefits to meet short-term financial obligations. In the mid 1990's, FINCA International (a provider of financial services to the world's micro-entrepreneurs) and AIG (a global leader in insurance services) identified an opportunity to bundle term life-insurance coverage to the microloans that FINCA was providing to its clients in Uganda...and micro-insurance was born.

What was done to address the situation Today, every microloan that FINCA Uganda makes to a client is automatically linked to a term life insurance policy that provides a range of benefits. In the case of the death of the borrower or spouse, the policy provides for the loan to be paid off entirely. In addition, the policy pays a death benefit and provides cash towards funeral expenses to the family if the borrower, spouse or any one of four named dependents (typically children) dies. In other countries in which FINCA provides micro-insurance, the policies also provide an education allowance to ensure that school-aged children can continue to study.

FINCA's loan/insurance scheme in practice Mr. Adriko, a Ugandan, 20 years old, didn't know his mother had insurance until she was killed in a car accident in 2005. She had taken out a microloan from FINCA to develop a business selling produce that included the term life insurance policy. Because of the policy, Mr. Adriko received a payment of about \$650, which he could use to take care of his family. A successful partnership to date, FINCA and AIG are now working to diversify the insurance products they offer. New products under development include short-term disability and health insurance.

What were the crucial elements/dynamics that led to the successful outcome? FINCA and AIG's rollout of microinsurance products, first in Uganda and now around the world, was been successful because of both parties commitment to providing financial services to the world's poor. FINCA and AIG also have taken great care to ensure that the financial products they provide are financially-viable, capable of delivering both social goods to the community and a monetary return to the two organizations.

Source : Bob Price, Corporate relations, FINCA Village banking, bprice@vilagebanking.org.

It is estimated that drought, desertification and other forms of water scarcity will affect as much as one-third of the world's population and could prompt large numbers of people to leave affected areas to secure their livelihoods. Current projections of temperature and sea-level rises and increased intensity of droughts and storms suggest that population displacement on a large scale will take place within the next

⁴⁴Human Tide: the real migration crisis, a Christian Aid report, May 2007. It is foreseen that 50 million people, between today and 2050, will be displaced due to natural disasters.

⁴⁵ Human Development Report 2007/2008 – Occasional paper, Climate Change and forced migration: Observations, projections and implications Oli Brown 2007/17, page 8.

30–50 years, particularly for people living in coastal zones.⁴⁶ Although constituting only 2% of the total land surface of the earth, these regions at present host 10% of the world's population and 13% of its urban dwellers.⁴⁷

Migration flows will take varying forms. Most of the movements will be within national borders, from rural communities -- where people's lifestyles have been completely transformed by climate change - to urban areas where more promising livelihoods are possible. These migration flows will exert additional resource pressures on migrant-receiving zones, which are likely to be located in the poorest countries. Thus, environmental migration will tend to accelerate urbanization, exacerbating urban poverty, conflict and, probably, criminality.

Though Africa is predominantly rural, it is the continent with the fastest rate of urbanization – growing by almost 5% each year.⁴⁸ Climate change is likely to be an increasingly important factor contributing to rapid and unplanned urbanization, with serious implications for urban welfare and public service delivery as well as broader public security and social stability. History has shown that only relatively prosperous and politically stable countries have been able to peacefully manage rapid urbanization.

**Box 3: Appropriate Development, Architecture and Planning Technologies (ADAPT):
Addressing Pressures of Urbanization and Migration with Energy-Efficient Housing**

The context/problem: The majority of housing in Egypt's major cities is of poor quality, build by local masons or the residents themselves up until the 1990s. The stock of urban housing has not been able to keep up with the steady increase in population and growing migration flows from rural to urban areas. Increasingly, low-income families are excluded from the urban housing market, forcing them to live in often decrepit shantytowns outside major cities.

What was done to address the situation: ADAPT is working with low-income communities to meet urban housing demand in a sustainable way. Under the direction of ADAPT's founder, Hany El Miniawy, community members acquire and develop local building materials that are environment-friendly and – because they are composed of readily available “ingredients” readily found in the local habitat -- virtually cost-less. The organization uses regional clay, sand, or stone mixed with recycled waste materials like rice, straw, cement, brick dust or iron ash to create original and effective building materials, rather than mass-produced and often expensive red bricks or reinforced concrete. All new mixes are tested and approved for safety and durability. ADAPT also trains local youth on how to produce the composite mix, use brick presses, and construct housing using the bricks they have produced. In addition to work on the ground, El Miniawy and ADAPT collaborate with universities and building research entities to disseminate their building concepts and technologies to students of architecture and planning. ADAPT works with the local government and community in each region to advance its concept and vision. The organization tailors its goals and projects to each community, adapting to the unique resources of individual regions.

Source : Iman Bibars and Manal Adel – ADAPT Cairo, Egypt.

Migration presents new challenges to conventional approaches to climate change adaptation, immigrant integration and conflict prevention. A key variable that needs to be borne in mind is that migrants are not

⁴⁶ “Control, adapt or flee, how to face environmental migration?” by Fabrice Renaud, Janos J. Bogardi, Olivia Dun, Koko Warner, UNU-EHS and EACH-FOR. InterSecTions N. 05/2007

⁴⁷ Ecosystems under pressure: A policy brief for the International Commission on Climate Change and Development, January 2008, UNU-EHS, SEI, Stockholm Resilience Center.

⁴⁸ UN-HABITAT “Urbanization: Facts and Figures”.

www.unhabitat.org/mediacentre/documents/backgrounder5.doc March 2007. Already 49% of the world's total population lives in cities and the growth rate of urban habitants nearly doubled that of total population growth.

always easily accepted by the host community, in particular where land and water resources are already scarce and there is widespread sentiment that migrants are creating additional resource pressures. While migration in itself does not incite conflict, the context in which it takes place and the political response to it plays an important role in shaping the risks of conflict.

c) *Climate change impacts on fragile states: rising conflict risks*

Although the number of wars has been declining in Africa, the risk of renewed outbreaks remains high in many regions and countries on the continent. Overcoming this considerable challenge to Africa's development has become even more complex with the advent of climate change. Climate change is likely to overstretch many societies' adaptive capacities and weaken and destabilize societies, leading to social unrest and violence.⁴⁹ The risk of conflict is commensurately more acute in countries in transition, which are characterized by poorly performing institutions and governance systems.

Even if the linkage between environmental stress and fragility is not a direct one, it is fundamental to consider their interaction. State capacity and governance are keys to prevention and management of conflict risks. Because climate change will further weaken and destabilize societies, fragile states will be at a greater risk of conflict, which could in turn become violent.

Furthermore, conflicts which may initially be limited to the local and national level often have destabilizing effects on neighboring countries as well, through refugee flows, arms trafficking or combatant withdrawal. Thus, the social impacts of climate change can transcend borders, swiftly expanding the geographical extent of crisis and conflict regions. The German Advisory Council on Global Change (WBGU) says that, with regard to the Sahel zone, "climate change will cause additional environmental stress and social crises in a region already characterized by weak states, e.g. Somalia and Chad, civil wars, e.g. Sudan and Niger, and major refugee flows (more than 690,000 people in Sudan and more than 390.000 in Somalia)".⁵⁰

While global warming is not a cause of conflict per se, it is a **multiplier** that increases the potential for conflict, in particular with regard to weak countries and societies in transition. Climate change is expected to accelerate some of the processes known to cause localized or low-level violence, such as urbanization and competition over land or water. The scope for conflict risks in Africa is real: 24 of the 46 countries on International Alert's list of countries at high risk for violent conflict are in Africa, and 13 of the 56 countries at high risk of political instability are also in Africa.⁵¹ A large number of these countries are exposed to climate change impacts – either directly, or through close proximity to neighboring states. When the effects of global warming e.g. competition for scarce resources, migration pressures -- are coupled with other stresses in fragile states such as poverty, high population growth and density, resource scarcity and a low level of economic development, conflict risks can quickly escalate.

5.2 What has been the response of the international community?

The international community, as well as individual countries, have taken initial steps to consider climate change's impact in Africa, in particular as regards environmental migration and security.

⁴⁹ German Advisory Council on Global Change (WBGU), 2007. *World in Transition: Climate Change as a Security Risk*. London and Sterling, VA: Earthscan.

⁵⁰ Ibid.

⁵¹ International Alert : "A climate of conflict", the links between climate change, peace and war". Dan Smith and Janani Vivekananda, November 2007.

- In April 2007, the United Nations Security Council held its first-ever debate on the impact of climate change on security. The meeting examined the relationship between energy, security and climate. Participants observed that climate change multiplies the potential for conflict, that migration is the most important stress factor and that the emerging issue of “environmentally induced migration” needs to be addressed. However, the meeting did not issue any resolution or statement.
- The EU Council in June 2007 invited the High Representative and the European Commission to present a report on the impact of climate change on international security by spring 2008.

In a larger sense, while the linkage between security and climate change is increasingly recognized, little has been done internationally to understand and respond to environmentally-induced migration as a result of climate change. The key issues here are an absence of protection under international law for environmental migrants and the disconnect between policies to address migration, environmental change and climate change adaptation.

The needs of environmentally induced migrants are not addressed through either international refugee or immigration policy, and there are no provisions protecting the rights of environmentally induced migrants in international law.⁵² Although the UN Security Council debate has finally brought the issue to centre stage, and a number of UN agencies are collaborating together on this issue,⁵³ environmentally induced migration continues to be treated separately from climate change’ adaptation. For example, the Africa-EU Summit in Lisbon adopted an Africa-EU Partnership on Climate Change⁵⁴ and separately an Africa-EU Partnership on Migration, Mobility and Employment.⁵⁵ Both of these agreements will be implemented on separate tracks.

Although National Adaptation Programs of Action (NAPAs) are intended to identify a limited number of immediate priority adaptation projects, it might be best in future to include issues such as migration and security (see Fact Box on NAPAs). Migration issues should be addressed as well in (Sub-Regional Action Programs (SRAPs). Finally, Poverty Reduction Strategies (PRSs) should have a migration component or be migration-sensitive in order to effectively tackle the causes of migration (sustainable land management, etc).

It is increasingly evident that efficient migration management policies can contribute to the adaptation capacities of vulnerable countries/communities – and migration policies at international, regional and continental level are gathering momentum.

- From the African side, and at the continental level, the African Common Position on Migration & Development⁵⁶ refers to the impact that unregulated migrant flows can have on national and international stability and security, including creating tensions between origin, transit and destination countries and within local host communities. At the regional level, the 33rd Summit of Heads of State

⁵² The term “environmental refugees” was first used by El-Hinnawi, E. (1985). *Environmental Refugees*. Nairobi: UNEP. Currently IOM has provided a working definition of “environmental migrants”.

⁵³ Including the IOM/UNFPA workshop in Bangkok in April 2007 that considered linkages between migration and environment change.

⁵⁴ The partnership aims at building a common agenda on climate change policies and cooperation, and collaboration to address land degradation and increasing aridity, including the “Green Wall for the Sahara Initiative”.

⁵⁵ The partnership aims at implement the Declaration of the Tripoli Conference on Migration and Development, the EU-Africa Plan of Action on Trafficking of Human Beings; implement and follow up the 2004 Ouagadougou Declaration and Action Plan on Employment and Poverty Alleviation in Africa.

⁵⁶ Endorsed by the Executive Council at the AU Summit in June 2006 in Banjul, Gambia.

and Government of the Economic Community of West African States (ECOWAS) recently adopted a common approach on migration.

- At the UN level, the High-Level Dialogue on International Migration and Development (HLD), which took place in the margins of the September 2006 General Assembly on Africa, concluded *inter alia* that migration needs to be better integrated into development policy and planning, that countries need to have migration policies and the internal capacity to develop them, that the business community needs to be drawn into the migration debate and that regional consultations are key for international understating and action.

5.3 What further steps are needed?

Rapid implementation of climate adaptation efforts A number of straightforward measures, such as the rapid implementation of adaptation strategies in the infrastructure, water management, energy and agriculture sectors would go far to diminish the social impact of climate change. A regional approach is fundamental, as many adaptation strategies for agriculture, infrastructure and energy are best developed at the regional or sub-regional level. This is equally true for migration management policy. Capacity-building for the African Union (AU) and the Regional Economic Communities (RECs) is important in order to enable them to take a leading role.

Strengthen climate information systems It is important to expand global information and early warning systems to ensure they provide data regarding weather events and patterns and how this data intersects with key variables such as potential environmental migration flows, fragile state contexts, and rural/urban movements. In particular, the Continental Early Warning System (CEWS), currently being implemented, could be enhanced with additional climate change and migration indicators

Integrate migration and adaptation to climate change in development strategies. The international community needs to better understand and address the significance of the migration and climate change nexus for human security and development. This is especially important with regard to the long-term effect of gradual environmental degradation and the impact of land-degradation on societies. The limited availability of data on migration in general, and on the interaction between climate change, environmental degradation and the movement of people in particular, constitutes a key challenge that needs to be addressed. The policy focus should be on conflict prevention.

At the same time, sustainable development policy needs to be climate sensitive, and peace building and state building strategies must take into account climate change and adaptation (water management, agriculture, and disaster prevention). This will enable local populations to successfully adapt to the effects of climate change and will also significantly reduce the risk of violent conflict. Conversely – because of the strong links between climate change adaptation and development issues, the current high levels of awareness on climate change and its consequences could be used as a driver for the mobilization of resources for sustainable development, and for raising awareness about the sustainability of current development efforts.

Implications for security policy Given that classic security policy cannot respond adequately to these new threats to international stability, climate policy and strategies for adaptation to climate change are emerging as key elements of preventive security policy. The stabilization of weak and fragile states is also critical to prevent violent conflict, as an effective development policy is the best preventive security policy. The OECD DAC Fragile States Group and DAC Network on Conflict, Peace and Development Co-operation are looking at including climate change issues among their work priorities. Classic security policy can already begin to plan for a situation where new energy resources are strategic, and prepare for

the peaceful handling of conflicts over such resources. Overall, the global nature of the climate change issue, and the need for international co-operation to obtain mitigation and adaptation, should be viewed not only as a stress factor for the international system, but also as an opportunity for increasing co-operation and problem-solving internationally and regionally.

Securing legal protection for environmentally induced migrants There is also a need to improve legislation with regard to environmentally induced migrants and their recognition, through a separate convention or anchor it in Intergovernmental Environmental Treaties.⁵⁷

Strengthening international co-operation and collaboration In the future, partnerships between UN agencies would be useful. The implementation of the Africa-EU Partnership on Climate Change and Migration⁵⁸ should also look at synergies and adopt a coordinated approach.

In conclusion, the priorities for the wider international community, in view also of the forthcoming TICAD IV meeting, which has a cluster on “Human Security”, and the next session of the High Level Dialogue on Migration, are:

- To increase support for capacity-building of the AU & RECs as well as at national level with regard to climate information, early warning systems and related response capacity;
- To support the development and availability of data on migration in general, and on the interaction between climate change, environmental degradation and the movement of people and to raise worldwide public and political awareness on these issues;
- To support the stabilization of weak and fragile states by making development strategies climate and migration sensitive;
- To look into the possibility of providing a legal protection framework for environmentally-induced migrants.

And with regard to Africa:

- To include climate change and migration indicators into the AU Continental Early Warning System and similar regional warning systems;
- To build its capacities at continental, regional and national levels, to reinforce regional co-operation and minimize the potential for conflict – or maximize the opportunities for peace and human security – at the inter-country, regional, and local level.

⁵⁷ For the full set of recommendations, “Control, adapt or flee, how to face environmental migration?” by Fabrice Renaud, Janos J. Bogardi, Olivia Dun, Koko Warner, UNU-EHS and EACH-FOR. InterSecTions N. 05/2007.

⁵⁸ The Africa-EU Joint Strategy was approved at the Lisbon Summit in December 2007 and the First Action Plan for the implementation of the new Africa – EU Strategic Partnership identifies, in the initial period 2008-2010, eight selected priority actions, all of which have a positive impact on the daily lives of the citizens of Africa and Europe. The Africa – EU Partnership on Climate Change and the Africa – EU Partnership on Migrations, Mobility and Employment are among those eight.

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FOCUS ISSUE 6: FINANCING AND FINANCING MECHANISMS

6.1 Adaptation costs in the developing world

In a world of rapid climate change, estimating adaptation costs is very difficult. First, climate change affects all sectors making it difficult to separate adaptation from general development. Second, it is increasingly difficult to extrapolate future impacts of climate change from past patterns -- making any estimate of the costs of adaptation highly speculative. With these important caveats, there have been efforts to estimate the costs of adaptation. These are briefly summarized below:

- The first estimate is based on preliminary calculations by the World Bank of the additional cost to adapt or climate-proof new investments financed each year by development aid, domestic resources and foreign direct investments. For all yearly investments in the developing world estimated at about USD 2 trillion the majority of which are domestic investments, and assuming that the percentage of these investments that are sensitive to climate risk vary between 5-20%, total yearly adaptation costs are estimated to range from USD 4 to 37 billion each year. A recent update by UNDP⁵⁹ using 2005 as a base year put the mid-range of the costs of adaptation at about USD 37 billion each year;
- The second estimate comes from an analysis by the UNFCCC⁶⁰ using a sectoral approach. For the world as a whole, it was estimated that additional investments needed for adaptation in 2030 could be as high as USD 170 billion, a large share of which is accounted for by infrastructure. The costs for developing countries are estimated at USD 57 billion and could be as high as USD 100 billion per year several decades from now;
- Extrapolating from the submitted National Adaptation Plans of Action (known as NAPAs), Oxfam⁶¹ estimated that the costs of adaptation for all developing countries at USD 33 billion.

While there is considerable debate as to the value of these estimates, they provide a useful order-of-magnitude against which current available resources for adaptation in developing countries can be considered.⁶² While private sources of funding can be expected to partially cover adaptation costs -- particularly in agriculture and fisheries where assets are generally privately owned, public resources are expected to play a predominant role in all sectors.

6.2 Assessment of current adaptation financing mechanisms

External development partners have begun funding adaptation in developing countries, but available resources are very modest relative to needs. Several bilateral donors have started to support developing countries in integrating adaptation into their national development strategies. However, it is currently not possible to know the magnitude of resources provided by donors to support adaptation because these ODA flows are not yet reported in a systematic way.

⁵⁹ UNDP, Human Development Report (2007), pp. 192-95.

⁶⁰ UNFCCC, Report on the Analysis of Existing and Potential Investment and Financial Flows Relevant to the Development of an Effective and Appropriate International Response to Climate Change, (2007).

⁶¹ Oxfam, Adapting to Climate Change - What's Needed in Poor Countries, and Who Should Pay? Oxfam Briefing Paper, May 2007.

⁶² Joint efforts are under way by the World Bank, the UK and the Netherlands to develop new methodologies for assessing the benefits and costs of planned adaptation and to help classify adaptation measures according to the level of priority.

At the multilateral level, funding for adaptation totalled around USD 50 million between 2001 and 2006, mainly channelled through the Global Environment Facility (GEF). Four international funds have been set up under the UNFCCC and Kyoto Protocol mechanisms for mobilising climate adaptation finance in developing countries:

- a) The *Least Developed Countries Fund*, which relies on voluntary contributions and operates under the GEF since 2001, addresses LDCs' immediate adaptation needs;
- b) The *Special Climate Change Fund*, also funded by contributions and operational under the GEF since 2005, was designed for funding adaptation planning in and technology transfer to developing countries;
- c) The *Strategic Priority on Adaptation* was set up by the GEF and funded by USD 50 million from GEF Trust Funds as a three-year pilot capacity-building facility; and
- d) The *Adaptation Fund*, which is not yet operational, will help fund adaptation measures in developing countries, using a 2 % levy on carbon credits generated under the Clean Development Mechanism (CDM).

As shown in Table 1, actual funding from these adaptation funds remains insignificant -- even if cofinancing of GEF projects are included -- when compared to the magnitude of adaptation costs estimates described above. The Bali UNFCCC conference has requested the GEF to i) improve access to GEF funds for those countries that are particularly vulnerable to the adverse effects of climate change and ii) simplify and streamline application procedures. There will also be greater flexibility in the use of funds for adaptation and a diversification of projects away from a strong focus on energy conservation and efficiency and renewable resources.

**Table 1: Pledges to and Approved Funding by International Adaptation Funds
(USD million)**

Fund	Total Pledged	Total Received	Total Projects Approved	Projects Approved for Africa	Countries
Least Developed Countries Fund	160	48	18	10	Eritrea, Niger, Malawi, Mauritania
Special Climate Change Fund	62	41	29	11	Tanzania, Ethiopia, Mozambique, Zimbabwe, Kenya
Adaptation Fund	-	-	-	-	To become operational soon
Strategic Priority of Adaptation	50	50	31	7	Two regional projects, Mozambique, Namibia
TOTAL	223	139	78	28	

Source: GEF, Financing Adaptation Action, 2007. Pledges and receipts are quoted from Oxfam (2007) using GEF information.

For the Adaptation Fund, current estimates project that the levy on CDM credits will be worth around USD 200-300 million currently and could reach USD 440 million by 2012. A long-standing issue regarding the management of the Adaptation Fund where China and the Group of 77 (G77) have expressed their discontent was partly resolved with the creation of an Adaptation Fund Board in Bali to supervise and manage the Fund under the authority and guidance of the Conference of the Parties and

with the GEF as trustee and secretariat. In light of this compromise, it is expected that the Adaptation Fund will be operationalised in the near future.

6.3 Carbon finance and the Clean Development Mechanism (CDM)

The United Nations Framework Convention on Climate Change (UNFCCC) entered into force in March 1994 with the stated objective to stabilise greenhouse gas (GHG) concentrations. The Convention divides countries into two groups: Annex I Parties, the industrialised countries who have historically contributed the most to climate change, and non-Annex I Parties, which include primarily the developing countries. The principles of equity and 'common but differentiated responsibilities' contained in the Convention require Annex I Parties to take the lead in reducing their greenhouse gas emissions. In Kyoto, Japan, in 1997, the Parties to the Convention negotiated a set of legally binding quantitative targets for 38 industrialised countries (including 11 emerging market economies). These targets, measured as a percentage change on 1990 levels, are to be achieved on average over the first five-year 'commitment period' of 2008-2012. The national emission targets range from -8% (e.g. for the 15 Member States of the European Union at that time) to +10% (Iceland), with the total reduction adding up to around -5%. All countries that have now both ratified the Kyoto Protocol and are listed in Annex B⁶³ to the Protocol are therefore legally bound to limit their national emissions to the specified target levels, on average over the period 2008-2012.

Based on the principle that the effect on the global environment is the same regardless of where GHG emissions reductions are achieved, countries may meet their targets through a combination of domestic activities and mechanisms under the Kyoto Protocol which are designed to allow Annex I countries to meet their emission reduction targets. Under the Kyoto protocol, several new market-based instruments have emerged that are designed to deliver cost-effective greenhouse gas emissions reductions. The remainder of this section describes the basic elements and dynamics of carbon finance arrangements, beginning with a brief introduction to the Carbon Market which describes the overall framework under which the CDM functions. Subsequent sections discuss a range of issues and constraints faced by many developing countries in developing and implementing CDM projects, and actions that could be taken to facilitate greater access to CDM credits.

a) The carbon market – structures, participants and recent trends

Carbon credits are a key component of national and international emissions trading schemes that have been implemented to mitigate global warming. They provide a way to reduce greenhouse effect emissions on an industrial scale by capping total annual emissions and letting the market assign a monetary value to any shortfall through trading. Credits can be exchanged between businesses or bought and sold in international markets at the prevailing market price. Credits can be used to finance carbon reduction schemes between trading partners and around the world as part of commitments by governments to reduce emissions through the 1992 UN Framework Convention on Climate Change and its 1997 Kyoto protocol.⁶⁴ Carbon transactions are “purchase contracts” whereby one party pays another

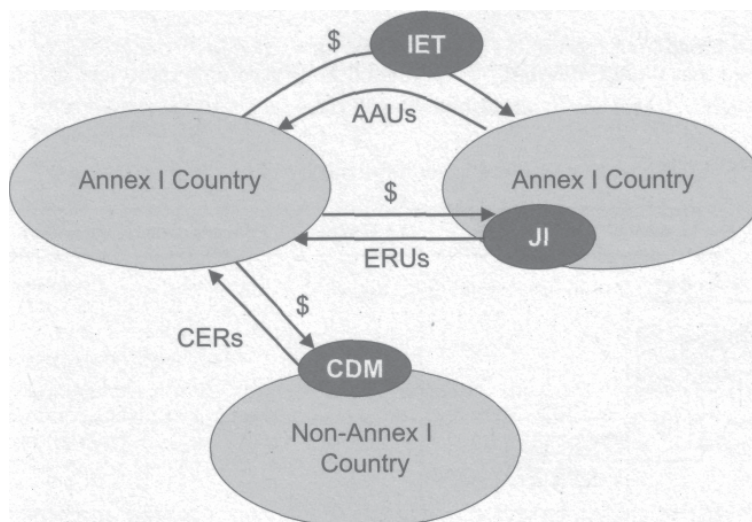
⁶³ Annex B Parties refer to the Kyoto Protocol while Annex I Parties refer to the Convention; the two lists are very similar: Annex B comprises all Annex I countries with the exception of Belarus and Turkey, plus Croatia, Liechtenstein, Monaco and Slovenia, which are not listed in Annex I. All Annex B countries have ratified the Kyoto Protocol with the exception of the United States.

⁶⁴ Under the Kyoto Protocol, signatory countries agreed to reduce emissions by 5.2% below 1990 emissions during the period 2008-2012, known as the first commitment period.

party for GHG emissions reductions or for the right to release a given amount of GHG emissions that the buyer can use to meet its commitment.

There are three mechanisms also known as the Kyoto Protocol Flexibility Mechanisms (see Figure 1). The first two, the Clean Development Mechanism (CDM) and Joint Implementation (JI) involve projects that reduce GHG emissions, thereby generating carbon credits that can be sold on the carbon market. JI projects come from within Annex I countries (known as Parties) – JI carbon credits are known as Emission Reduction Units (or ERUs) -- whereas CDM projects are established in developing countries (non Annex I countries) and generate what is known as Certified Emission Reductions (CERs). The third mechanism, known as the International Emissions Trading (IET) allows Annex I Parties to exchange among themselves carbon credits known as Assigned Amount Units (AAUs). In the EU-ETS system, AAUs are exchanged into EU Allowances (EUAs). All of these different units (ERUs, CERs and EUAs) are effectively “permits” allowing an Annex I Party to emit one tonne of carbon dioxide equivalent (1 tCO₂e).

Figure 1: Kyoto Mechanisms



Source: UNEP, Guidebook to Financing CDM Projects, 2007

Carbon transactions can be grouped into two main categories: i) *allowance-based transactions*, where the buyer of emission credits purchases allowances created and allocated under cap-and-trade regimes, such as the European Union Allowances under the European Union Emissions Trading Scheme (EU ETS); and ii) *project-based transactions* in which the buyer purchases emission credits from CDM and JI projects. The EU ETS is the largest emission trading scheme in operation (see Box 2). Other participants in the global carbon market include: i) the Japanese business federation through the Keidanren voluntary action plan set up in 1997 which currently covers 82% of industrial emissions in Japan, embracing 34 industries; ii) the Chicago Climate Exchange (CCX), a voluntary scheme based in Chicago, USA; iii) the Regional Greenhouse Gas Initiative (RGGI), a coordinated effort between seven U.S. Northeastern and mid-Atlantic states to implement a cap and trade program to limit GHG emissions; iv) the new Californian cap and trade scheme; and vi) power retailers and large consumers regulated by New South Wales (NSW/Australia) emissions regulations. Additional schemes are at various stages of being developed.

Box 1: The European Greenhouse Gas Emission Trading Scheme (EU ETS)

The EU ETS is currently the largest emissions trading system in operation. The system started operating in January 2005 and will run in two phases: 2005-07 and 2008-2012. During Phase I, the scheme covers about 11,500 plants or installations in five main sectors -- power and heat generation, iron and steel, mineral oil refineries, mineral industry (cement, glass, ceramics), and the pulp and paper sectors -- that account for approximately 45% of the EU's emissions, or over 2 billion tonnes of CO₂ emissions per year.

Within the so-called Burden Sharing Agreement framework, the EU ETS helps EU member states comply with their Kyoto Protocol commitments -- an 8% reduction in CO₂-e (CO₂ equivalent) emissions between 1990 (baseline year) and 2008-12. Each member state is responsible for allocating EU allowances (EUAs, equivalent to 1 tCO₂-e each) to the installations covered by the EU ETS in that country.

In order to allow companies to fully exploit their comparative advantages, the EU ETS allows companies to trade surplus EUAs between themselves. In this way, companies that are successful in reducing their GHG emissions beyond their target generate a surplus of allowances and can sell them to companies that do not meet their targets. This is known as *allowance-based trading*. In addition, companies are able to purchase CERs from CDM projects (and, from 2008 onwards, also ERUs from Joint Implementation projects) in order to achieve their targets (*project-based trading*).

Source: European Climate Exchange, www.europeanclimateexchange.com/default_flash.asp.

An additional source of demand for emission reduction credits is the growing market for voluntary emission reductions (VERs). Due to an increasing interest in the mitigation of climate change, environmentally-responsible actors, ranging from private individuals to public and private institutions, want to offset their own carbon emissions on a voluntary basis. For example, several large international banks are progressively becoming 'carbon neutral'. To meet this demand for VERs, a number of companies and organisations offer a variety of carbon offsets⁶⁵.

Although prices paid for VERs are generally lower than for CERs, the voluntary market, in some cases, represents a good alternative for certain emission reduction projects that are not eligible under the CDM. The rapidly expanding voluntary carbon market⁶⁶, because of lighter procedures, has historically served as a source of experimentation and innovation in the carbon markets. It is as well the market that is most accessible to poorer and smaller communities in developing countries. The voluntary over-the-counter (OTC) markets i) are currently the only source of carbon finance for forestry projects and ii) have a slightly higher proportion of credits sourced from Africa (6% vs. 3% for CDM). Moreover, the voluntary markets seem to be particularly hospitable for smaller offset projects. More respondents cited selling offset credits sourced from micro projects, generating less than 5,000 tCO₂-e, than any other project type. Around 36% of offset credits in the OTC market were sourced from projects less than 100,000 tCO₂-e. This finding suggests that voluntary markets have a potentially important role to play in contributing to sustainable development in smaller communities.

⁶⁵ Carbon or emissions offsets originate from activities in any developing country which has ratified the Kyoto Protocol and has in place a system to validate carbon reduction projects through one of the UNFCCC's approved mechanisms. Once approved, these units are termed Certified Emission Reductions, or CERs.

⁶⁶ Between 2005 and 2006 the over-the-counter (OTC) voluntary offset market also grew 200%. While volumes are small relative to transactions in the regulated carbon markets like the EU ETS, the combined voluntary markets (CCX+OTC) are larger in volume than both the Kyoto Protocol's Joint Implementation mechanism and the New South Wales Greenhouse Gas Abatement Scheme (see Table 1).

The combined carbon market grew in value to over USD 30 billion in 2006, or three times the value in 2005. Preliminary market surveys by Point Carbon and reported at the Copenhagen conference in mid-March show that the global carbon market expanded by 80% in 2007 from the previous year to USD 60 billion, with the total traded volume growing 64% to 2.7 billion tons. The strong growth in both value and volume indicates that a greater number of market participants believe the carbon supply-demand situation will become tighter in the future due to a shortfall in the supply of carbon credits available for trading. The market was dominated by the sale and re-resale of EU ETS and by project-based activities under the CDM. The voluntary carbon markets for GHG reductions by corporations and individuals reached USD 93 million (see Table 2).

Table 2: Carbon Markets Summary (2006)

	Volume (million of tCO₂-e)	Value (USD million)
Allowances-Based GHG Trading Schemes	1,121	24, 582
- EU ETS Trading Scheme	(1,101)	(24,357)
- New South Wales	(20)	(225)
Project-based transactions	508	5,477
- Primary Clean Development Mechanism	(450)	(4,813)
- Secondary Clean Development Mechanism	(25)	(444)
- Joint Implementation	(16)	(141)
- Other compliance	(17)	(79)
Voluntary markets	23	93
- Voluntary OTC Offset Market	(13)	(55)
- Chicago Climate Exchange (CCX)	(10)	(38)
Total	1,652	30,152

Sources: World Bank, State and Trends of the Carbon Market (2007) and Katherine Hamilton et al. State of the Voluntary Carbon Markets 2007 – Picking Up Steam

b) The Clean Development Mechanism

CDM projects in developing countries provide an option allowing Annex I Parties to purchase emission credits and help them comply with their commitments under the Kyoto Protocol. CDM investments are market-driven in the sense that prices and volumes of emission reductions are negotiated between individual buyers and sellers. In addition to providing Annex I Parties and their entities with access to cost-effective emission reductions, CDM projects are also supposed to promote sustainable development in developing countries. CDM project developers must comply with relatively strict rules and procedures (see Box 3). In an effort to reduce transaction costs for small-scale projects, special provisions have been adopted to simplify and streamline procedures. CDM procedures also contain a provision enabling project participants to bundle several projects of the same type (e.g. renewable energy) under a single project design document, thus allowing for cost savings because these activities can use the same baseline methodologies and reporting and monitoring procedures.

Box 2: The Clean Development Mechanism – Procedures and Key Stakeholders

The Clean Development Mechanism (CDM) is a mechanism whereby an Annex I party may purchase Certified Emission Reductions (CERs) which arise from projects located in non-Annex I countries. In order for a project to generate CERs, it must undergo a rigorous process of documentation and approval by a variety of local and international stakeholders. In addition to more conventional steps involved in the implementation of regular projects such as a feasibility assessment and development of a Project Design Document (PDD), CDM projects require: i) host country approval, ii) project validation, iii) registration, iv) emission reduction, v) verification and vi) credit issuance. Each of these steps involves detailed specifications and ancillary fees leading to the criticism of high transaction costs, particularly for countries with little experience in the process. For instance, the proposed project must provide real, measurable, and long-term benefits related to the mitigation of climate change using an approved baseline and monitoring methodology to be validated and then registered by the CDM Executive Board. One of the more complex components of validation is the fact that the proposed project must deliver reductions in emissions that are additional to any that would occur in the absence of the project activity. Verification of emission reductions must be performed by an external auditor. The UNFCCC has taken actions to simplify procedures and fees for small-scale projects and allowing regrouping of small-scale project under programmatic CDM projects to reduce transaction costs.

The key stakeholders involved in a CDM project are:

1. The project host: generally a government institution whose role is to provide the land, facilities or resources that are required to undertake the CDM project.
2. The project developer is responsible for driving the project through the CDM project cycle.
3. A project participant is either a Party (government) to the Kyoto Protocol or a private entity authorised by a Party to participate in the project. Only project participants can decide on the distribution of CERs from a project.
4. The CER buyer must either be an Annex 1 Party (government) or be authorised by an Annex 1 country in order to be able to transfer CERs from a CDM project into an account in the registry of the country of the purchaser.
5. The Designated Operational Entity (DOE) validates the project prior to registration as a CDM project and verifies the emission reductions of a project prior to issuance of CERs. DOEs are generally external auditors.
6. The Designated National Authority (DNA) of the developing country in which the project is located authorises the project prior to validation.
7. The CDM Executive Board is responsible for administering the procedures relating to the registration of projects and issuance of CERs.

Source: Adapted from Guidebook to Financing CDM Projects. UNEP and Eco Securities, 2007.

Since their inception, CDM projects have diversified significantly. There are currently 92 UNFCCC approved methodologies and more methodologies are being worked out for small-scale CDM projects.⁶⁷ Below are examples of the most popular types of CDM projects:

- Renewable energy: generation of clean energy (electricity or heat) from renewable sources such as wind, wave/tidal, solar, hydro, biomass or geothermal energy. In such projects, emission reductions occur if energy would otherwise have been provided by fossil fuels.

⁶⁷ There are currently 46 approved methodologies for large-scale CDM projects, 32 for small-scale ones and 14 known as consolidated methodologies.

- Energy efficiency such as fuel switch projects involving the substitution of one fossil fuel with another with lower emissions e.g. a switch from coal to gas-fired power generation; an improvement to increase the efficiency of a power or heat generation plant; or an improvement in the efficiency in the transmission and distribution of electricity.
- Energy demand reduction: projects that help to reduce energy use from manufacturing industries such as cement or from buildings or agricultural facilities.
- Emission reductions from various industries (end-of-pipe emissions): as shown in Table 3 emissions from chemical industries and particularly the production of nitric acid and aluminium smelters emit GHG with high weather warming potency. The recovery of gas flared from oil wells and the capture of methane emissions from coal beds and mines for electricity generation are other significant ways to reduce emissions.
- Methane extracted from municipal or industrial waste: methane generated due to the anaerobic decomposition of municipal waste is extracted from the waste streams and used as a biogas to supply heat and/or electricity on- or off-site, or simply burned (i.e. flared) in order to reduce its global warming potential (GWP).
- Afforestation and reforestation: currently, afforestation and reforestation are the only land-use, land-use change and forestry (LULUCF) projects eligible under the CDM. Afforestation projects involve planting trees on land which was not previously forested, whereas reforestation projects promote carbon sequestration by planting trees on land which was recently cleared. It was decided in Bali that avoiding deforestation be further studied and experimentations be undertaken for possible consideration under the CDM approach in the future. There are currently three afforestation CDM projects under validation but none registered yet.

Table 3: CDM Projects and Issues by Sector (%)

	Projects	Issues of CERs
Renewables	59	25
CH ₄ reduction & coal mine/bed	20	7
Energy efficiency	13	2
Fuel switch	4	0
HFCs, PFCs & NO ₂ reduction	2	65
Cement	2	1

Note: The marked asymmetry between CDM projects and their respective CER allocation is due to the fact that different greenhouse gases have vastly different global warming potential over a 100 year period (GWP). Taking carbon dioxide (CO₂) as the reference (GWP = 1), the other GHGs have vastly larger GWPs: for instance, methane or CH₄ has a GWP of 21 while hydro-fluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) have GWP several thousand times larger. Thus, projects that help to reduce HFCs, PFCs & NO₂ yield much larger amounts of emission credits.

Source: UNEP (2007).

Asia continues to dominate the CDM market accounting for about 80% of total volumes transacted, led by China, which accounted for 60% of the CERs purchased by industrialized countries since 2002. The dominance of China is partly accounted by large HFC23 reduction projects with large GWP. As CDM projects with longer lead-time come on stream, the picture will likely be different by 2012. Renewable energy, biomass energy and energy efficiency account for two-thirds of confirmed CDM projects. But by the volume of CERs, nearly half of CER flows come from just 15 large industrial gas projects (11 HFC destruction projects and four N₂O reduction projects). However, the picture would be different if expected credit flows from all 3000+ projects in the pipeline were examined.

Private sector buyers⁶⁸ dominated the CDM market with the EU countries accounting for two-thirds and Japan for nearly 30% of CERs transactions on a cumulative basis. In contrast, the JI market has been dominated by public buyers.

Unlike the EU ETS market – which has witnessed significant volatility, CER prices have been more stable, averaging about USD 11 per ton of CO₂-e in recent months. A major factor underpinning this stability has been the market power of China, which maintained an informal pricing policy by raising the minimum price floor.

c) The carbon market and Africa

Africa including North Africa accounted for about 3% of the USD 5 billion CERs transactions in 2006. These numbers reflect current limitations to expanding carbon business in much of Africa where electricity access is very low and therefore mitigation opportunities more limited. But as is the case for other regions of the world, Africa has benefited from the surge in new CDM projects worldwide. Table 4 shows a pipeline of 41 CDM projects in sub-Saharan in March 2008, doubling the 2006 figure. While South Africa accounts for almost half of Africa's CDM projects, 10 other sub-Saharan African countries have at least one CDM project under consideration for approval. Egypt and Tunisia have a pipeline of 10 CDM projects.

Table 4: Regional distribution of CDM projects

Total in the CDM Pipeline	Number		kCERs	2012 kCERs		Population	2012 CER per capita
Latin America	660	21.4%	63,510	381,096	15.3%	559	0.68
Asia & Pacific	2295	74.5%	364,816	1,979,584	79.4%	3,529	0.56
Europe & Central Asia	34	1.1%	3,571	17,957	0.7%	149	0.12
Sub-Saharan Africa	42	1.4%	11,574	65,028	2.6%	752	0.09
North Africa & Middle East	51	1.7%	9,831	51,025	2.0%	278	0.18
Less Developed World	3,082	100%	453,302	2,494,690	100%	5,266	0.47

Source: UNEP Risoe Centre (2008), The CDM/JI Pipeline, March.

Carbon finance projects in Africa cover a broad range of sectors including energy efficiency (Ghana and Nigeria), landfills methane capture (Nigeria, Uganda and South Africa), afforestation/reforestation (Ethiopia, Mali, Niger, Uganda, Nile Basin), geothermal power (Kenya), hydro power (Kenya), electricity connection (Ethiopia), and biodiversity corridor (Madagascar). While the table clearly illustrates Africa's limited engagement with CDM projects as a share of the total CDM market, it also convincingly shows that carbon finance is a viable proposition in sub-Saharan Africa -- and that more efforts will be needed to fully capture new business opportunities provided by the carbon market.

Experiences from many parts of the world including Africa attest to the central role played by the private sector in initiating and developing CDM projects. Engaging the local private sector has proven important in terms of technology and energy source options, building design, waste management arrangements, and land use. The availability of showcase projects in the country, combined with hands-on project training

⁶⁸ Until 2005, the CDM market was dominated by just two buyers namely, the World Bank acting on behalf of a number of governments through various carbon funds, and the Government of the Netherlands. Market activities increased significantly in 2005, following changes which allowed the use of CERs as compliance units in the EU Emissions Trading System and the entry into force of the Kyoto Protocol.

experience, has proven to be the most effective means of increasing private sector interest in, and understanding, of the CDM. Brazil, India, Mexico, and more recently China are good examples of the benefit of demonstration projects in raising awareness.

A more proactive approach could play a significant role in increasing awareness within the private sector and other project developers of the opportunity offered by CDM projects in Africa. Capacity development, particularly as regards the office of the Designated National Authority⁶⁹ -- which plays a critical role in the CDM project cycle -- should be given much greater attention.⁷⁰ In the case of Tanzania, a dedicated budget for the DNA Office has greatly facilitated its work and provided a more sustainable programme of activities. Also, the reforms of the legal and regulatory frameworks have proven to play an important role. Because CDM projects involve investments, improving the business environment and modifying regulatory frameworks -- such as, for example, allowing independent producers of renewable energy to be connected to the national electricity grid -- must receive a stronger focus. Finally, issues of financing, including where necessary the provision of start-up subsidies to help the project developer cover project risks (see, for instance, arrangements under the Uganda mini-hydro project in Box 2 of the Energy Annex) should also receive more emphasis. Experiences in a number of CDM projects have shown that micro-finance could play an important role in promoting the development of small-scale CDM projects.

Box 3: Capacity Development for CDM Implementation

The United Nations Environment Programme (UNEP) is, through its Risoe Centre on Energy, Climate and Sustainable Development (URC), assisting developing countries in becoming active participants in the Clean Development Mechanism (CDM). This is done by supporting the establishment of an enabling business & regulatory environment for CDM investment in the countries, and specifically by:

- i) developing institutional capability in selected public & private entities to participate in CDM project design, implementation, and monitoring;
- ii) supporting the establishment of Designated National Authorities (DNAs);
- iii) establishing a National CDM Project Approval Procedure;
- iv) assisting in the creation of Sustainable Development Criteria; and v) creating a pipeline of CDM projects i.e. Project Information Notes (PINs) & Project Design Documents (PDDs).

Since 2002, the Capacity Development for CDM (CD4CDM) initiative has been or is currently operating in Egypt, Morocco, Cote d'Ivoire, Ghana, Mauritius, Mozambique, Tanzania and Uganda. Experience with CDM capacity building and institutional approaches will be shared with other countries in the region and form the basis for further activities. South-South-North of South Africa, the Energy Research Centre (ERC) at the University of Cape Town and Environment et Développement du Tiers Monde (ENDA-TM) in Senegal are assisting URC in implementing the project in the region.

Source: UNEP (2005), Capacity Development and Project Preparation for CDM Implementation in Host Countries.

6.4 New innovative and concessional climate-related financing

The introductory section of this paper demonstrated that available funds are clearly insufficient compared to the needs for adapting to climate risk. And while the carbon market offers opportunities, generating

⁶⁹ Currently only 27 countries in sub-Saharan Africa have set up DNA offices.

⁷⁰ The Chinese government for instance, allocates a share of CDM project proceeds to the development of project design, validation etc in more backward regions where CDM projects are much fewer.

carbon finance will require a more strategic focus and time-consuming development of capacity and techniques. The Nairobi Framework has been established as an inter-agency capacity building mechanism focusing on developing the carbon market in Africa – but its implementation will take time. There is thus a need for urgent actions to generate substantial and predictable levels of funding for adaptation.

a) A new multi-donor fund to finance forestry, clean technology and adaptation

Under the impulse of three donors (US, UK and Japan) who, together, will contribute large additional resources (currently estimated at several USD billion), the World Bank is working to establish a multi-donor trust fund geared to promoting low carbon and climate resilient economic growth and poverty reduction in developing countries. Consultations are underway with all major European donors and regional development banks on possible contributions and collaboration in areas covering forestry, clean technology and climate resilience. This new fund will make it possible to pilot transformational approaches in a few countries with the expectation that in time, these will be fully mainstreamed in national development planning/strategies and blended with the World Bank's concessional IDA resources.

b) Two new World Bank carbon facilities

The Forest Carbon Partnership Facility (FCPF) was set up to pilot a system of positive incentives for reducing emissions from deforestation and degradation (REDD) and to build the capacity of countries in this area in preparation for the post-2012 period. Consultations are underway with a broad set of stakeholders including indigenous peoples, the private sector and others. Nine donor countries and corporations have already announced pledges of USD 165 million and 11 African countries (together with 21 other developing countries) have expressed interest in participating in the pilot phase of the project. Operationally, recipient countries will prepare and commit themselves to implementing an emission reduction programme from avoiding deforestation as a basis for an emission reduction purchase agreement. For the moment, credits from avoiding deforestation are not eligible for trading for compliance towards international emissions reduction obligations.

The Carbon Partnership Facility (CPF) is designed to help countries adopt a larger-scale, longer-term approach to GHG reductions, again focusing on the post-2012 period. The CPF is a significant departure from the current practice (under the CDM and other carbon finance) of focusing on one project at a time: it involves a broader countrywide or sub-regional approach clustering projects in a variety of sectors such as power development, energy efficiency, gas flaring, transport, urban development and integrated waste management systems. The CPF would also guarantee the purchase of emission reductions for at least 10 years beyond 2012 to help remove uncertainty about the long-term future of the carbon market.

c) Other funding initiatives

A financial mechanism for the “Cool Earth Partnership” is being developed by Japan. Starting in 2008, Japan will provide funds amounting approximately to USD 10 billion (part of which through the multi-donor trust fund described above) to developing countries for supporting adaptation to climate change, improved access to clean energy, and mitigation working together with private funds.

The Congo Basin Fund (CBF) is aimed at taking early action to protect the forests in the region from deforestation. The African Development Bank will act as the implementing agency for the CBF and plans to invest over USD 800 million overall in biodiversity conservation and natural resource management in Central Africa's Congo Basin. The CBF aims to develop the capacity of local people and

institutions to manage their forests and help local communities find livelihoods that are consistent with forest conservation.

It was decided in Bali that reducing emissions from deforestation and forest degradation would be further studied and pilot projects undertaken to gain experience. This could lead to a new carbon credit program within the UNFCCC – Reducing Emissions in Deforestation and Forest Degradation (REDD) – which would compensate countries with carbon credits for their efforts in reducing CO₂ emissions through forest conservation and by controlling forest degradation.

Switzerland is working on setting up a multilateral adaptation fund to finance adaptation in developing countries. Funding of the Swiss scheme will be generated by means of a low carbon tax⁷¹ levied on the basis of different responsibilities between industrialised and developing countries. Based on preliminary estimates, using a USD 2/t of CO₂ tax in industrialised countries and USD 1/t of CO₂ in developing countries, this fund could generate as much as USD 40 billion a year. Further details on this initiative are still to be worked out.

In addition to the above initiatives, the increase in the IDA15 replenishment -- from USD 32 billion under IDA14 for the three-year period ending in June 2008 to almost USD 42 billion for the subsequent three-year period -- will most likely raise the share of IDA concessional resources (about half of which earmarked for sub-Saharan Africa) that are allocated for climate-related projects and programs.

Last but not least, discussions have begun on the possibility of leveraging donors' credit ratings to raise funding via long-term bonds on international capital markets to finance adaptation as well as mitigation projects. As for a similar scheme to raise funding for the financial facility for immunization (IFFIM), there will be substantive transaction costs (legal, financial, and fiduciary).

6.5 Recommendations

- i) Examining ways to facilitate and promote greater access by Africa and other low-income countries to the **Clean Development Mechanism**; including:
 - Further simplify CDM procedures where relevant;
 - Support capacity building in Africa (including South-South collaboration) for the design, validation, registration and implementation of CDM projects;
 - Promote a more equitable distribution of CDM projects across regions possibly by influencing CER buyers' decisions; and
 - Further pursue experimentation and other works with the perspective to cover carbon capture and storage under market mechanisms including the CDM.
- ii) Facilitating and promoting greater access for Africa to the **carbon market and other GHG-friendly activities**.
- iii) Implementing reforms recently decided by the Conference of Parties in Bali regarding the **Global Environment Facility (GEF)** including:
 - Improve access to GEF funds for those countries that are particularly vulnerable to the adverse effects of climate change,
 - Simplify and streamline procedures, and
 - Enhance support for capacity building in developing countries.

⁷¹ A carbon tax is a tax on the carbon content of fossil fuels (coal, oil, gas).

- iv) Recognising that current financing available to developing countries for climate adaptation are woefully inadequate. Provide **additional resources** from official and concessional sources and through innovative financing mechanisms, including raising the **share of IDA resources** devoted to climate change-related activities in Africa.
- iv) Continuing efforts to strengthen and improve the business environment and regulatory frameworks in order to attract greater **private sector** involvement in CDM projects.

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Acronyms

AAU	Assigned Amount Unit
AfDB	African Development Bank
AFOLU	Agriculture, Forestry and Other Land Use
AMCOW	African Ministers' Council on Water
AU	African Union
CAADP	Comprehensive African Agricultural Development Programme
CBF	Congo Basin Fund
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CERF	Central Emergency Response Fund
CFL	Compact Fluorescent Lamps
CGOS	Global Climate Observing System
CIRAD	French Agricultural Research Centre for International Development
C0₂	Carbon Dioxide
C0₂-e	Carbon dioxide equivalent
COMELEC	Comité Maghrébin de l'Electricité
COP	Conference of the Parties (in the context of UNFCCC)
CPF	Carbon Partnership Facility
DFID	Department for International Development
DNA	Designated National Authority
DOE	Designated Operational Entity
EACH-FOR	European Commission-funded Environmental Change and Forced Migration Scenarios project
EAPP	East Africa Power Pool
ECOWAS	Economic Community of West African States
ERU	Emission Reduction Unit
ESF	Exogenous Shock Facility
ESKOM	South African Electricity Supply Company
EUA	European Union Emissions Trading Allowance

EU-ETS	European Union Emissions Trading Scheme
FAO	Food and Agriculture Organisation
FCPF	Forest Carbon Partnership Facility
FDI	Foreign Direct Investment
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGFR	Global Gas Flaring Reduction
GHG	Greenhouse Gases
GWP	Global Warming Potential
HFC	Hydro chlorofluorocarbon
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HLD	High Level Dialogue
IAA	Integrated Aquaculture-Agriculture
ICRAF	International Centre for Research in Agroforestry
IDA15	International Development Agency
IET	International Emissions Trading
IFAD	International Fund for Agricultural Development
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
ISDR	UN/Inter-Agency Secretariat of the UN International Strategy for Disaster Reduction
IWRM	Integrated Water Resources Management
JI	Joint Implementation
LPG	Liquefied Petroleum Gas
LULUCF	Land Use, Land-Use Change and Forestry
MDGs	Millennium Development Goals
MOP	Meeting of Parties
MW	Megawatt
NAPA	National Adaptation Action Plan
NBI	Nile Basin Initiative
NEPAD	New Partnership for Africa's Development

ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OPEC	Organisation of Petroleum Exporting Countries.
OTC	Over the Counter
PIN	Project Idea Note
PRSs	Poverty Reduction Strategies
RECs	Regional Economic Communities
REDD	Reducing emissions from deforestation and ‘forest’ degradation
RGGI	Regional Greenhouse Gas Initiative
SADC	Southern Africa Development Community
SAPP	Southern Africa Power Pool
SRAPs	Sub-Regional Action Programs
tCO₂e	Tonne of carbon dioxide equivalent
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UN-HABITAT	United Nations Habitat
UNSC	United Nations Security Council
UNU-EHS	United Nations University Institute for Environment and Human Security
VARG	Vulnerability and Adaptation Resource Group
VER a/	Verified Emission Reduction
VER b/	Voluntary Emission Reduction
WAPP	West Africa Power Pool
WBGU	German Advisory Council on Global Change
WHO	World Health Organisation

Glossary

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: The process of establishing a forest on land that is not a forest, or has not been a forest for a long time by planting trees or their seeds.

African Ministers' Council on Water (AMCOW): The African Ministers' Council on Water was launched in 2002 with as mission, to provide political leadership, policy direction and advocacy in the provision, use and management of water resources for sustainable social and economic development and maintenance of African ecosystems and strengthen intergovernmental cooperation to address the water and sanitation issues in Africa.

Annex I Parties: Countries listed in Annex I to the UNFCCC; developed countries taking the lead in responding to climate change.

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

Aquaculture: The cultivation of aquatic organisms under controlled conditions.

Assigned Amount Unit (AAU): Unit measured in tonnes of carbon dioxide equivalent, in which Annex I country targets are denominated, under the Kyoto Protocol.

Biofuels: an abbreviation of bioorganic fuel. It is a scientific name for any plant or animal substance that can burn and is an alternative considered to replace petroleum gas. It is considered a means of reducing greenhouse gas emissions and increasing energy security by providing an alternative to fossil fuels.

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 Credit: Generic term for an allowance to emit one tonne of carbon dioxide equivalent.

Carbon Dioxide (CO₂): The most common greenhouse gas.

Carbon Dioxide equivalent (CO₂-e): Unit in which different greenhouse gases can be measured based on their GWP.

Carbon Fertilisation: An increase in atmospheric carbon dioxide that may be beneficial to tree growth. The elevated carbon dioxide concentrations enhance photosynthesis rates with increases utilisation of carbon dioxide.

Carbon Partnership Facility (CPF): A new facility set up by the World Bank designed to help countries adopt a larger-scale, longer-term approach to GHG reductions, focusing on the post-2012 period.

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.

Cereals: defined as wheat, coarse, grains and rice.

Certified Emission Reduction (CER): Carbon credit from a CDM project, expressed in tonnes of CO₂ equivalent (tCO₂-e).

Chicago Climate Exchange (CCX): North America's only and the world's first global marketplace for integrating voluntary legally binding emissions reductions with emissions trading and offsets for all six greenhouse gases.

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): Mechanism introduced by the Kyoto Protocol governing project- level carbon credit activities in non-Annex I countries.

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.

Comité Maghrébin de l'Electricité (COMELEC): Power pool of the Union of Arab Maghreb

Commitment Period: 2008-12, the period when Annex I countries must show they have met their Kyoto Protocol targets.

Compact Fluorescent Lamps (CFL): are designed to replace an incandescent lamp and can fit in the existing light fixtures formerly used for incandescents. Compared to general standard incandescent lamps giving the same amount of visible light, CFLs use less power and have a longer rated life.

Conference of the Parties (COP): Official meeting of the Parties to the UNFCCC.

Congo Basin Fund (CBF): A new fund set up by several donors with the aim at taking early action to protect the forests in the Congo Basin region from deforestation. The African Development Bank will act as the implementing agency for the CBF.

Deforestation: The conversion of forested areas to non-forest land for use such as arable land, pasture, urban use, logged area of wasteland.

Designated National Authority (DNA): Climate change focal point of a member country of the UNFCCC which approves CDAA projects in the project host country.

Designated Operational Entity (DOE): Organisation accredited by the CDM Executive Board for validating CDAA projects.

Early Warning Systems (EWSs): They gained attention in the 1970s and 1980s during the extended droughts and famines in the West African Sahel and in the Horn of Africa. Formal EWSs have been developed to anticipate and adapt to almost every hazard - technological, hydrological, meteorological, and anthropogenic. In the context of climate change, they are notably used to anticipate natural disasters and epidemics.

Ecosystems: a natural unit consisting of all plants, animals and microorganisms (biotic) in an area functioning together with all of the non-living physical (abiotic) factors of the environment.

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).

Emission Reduction Unit (ERU): Carbon credit from a JI project, expressed in tonnes of CO₂ equivalent (tCO₂e).

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.

European Union Emissions Trading Allowance (EUA): Carbon credits created as a tradable commodity under the EU ETS, expressed in tonnes of CO₂ equivalent.

European Union Emissions Trading Scheme (EU-ETS): Cap-and-trade scheme for carbon dioxide emissions from major industrial sectors within the EU.

Exogenous Shock Facility (ESF): An IMF facility to provide policy support and financial assistance to low-income countries facing exogenous shocks. An exogenous shock is an event that has a significant negative impact on the economy and that is beyond the control of the government. That could include commodity price changes (including oil), natural disasters, and conflicts and crises in neighbouring countries that disrupt trade.

Forest Carbon Partnership Facility (FCPF): A new facility set up by the World Bank to pilot a system of positive incentives for reducing emissions from deforestation and degradation (REDD).

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.

Global Environment Facility: (GEF): The Global Environment Facility (GEF), established in 1991, is an independent financial organization that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities.

Global Gas Flaring Reduction (GGFR): A public-private partnership established at the World Summit on Sustainable Development in 2002 with the aim to support national governments and the petroleum industry in their efforts to reduce gas flaring and venting of gas associated with the extraction of crude oil.

Global Warming Potential (GWP): The different potencies of GHGs with regards to their impact on climate change, expressed in comparison to the GWP of carbon dioxide, which is 1.

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): Defined by the Intergovernmental Panel on Climate Change as one of a group of six gases (CO₂ - Carbon dioxide, CH₄ - Methane, N₂O - Nitrous oxide, PFCs - Perfluorocarbons, MFCs - Hydrofluorocarbons, SF₆ - Sulphur hexafluoride) which contribute to human-induced climate change.

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.

Integrated Water Resources Management (IWRM): The Integrated Water Resources Management is a process to help determine how to meet society's long-term needs for water and coastal resources while maintaining essential ecological services and economic benefits. Worldwide, water policy and management are beginning to reflect the fundamentally interconnected nature of hydrological resources, and IWRM is emerging as an accepted alternative to the sector-by-sector, top-down management style that has dominated in the past. Managing water resources at the basin or watershed scale including integrating land and water, upstream and downstream, groundwater, surface water, and coastal resources is a major feature of IWRM.

Intercropping: The agricultural practice of cultivating two or more crops in the same space at the same time.

Intergovernmental Panel on Climate Change (IPCC): The Intergovernmental Panel on Climate Change was established to provide the decision-makers and others interested in climate change with an objective source of information about climate change. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.

International Development Agency (IDA15): One of the 5 agencies of the World Bank Group which provides concessional lending to developing countries. IDA15 refers to the recently concluded replenishment agreement to IDA for the three-year period from July 2008 to June 2011.

International Emissions Trading (IET): Mechanism introduced by the Kyoto Protocol allowing the exchange/trading of emission allowances (AAUs) between Annex I countries.

Joint Implementation (JI): Mechanism introduced by the Kyoto Protocol governing project-level carbon credit activities between Annex I countries.

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: A protocol to the UNFCCC with the objective to reduce GHG which was agreed on 11 December 1997 and entered into force on 16 February 2005. 175 parties have ratified the protocol. Of these, 36 developed countries (plus the EU as a party in its own right) are required to reduce greenhouse gas emissions to the levels specified for each of them in the treaty with three more countries intending to

participate One hundred and thirty-seven (137) developing countries have ratified the protocol, including Brazil, China and India, but have no obligation beyond monitoring and reporting emissions

Land Use, Land-Use Change and Forestry (LULUCF): A Kyoto Protocol jargon for terrestrial carbon sink activities (forestry, agriculture, etc.)

Liquefied Petroleum Gas (LPG): Liquefied petroleum gas is a mixture of hydrocarbon gases.

Meeting of Parties (MOP): With the coming into force of the Kyoto Protocol in 2005, the COP started to function as a Meeting of Parties to the Kyoto Protocol.

Megawatt: A measure of electricity generation, a megawatt is equal to one million watts.

Millennium Development Goals (MDG): represent a global partnership that has grown from the commitments and targets for the year 2015 established at the world summits of the 1990s. Responding to the world's main development challenges and to the calls of civil society, the MDGs promote poverty reduction, education, maternal health, gender equality, and aim at combating child mortality, AIDS and other diseases.

Nile Basin Initiative (NBI): The Nile Basin Initiative, which is a partnership initiated and led by the 9 riparian states of the Nile River (Burundi, DRC, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda) seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security.

Non-Annex I countries: Countries not listed in Annex I to the UNFCCC; generally developing countries.

Official Development Assistance (ODA): Development aid from developed to developing countries.

Over the Counter (OTC): Bilateral contract between two parties, not mediated through an exchange.

"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.

Project Idea Note (PIN): Preliminary CDM feasibility study; not a statutory part of the CDM process but often produced to facilitate host country approval and/or financing of a project.

Reducing Emissions from Deforestation and 'Forest' Degradation (REDD): A system, which is being experimented through pilot projects, to provide incentives to developing countries for reducing emissions from deforestation and degradation.

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

Regional Greenhouse Gas Initiative (RGGI): A cooperative effort by U.S. Northeastern and Mid-Atlantic states to reduce carbon dioxide emissions.

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.

Smallholder Farmers: Farmers that hold between 1-10 hectares. In its economic use, the term 'smallholder agriculture' is often simply a description of the production unit.

Southern African Development Community (SADC): The Southern African Development Community is an inter-governmental organization. It furthers socio-economic cooperation and integration as well as political and security cooperation among 15 southern African countries.

Subsistence farmers: Self-sufficient farmers who grow only enough food to feed the family.

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.

Tonne of carbon dioxide equivalent (tCO₂e): Common unit for carbon credits.

United Nations Framework Convention on Climate Change (UNFCCC): International legal instrument to address climate change, signed in 1992.

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.

Verified Emission Reduction (VER a/): Carbon credit which has been verified by an independent third party, but not otherwise approved under the Kyoto Protocol.

Voluntary Emission Reduction (VER b/): Carbon credit created specifically for the voluntary-offset market.

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.

Climate challenges to Africa, from Bali to Copenhagen

This paper* was prepared for discussion during Session 3 on Climate Change at the 12th Meeting of the Africa Partnership Forum held in Rome, 10 June 2009. It addresses the issues of enhanced action on adaptation, technology development and transfer and enhanced action on the provision of financial resources and investment.

* The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD or of the governments of its member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Introduction

APF members have agreed during previous meetings that Africa, as the continent least responsible but most affected by climate change, has an important stake in the success of the negotiations for a post-2012 climate agreement. Against this background the purpose of this paper is to set out some of the key issues of particular relevance to Africa in the upcoming negotiations and to derive key policy messages for both Africa and its external partners.

The framework for the negotiations is set by the Bali Action Plan (BAP) agreed in December 2007 which set out a road map for reaching a new agreement on the post-2012 framework by 2009. This note covers a subset of issues of particular relevance to Africa out of the broader set of topics which will be discussed at the next UNFCCC Conference at Copenhagen (7-18 December). The preparations for the Copenhagen Conference are gathering pace with several additional UNFCCC meetings scheduled in Bonn (June and August/September). Further climate meetings are also being held in Kigali (May 20-21) for Finance Ministers, Nairobi (May 25-29) for Environment Ministers negotiators and other experts, and Addis Ababa (October). Climate change will also be discussed at the next African Union Summit in July.

Previous APF discussions and follow-up

Climate change issues were discussed at the 8th APF in Berlin (May 2007). At the 10th APF in Tokyo (April 2008), the APF reviewed papers on the impact of climate change and commissioned further work on promoting greater access to the world carbon finance and on an effective post-2012 climate framework. Access to carbon markets and new innovative financing for climate adaptation was briefly discussed at the 11th APF in Addis Ababa (November 2008). The papers prepared for Addis were also subsequently transmitted by NEPAD to the Africa Ministerial Conference on the Environment (AMCEN) which have led to further work on adaptation financing, jointly with NEPAD and UNECA, to serve as a technical input to a high-level expert meeting that took place ahead of the AMCEN meeting in late May 2009 in Nairobi.

From Bali: a shared vision...

In Bali, countries agreed on a *shared vision*, a comprehensive set of actions for long-term cooperative action based on the following key principles: (i) developed countries taking the lead on emission reductions; (ii) developing countries, and in particular emerging economies, agreeing to contribute to the global mitigation effort; (iii) special attention being paid to the least-developed countries which need to pursue their sustainable development and should not be subjected to mitigation commitments; and (iv) developed countries providing predictable additional financing, technical and capacity building support to help developing countries adapt to climate change and contribute to greenhouse gas emissions.

The Bali Action Plan also set out in some detail broad agreement on four pillars:

On mitigation:

- Emission reduction by all developed countries and efforts by developing countries along the principle of ‘nationally appropriate mitigation actions’;
- Policies and practices aiming at encouraging emission reductions from deforestation and forest degradation and the sustainable management of forests in developing countries; and
- Sector-specific actions for mitigation; and using market mechanisms as a means, among others, to promote mitigation actions;

On *adaptation*: international cooperation to support implementation of adaptation actions that include risk management and risk reduction strategies;

On *technology development and transfer*: scaling up of technology development and transfer to developing countries and cooperation on research and development; and

On the provision of *financial resources*:

- Improved access to adequate, predictable and sustainable financial resources for developing countries, including innovative financing mechanisms; and
- Support for capacity-building, in particular for the most vulnerable developing countries.

... To Copenhagen: key areas needing progress

Against the background of the shared vision agreed in Bali, there remain major areas on which agreement will be required for a successful new climate accord in Copenhagen. From the perspectives of low income countries, broad agreement on the following issues is most critical:

On *mitigation*: more clarity on a long-term global goal for emission reductions. Clear ambitious emission reduction targets for industrialized countries are a critical prerequisite. Many of the more advanced developing countries indicated in Bali that they were willing to contribute to emission reductions according to the ‘nationally appropriate mitigation actions’ principle provided they get support from industrialized countries;

On *adaptation*: more attention to the central role of adaptation to climate change, with special attention to LDCs, and particularly Africa and Small Island Developing States (SIDS) that are particularly vulnerable to the adverse effects of climate change. While the discussions under the UNFCCC negotiations have focused on National Adaptation Programmes of Action (NAPAs), it is critical that more support be provided to help developing countries mainstream climate change in overall development management;

On *mobilizing financial resources*: to assist developing countries in their adaptation actions as well as additional mitigation actions. Significant public funding is essential but it is unlikely that it will be sufficient to meet needs. Carbon finance and other innovative mechanisms are viable options that need to be considered; and

On *managing these financial resources*: in addition to the challenge of mobilizing the needed resources, there remain important differences on how the resources should be managed. Broadly speaking, developing countries want more direct control over funds -- to be managed under the UNFCCC -- to ensure that funding addresses their sustainable development priorities. Developed countries are pushing for governance of funds through existing channels in part to avoid the proliferation of financial mechanisms and institutions.

Scope of paper

The above issues will be reviewed under the four pillars of the Bali Action Plan – mitigation, adaptation, technology transfer and financing. Where relevant, the report will also briefly cover selected technical and policy issues of particular relevance to low income countries, and most particularly: (i) the issue of Reducing Emissions from Deforestation and Forest Degradation (REDD); and (ii) ways of making the carbon market, and more particularly the Clean Development Mechanism (CDM) more accessible to Africa.

Recommendations***On mitigation***

Call for urgent and strong action to reduce global emissions by developed countries in line with the reduction range of 25-40% by 2020, together with incentives for key developing countries to cut emissions.

Make funding and policy support for reduced emissions from deforestation and forest degradation in developing countries (including through South-South cooperation) an integral part of the new climate agreement, given its vital role in global emission reductions.

Strengthen the capabilities of and financing to African countries to facilitate full and effective implementation of the IPCC guidelines for the REDD.

On adaptation

Provide urgent support to help meet immediate adaptation priorities in vulnerable countries. Funding the NAPAs is a clear starting point to be supplemented by support to help African countries mainstream adaptation in national development strategies.

Support country/regional efforts to improve climate data and information and to develop the capacity of African countries to monitor climate change and to enhance knowledge-sharing.

Help vulnerable countries to integrate climate change adaptation at national, sectoral and project levels through climate proofing of development projects.

On technology development and transfer

Support efforts to develop and share technologies for adaptation.

Support the effective diffusion and transfer of technology in areas of particular relevance to Africa such as REDD, land uses, and small-scale renewable energy (i.e. small hydropower and rural electrification).

Support the development of a suitable intellectual property rights (IPR) regime for their transfer and deployment in developing countries.

Support Africa's efforts to promote and facilitate the gathering and sharing of climate information, indigenous technology and other South-South collaboration on adaptation including through new African initiatives such as ClimDev-Africa and the Africa Centre for Climate Analysis.

On the provision of financial resources

On accessing funding, external partners to be more pro-active in helping to promote Africa's access to information and procedures and African countries to be more responsive to the requirements for access to existing climate funds.

On making the carbon market more relevant to Africa

- Encourage the development of additional simplified methodologies for sectors with high potential in Africa.
- Support a broader programme rewarding all relevant emission reductions from the agriculture, forestry and land use sectors (AFOLU) in the post-2012 period.

Ensure that future climate financing provides new, additional, predictable and sustainable resources including through the new climate change funding initiatives currently under discussion.

Ensure that future funding responds to the long-term sustainable development priorities of Africa, and that transaction costs are kept to a minimum.

Issues for discussion

Does the Forum agree that these are the key issues where any agreement at Copenhagen will need to accommodate Africa's interests?

Whether and if so how messages on these issues might be sent for instance to the G8 Summit (or the negotiating process?)

Whether Secretariats should be asked to undertake further work, in consultation with AMCEN, to help provide technical background etc.

Whether it should review this again at its next meeting in the autumn, in the run-up to Copenhagen?

I. Enhanced action on mitigation

Background

According to the 2007 Report of the Intergovernmental Panel on Climate Change (IPCC), the international community should aim to limit temperature increases to 2°C on the grounds that anything higher would be dangerous. This would require stabilising greenhouse gas concentrations in the atmosphere at 450 ppm⁷² of CO₂ equivalent (CO₂e) by the end of this century. To achieve this objective, industrialized countries as a group will need to reduce emissions in the range of 25-40% below 1990 levels by 2020 and in the range of

⁷² Parts per million in atmospheric concentrations.

80-95% by 2050. But according to the latest climate information⁷³, greenhouse gas (GHG) concentrations have already reached 430 ppm and are rising by about 2.5 ppm a year, partly on account of larger emissions in the emerging economies. According to Stern, the chance of keeping emission concentrations below 450 ppm has probably been missed meaning a significantly higher probability of climate warming in excess of 2°C.

Setting ambitious mitigation actions therefore become even more urgent. Based on their historic responsibilities, industrialized countries will need to take the lead in emission reductions. But this will not be sufficient; mitigation efforts will also be needed from developing countries. South Korea, Mexico, and South Africa among others have offered to apply mitigation actions that are ‘substantial deviations from baseline’. There was however, a general agreement that the least developed countries (LDCs) and small island developing states (SIDS) should not be asked to make commitments for mitigation. Instead, they should be assisted in achieving sustainable development including, in the case of Africa, greater access to modern energy.

Achieving political clarity on the above issues is at the core of a successful outcome in Copenhagen. But solutions will need to be developed and negotiated in the next few months to address complex political and technical challenges among which: (i) how to ensure comparability of efforts within the group of developed countries including between the European Union and other industrial countries; (ii) how to set voluntary but ambitious commitments by developing countries; and (iii) how to recognize mitigation actions by developing countries and link these actions with technology, financing and capacity building support by developed countries that are ‘measurable, reportable and verifiable’.⁷⁴ In addition to the above issues, negotiators will also have to review and discuss a range of technical considerations for mitigation such as using a sectoral approach on mitigation, reducing emissions from deforestation and forest degradation and from land-use changes more broadly.

The objective of this section is not to present a comprehensive picture of all areas covered under the negotiations on climate mitigation, which far exceeds the scope of this paper. For instance, sectoral approaches to mitigation are not covered in part because of its limited relevance to low-income countries but also because a full coverage of sectoral approaches, given strong positions for and against the different group of countries, may detract attention from what is more directly relevant to Africa. Also, the Clean Development Mechanism (CDM) which is at the base of the carbon offset system and was covered more extensively in the papers prepared for the 11th APF meeting in Addis Ababa will be dealt briefly under the financing section. Instead, this section reviews the principal issues related to climate mitigation negotiations and more especially those of particular relevance to Africa and other low income countries. The report will cover separately mitigation by developed and developing countries. Furthermore for developing countries, the discussion will distinguish issues that are more directly relevant to the more advanced developing countries from those that are more relevant to Africa and other low income countries.

Mitigation by developed countries

Given the critical role of leadership by developed countries on emission reductions, quantified commitments made so far by industrial countries have been modest and are significantly below what is being called for by the scientific community to avoid catastrophic climate change. The European Union member states, as a group, are the only countries which have made quantified commitments to reduce

⁷³ Mentioned in Nicholas Stern, *The Global Deal - Climate Change and the Creation of a New Era of Progress and Prosperity* (2009).

⁷⁴ The ‘measurable, reportable and verifiable’ or MRV principle was key to achieving the agreement in Bali.

GHG emissions by 20% in 2020 compared with their 1990 levels with the possibility of an additional 10% reduction if other developed countries adopt larger reduction targets.

Three other countries including the US, Japan and Australia currently have draft bills under discussion in their respective parliaments. In Japan, the government has proposed cuts of between 7-15% by 2020 compared to 1990 levels. Similarly, in Australia, the government has submitted a bill proposing to cut carbon emissions of 4-15% below 2000 levels by 2020. In the US, the ‘American Clean Energy and Security Act of 2009’ proposes to gradually reduce emissions to 20% below the 2005 level by 2020, and 83% below the 2005 level by 2050. In addition, the Act proposes to establish an emission cap and to allow for the use of emission offsets as a way to reduce the costs of achieving the emission reduction goals. On a related issue, the US Environmental Protection Agency (EPA) has recently declared carbon dioxide a pollutant dangerous to human health thus opening the way for EPA to regulate CO₂ emissions in the future.

Mitigation by developing countries

Given the general agreement that LICs and SIDS should not be subject to mitigation commitments, most of the discussions on developing countries have focused on ways to encourage the engagement of the more advanced developing countries in mitigation efforts. For low-income countries including most of Africa, the discussions are more narrowly focused on various ways to help developing countries more fully exploit the potential of mitigation contributions from forests and land use. In addition, there remains the challenge of finding appropriate indicators and methods for differentiating those developing countries that will need to make commitments on mitigation from others such as the LICs and SIDS.

For the more advanced developing countries with significant mitigation potential the discussions are focusing mainly on:

- (i) Agreeing on the coverage of ‘nationally appropriate mitigation actions’ or NAMAs. Discussions on NAMAs have raised the importance for developing countries to have accurate, comprehensive and reliable greenhouse gas (GHG) inventory data and to report the information on a regular basis;
- (ii) Establishing a registry for NAMAs with the aim to recognize mitigation actions by developing countries; and
- (iii) Linking mitigation actions with technology, financing and capacity building support by developed countries and ensuring that both mitigation and support actions are measured, reported and verified.

For low income countries, the discussions on mitigation have taken a more sectoral approach focusing primarily on the importance of mitigation actions related to ‘*reduce emissions from deforestation and forest degradation (REDD⁷⁵)*’ and to a lesser extent, to land use and land-use change including the agricultural sector. Since deforestation accounts for roughly 17 to 20% of total emissions, REDD is emerging as having a big potential for mitigation and is expected to feature prominently in Copenhagen.

⁷⁵ Forests play a critical role in climate change by sequestering or storing, large quantities of carbon (by absorbing CO₂) as they grow. Stopping or slowing the rate at which such forests are cleared or degraded is essential to maintaining their carbon-storing capacity and the ecological “services” they provide, including biodiversity and watershed protection.

While there is broad agreement that REDD-plus⁷⁶ could form an important part of the mitigation efforts of those developing countries with significant forest resources, the acceptance and implementation of REDD-plus activities will require resolution of several challenges.

Some of these challenges are technical in nature such as:

- The need to establish a reference level (baseline) of forest carbon stocks against which future reduction in emissions can be calculated and more generally, national forest inventories for which significant capacity building support to LDCs will be needed; and
- Addressing problems caused by leakages -- for example, where curbing deforestation in one area could lead greater deforestation elsewhere -- and non-permanence of emission reductions from REDD-plus activities given for instance, the vulnerability of forests to fire.

There are also broader issues such as:

- The potential that REDD-plus activities may have severe implications for indigenous peoples and local communities whose livelihoods depend on forests;
- Related to the above, uncertainties about land ownership and tenure rights which is a common problem to many developing countries;
- The framework for delivering financial resources for REDD-plus activities where two approaches have dominated the discussions: a market-based mechanism allowing public and private finance from developed countries to credit part of the emission reduction obligations through REDD-plus activities and a public fund-based mechanism financed by ODA for instance.

In the case of Africa, the forestry and agriculture sectors together account for 75% of emissions from the region. Thus besides forestry which was discussed above, *agriculture* also needs to be part of efforts to meet international and national climate change objectives. But agriculture has remained somewhat marginal to climate change negotiations because it is perceived to be a difficult sector for three main reasons: the sheer number of areas and farmers involved, the multitude of farming systems, and sharing with forestry, uncertainties related to permanence, leakages and additionality⁷⁷. Further work on mitigation from agriculture through pilot activities, capacity building, technology transfer and institutional mechanisms will be needed.

⁷⁶ Under the Bali Action Plan, REDD-plus expands on the concept of deforestation and degradation of forests to cover a broader range of activities and approaches including the sustainable management of forests and other measures aimed at enhancing forest carbon stocks.

⁷⁷ Additionality refers to the evidence that any reduction in emissions from a project is genuinely additional to reductions that would occur if that project were not in place.

Box 1: Preserving and protecting Congo Basin forest ecosystems

The Congo Basin is one of Africa's most important natural resources The forest ecosystems of this basin are immense, covering an area twice the size of France (over 200 million hectares). They constitute the second largest area of contiguous moist tropical forest left in the world and represent approximately one-fifth of the world's remaining closed canopy tropical forest. This vast area hosts a wealth of biodiversity, including over 10,000 species of plants, 1,000 species of birds, and 400 species of mammals. It is also home to more than 50 million people living in ten countries, many of whom depend on the forest for their food, shelter and livelihoods.

It is also of global significance As the second largest tropical forested area on the planet, the Congo Basin rainforest represents a carbon store of global importance. Curbing deforestation in the Congo Basin may provide a highly cost-effective way of reducing greenhouse gases on a global scale. The rainforest is coming under pressure from uncontrolled logging, slash and burn agriculture practices, population growth, commercial poaching and expanding oil and mining industries. Forests are currently disappearing at the rate of approximately 930,000 hectares per year. If action is not taken now, it is estimated that by 2040 over two-thirds of Congo Basin forests will have been destroyed – with devastating consequences on global CO₂ emission levels -- and countless species

African governments have undertaken important commitments to preserve and sustainably manage Congo Basin forests. Countries in the region have worked together over the past two decades to forge a common approach to conserving the Congo Basin's rich forest ecosystem while concurrently ensuring sustainable livelihoods for inhabitants. This collaboration culminated in 1999 with the ground-breaking Yaoundé Declaration, which sets forth firm political commitments, including i) creation of new protected forest areas and trans-border conservation initiatives; ii) plans to combat illegal logging and illegal poaching of wildlife; and iii) broadened application of sustainable forest management strategies. The Yaoundé Declaration in turn gave birth three years later to the Conference of Ministers of Forestry of Central Africa (COMIFAC) – charged with coordinating and supervising implementation of the Declaration through a regional Plan of Convergence which covers ten strategic areas.

Supportive action by the international community. These regional commitments and institutional arrangements are now complemented by a number of international initiatives geared to protecting and sustainably managing Congo Basin rainforests.

- The **Congo Basin Forest Partnership (CBFP)**, launched in 2002, is an informal association that brings together approximately 48 governmental, nongovernmental, and international organizations. The CBFP is a non-binding network based on a voluntary agreement to raise the effectiveness of programs and initiatives through improved communication and collaboration. A prime example of the partnership's collaboration is the work undertaken to research and publish "The Congo Basin Forests 2006". This is the first comprehensive baseline assessment of i) the nature and condition of the region's forest ecosystems and ii) the threats and the impacts, both positive and negative, of human activities. CBFP works in close partnership with COMIFAC to implement the Convergence Plan and the Yaoundé Declaration.
- In October 2007 the World Bank established the **Forest Carbon Partnership Facility (FCPF)** as a way to kick-start Reducing Emissions from Deforestation and Degradation (REDD). The fund is initially providing USD 300 million to finance emissions reductions through forest conservation initiatives. Six countries in Africa (the Democratic Republic of Congo, Gabon, Ghana, Kenya, Liberia and Madagascar) receive grant support to build their capacity for REDD, including establishing emissions reference levels, adopting strategies to reduce emissions from deforestation and degradation, and designing monitoring systems.
- The **Congo Basin Forest Fund (CBFF)** was launched in June 2008 to help the people and institutions of the Congo Basin to manage their forests, develop livelihoods that are consistent with forest conservation and reduce GHG emissions. It will provide funding and support efforts to ensure governments, civil society, NGOs and the private sector work together. The CBFF has been initially financed by a grant of £100 million from the British and Norwegian Governments.

Source: Text compiled from numerous sources, including AfDB, CBFP, CBFF, World Bank, and USAID websites

Recommendations

- Call for urgent and strong action to reduce global emissions by developed countries in line with the reduction range of 25-40% by 2020, together with incentives for key developing countries to cut emissions.
- Make funding and policy support for reduced emission reductions from deforestation and forest degradation in developing countries (including through South-South cooperation) an integral part of the new climate agreement, given its vital role in global emission reductions.
- Strengthen the capabilities of and financing to African countries to facilitate full and effective implementation of the IPCC guidelines for the REDD.

II. Enhanced action on adaptation

Introduction

Of the four pillars of the Bali Action Plan, adaptation is the one that matters the most to low-income countries. Yet, in the discussions for the post-2012 climate agreement, adaptation has received much less attention than mitigation. As a result, compared to discussions on mitigation which are more structured with coherent agendas for developed and developing countries, the discussions on adaptation consist of a variety of views that leave important gaps on how adaptation will move from ideas to actions. In addition, there are divergent views on institutional arrangements for adaptation. Whereas the UNFCCC has clear leadership on issues related to mitigation efforts, the role of UNFCCC in adaptation is less clear given the roles played by other bilateral and multilateral institutions.

In the absence of a clear negotiating framework on adaptation, this section, compared to the previous one which more closely follows discussions in the context of the UNFCCC, will be organized differently. First, by using the disaster risk reduction (DRR) agenda as an illustration, it highlights the changes that are required for a more effective adaptation strategy. Then it briefly reviews the current status of adaptation in the context of the climate negotiations, highlighting areas of convergence and those issues characterized by a diversity of opinions. Next, it discusses the experience with national adaptation programs of action (NAPAs). It then reviews the key challenges of integrating adaptation at the national level and makes suggestions on key recommendations concerning the adaptation.

Adaptation as reducing vulnerability to current and future climate change

While the need to adapt to a changing environment is not new, rapidly changing climate conditions pose new challenges and relying on past knowledge may no longer be sufficient. Adapting to the consequences of climate change therefore requires anticipation, more detailed climate information at the local level and a different organization. It is in this context that the shift from reactive disaster management to preventive, multisectoral disaster risk reduction (DRR) initiatives that can be integrated at the national level (Table 1) provides a useful perspective on adaptation to climate change. The DRR approach is being given greater prominence by those associated with the adaptation to climate change with the important difference that requirements for climate adaptation are broader than those for DRR since it would include, for instance, such actions as adapting the tourism sector in coastal areas. The Bali Action Plan explicitly recognizes the importance of a DRR-like approach to climate adaptation.

Table 1. From disaster management to disaster risk reduction

From:	To:
Focus on hazards	Focus on vulnerability
Reactive	Pro-active
Science- or expert-driven	Partnerships with a wide range of stakeholders including those at risk
Response management	Risk management
Symptoms	Causes
Local focus	Broader context

Source: Salter J. (1998), *Risk management in the emergency management context*.

Current status of adaptation in climate negotiations

Discussions in the context of the UNFCCC have shown convergence on the importance of observation and scientific information, and knowledge-sharing relying on both North-South and South-South and thus the role of regional centres. But the discussions have also shown varied views on several issues related to adaptation. For instance on the issue of providing incentives for adaptation, developing countries have approached the issue from ‘the polluter pays’ compensation principle in demanding finance, technology and capacity-building from developed countries. This approach has had limited success. As shown in Box 2, resources currently made available under the UNFCCC framework for climate adaptation are very limited.

In addition to finance and capacity constraints, non-existent or inadequate climate data⁷⁸ and lack of technical capacity constitute major handicaps for designing and implementing adaptation strategies in Africa. ClimDev-Africa and the new Africa Climate Policy Centre (Box 3) represent regional initiatives to address constraints listed above. Discussions within the context of climate negotiations also highlighted other priorities from the perspectives of developing countries. Most noteworthy is how to integrate stand-alone adaptation projects such as those covered under the NAPAs into nation-wide adaptation strategies. This issue will be treated in greater detail in the next section.

⁷⁸ Africa has on average one meteorological station for 25,000 km² compared to 716 km² for the Netherlands.

Box 2: Support for adaptation in the context of international negotiations on climate change

Adaptation is a relatively recent concern within the context of international negotiations on climate change. While adaptation is mentioned in both the UNFCCC and the Kyoto Protocol, the implementation of adaptation has come into sharper focus since 2001 at the seventh Conference of the Parties in Marrakech which established three funds dealing with adaptation:

- *The Least Developed Countries Fund* was created to help the least developed countries (LDCs) prepare their National Adaptation Programmes of Action (NAPAs), which establish and prioritise adaptation actions through specific projects. The fund also supports institutional capacity building and other activities.
- *The Special Climate Change Fund* finances activities in both mitigation and adaptation in all developing countries. These activities can be either sector specific or aimed more broadly at adaptation, technology transfer and economic diversification.
- *The Adaptation Fund* was set up under the Kyoto Protocol to provide funding for adaptation purposes to parties to the Protocol. Unlike the other two funds which are financed by voluntary contributions, the Adaptation Fund gets its resources from a 2% levy on the proceeds of certified emissions reductions from projects under the Clean Development Mechanism (CDM).

These funds are part of a more complex architecture of international funding sources for adaptation that also includes the Strategic Priority on Adaptation of the Global Environmental Facility and the various World Bank Group climate funds as well as bilateral initiatives.

Regarding capacity support, successive rounds of negotiations have sought to develop a more comprehensive approach. This includes the '*Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change*' which serves as a platform for the dissemination of scientific and technical knowledge. During its first phase (2005-2010), the Nairobi Work Programme put emphasis on efforts to improve the understanding and assessment of impacts, vulnerability and adaptation to climate change and make informed decisions on practical adaptation actions with a focus on: methods and tools; data and observations; climate modeling; climate-related risks and extreme events; socio-economic information; adaptation planning and practices; research; technologies for adaptation; and economic diversification as an instrument for adaptation. For the remaining two years, the emphasis of the Nairobi Programme will be on economic diversification and adaptation planning and practices, on education, training and public awareness, and the promotion of regional centres.

Source: Adapted from the OECD/DAC "*Policy Guidance on Integrating Climate Change Adaptation into Development Cooperation*".

Box 3: Climate for Development in Africa (ClimDev-Africa) & African Climate Policy Centre (ACPC)

ClimDev-Africa is a 10-year regional programme initiated jointly by the African Union Commission, the UN Economic Commission for Africa and the African Development Bank in collaboration with the Secretariat of the Global Climate Observing System (GCOS) with the aim of:

- Enhancing the provision of essential data for climate services, policy and best adaptation practices;
- Supporting the integration of climate change into economic development and planning processes;
- Contributing to strengthening the human and institutional capacities of African countries and RECs related to climate change policies and programmes; and
- Supporting policy dialogue and policymaking processes at the regional, sub-regional, national and local level through knowledge-sharing.

Source: UNECA (2009).

An analysis of National Adaptation Programs of Action (NAPAs)

Under an initiative launched by the UNFCCC in 2001, least developed countries were encouraged to develop NAPAs to identify priority adaptation activities that respond to their urgent and immediate needs. Using existing information and involving local communities, NAPAs help to assess vulnerability to current climate variability, identify key adaptation measures and set priorities. Countries then become eligible to apply for funding under the LDC Fund.

Thirty nine least-developed countries including 27 from Africa have developed NAPAs. As of today, only three such projects are under implementation. On the basis of some 450 projects submitted by 39 LDCs, the most popular sectors of adaptation are in decreasing order: food security (20% of total projects); forest and other terrestrial ecosystems (18%); water resources of all types (14%); energy (12%) and coastal zones (10%). Only 7% of the NAPA projects are multi-sectoral (for instance combining food security, water resources and infrastructure). That only 1% of the projects address national adaptation policy integration (Bangladesh, Republic of Kiribati, Madagascar, and Rwanda) reflects the very piecemeal approach to adaptation.

Challenges to integrating adaptation at the national level

While it is increasingly recognized that climate change is no longer simply an environment problem, the experiences of most low-income countries as described in the previous section highlights the importance of integrating adaptation in national development strategies. Getting adaptation right requires: (i) improved quality and availability of climate information; (ii) the capacity for climate change and impacts modeling; and (iii) that climate change adaptation, which is still not viewed as a development issue, should receive higher priority in national development strategies. There remains the mismatch in terms of time-scales over which many climate change impacts might manifest themselves (10-20 years) and the much shorter time horizons of development strategies including poverty reduction strategies. In addition, promoting a government-wide approach to climate adaptation will require reinforcing responsibility for climate coordination, including elevating this role in the government.

Similar institutional reforms must take place within donor policies and processes. Adaptation is still a low priority within donor agencies, the project-based approach still dominates and most often, climate considerations are compartmentalized within small teams. Project-based implementation is also likely to affect the sustainability of funding and hinder effective adaptation planning and implementation.

Aligning finances to national priorities and systems using the Paris Agenda harmonization framework constitutes another challenge. Bangladesh's example of a multi-donor trust fund to finance activities under the country-led Climate Change Strategy show promise of ensuring national coordination and ownership of the adaptation agenda.

Recommendations

- Provide urgent support to help meet immediate adaptation priorities in vulnerable countries. Funding the NAPAs is a clear starting point to be supplemented by support to help African countries mainstream adaptation in national development strategies.
- Support country/regional efforts to improve climate data and information and to develop the capacity of African countries to monitor climate change and to enhance knowledge-sharing.
- Help vulnerable countries to integrate climate change adaptation at national, sectoral and project levels through climate proofing of development projects.

III. Enhanced technology development and transfer

Introduction

The Bali Action Plan calls for enhanced action on technology development and transfer to support action on mitigation and adaptation and for enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation. The IPCC⁷⁹ identifies three major dimensions necessary to ensure the effectiveness of technology transfer: capacity building, enabling environments, and mechanisms for technology transfer. In the context of the climate negotiations, the UNFCCC⁸⁰ defined five key elements for effective action to transfer technology:

- (i) country-driven technology needs assessments;
- (ii) technology information;
- (iii) enabling environments for private and public sector investment in technology transfer;
- (iv) capacity building and particularly capabilities and institutions in developing country Parties to enable them to assess, adapt, manage and develop environmentally sound technologies (EST);
- (v) mechanisms to enhance coordination among stakeholders and to facilitate the development of projects and programs to support these ends.

This section is structured as follows:

- 1) description of the current setup for delivery of technology transfer in the UNFCCC framework;
- 2) review of experiences in providing support in the area of technology transfer in climate that shows a major difference between mitigation - where technology transfer is more relevant and adaptation - where diffusion of management practices plays a more important role;
- 3) a brief discussion of problems surrounding intellectual property rights;
- 4) a review of various options on institutional arrangements and governance for technology; and
- 5) suggested priorities for Africa.

⁷⁹ Special Report of the Intergovernmental Panel on Climate Change (IPCC) Working Group III, "Methodological and Technical Issues in Technology Transfer".

⁸⁰ See Annex to Decision 4/CP.7 (FCCC/CP/2001/13/Add.1.).

Current setup for delivery of and access to technology

In the current setup under the UNFCCC, the Global Environment Facility (GEF), as an operational entity of the financial mechanism under the Convention, is mandated to provide financial support for the technology transfer framework through both the climate change focal area and the Special Climate Change Fund (SCCF). In addition, the Conference of Parties has established the Expert Group on Technology Transfer (EGTT) under the Subsidiary Body for Scientific and Technological Advice (SBSTA) with the “objectives of advancing the development and transfer of technology activities under the Convention”. EGTT activities have included analytical work, particularly in terms of innovative financing, including a workshop, technical paper, and project financing guidebook.

Support by the GEF for capacity-building of developing countries in the area of technology transfer includes: (a) implementation of the results of technology needs assessments (TNAs); (b) technology information; (c) facilitating national/regional access to the information provided by international centres and networks, and for working with those centres for the dissemination and transfer of environmentally sound technologies (ESTs) and know-how; and (d) enabling environments.

The Convention has also identified the following priority areas under *mitigation*: (a) energy efficiency, energy savings, renewable energy and less-greenhouse-gas emitting technologies; (b) energy efficiency and savings in the transport and industry sectors; (d) afforestation, reforestation and use of marginal land; (e) solid and liquid waste management for the recovery of methane. Under *adaptation*, the guidance was less clear, with the sole mention of climate-friendly agricultural technologies and practices, including traditional agricultural methods.

Review of experiences in technology transfer for Africa

As part of the GEF-4 replenishment process, the operational strategy for mitigation in the GEF was revised to focus primarily on six strategic programs in the mitigation area:

- 1) energy efficiency in the building sector;
- 2) energy efficiency in the industrial sector;
- 3) market-based approaches for renewable energy;
- 4) sustainable energy production from biomass;
- 5) sustainable innovative systems for urban transport; and
- 6) management of land use, land-use changes and forestry (LULUCF) as a means to protect carbon stocks and reduce GHG emissions.

A recent GEF⁸¹ report on investment for technology transfer highlights the large differences between countries and regions, with some developing countries at the forefront of innovation and technology diffusion in a particular sector. This points to the heterogeneity among “developing countries” in technology transfer and diffusion, and therefore to the necessity of different responses to facilitate technology transfer. Another important aspect is the importance of domestic investment and of activities that can facilitate private sector investment in leveraging resources for technology transfer.

On *mitigation*, the review shows that a number of African countries have benefitted from GEF-coordinated transfer of ESTs, notably in the following areas:

⁸¹ UNFCCC (2008), Report of the Global Environment Facility on a strategic programme to scale up the level of investment for technology transfer, Note by secretariat FCCC/SBI/2008/5

- (i) energy efficiency such as lighting, light-emitting diodes, energy-efficient building design, heat recovery for power generation from industrial processes;
- (ii) renewable energy such as small solar rural electrification, solar water heating, wind turbines, geothermal and small hydropower projects;
- (iii) transport technology such as bus-rapid transit systems.

Assessing technology transfer for *adaptation* to climate change has been more problematic and is due to the nature of adaptation itself: climate change adaptation activities are difficult to separate from other development activities, as adaptation is inextricably linked to development. Thus while “technology transfer” plays an important role in mitigation, in adaptation it is “technology, techniques and practices” supported by “information and skills” that would cover the range of required measures, for instance:

- in agriculture, many forms of adaptation will be concerned with transfer and diffusion of management practices and related knowledge, traditionally provided through agricultural extension services;
- in health, a significant part of adaptive measures will consist of the capacity to predict and prepare for the likely expansion of vector diseases such as malaria;
- in infrastructure, the issue concerns not so much specific technologies, but rather techniques and good practices which will have to be shared, including with other countries that have faced related issues. It is a domain where transfer of technologies and techniques, such as building codes, is likely to be promoted by the investors themselves, encouraged and pushed by the insurance industry.

Issue of intellectual property rights

Intellectual property rights (IPRs) have attracted significant attention in the climate talks. While many developed countries stressed the importance of IPRs in encouraging innovation in technology development and deployment, and noted that the cost related to IPRs is a small fraction of the overall cost of technologies, developing countries tend to see IPRs as a barrier to technology transfer. Clearly, there is a need to find a balance between rewarding innovators and greatly scaling up technology diffusion and transfer. This has led to a number of propositions by developing countries such as:

- (i) funding mechanisms to develop and deploy technology;
- (ii) generating funding to “buy IPRs” including, for instance, developed country governments compensating property rights owners for their transfer and deployment in developing countries; and
- (iii) modifying national policies on the use of IPRs for publicly funded research and development, and learning from existing approaches undertaken in the public health sector. Successful approaches from other regimes involving compulsory licensing for specific technologies, such as in the health sector, have been suggested for application in the climate change context. Other suggestions are: incentives (tax exemption, subsidies, etc.) for technology innovators to apply differential pricing; patent pools to disseminate technologies to developing countries at low cost; and licensing publicly funded technologies.

Institutional arrangements and governance for technology

The climate talks reveal broad agreement on the limitations of the current technology framework, although the perspectives tend to differ between developing and developed countries. From the perspectives of developing countries, barriers to technology transfer are broader and include technical, human skills, financial and social aspects. More specifically, inadequate technology information -- on

cost, performance and suitability; limited capacity for operations and maintenance; limited skills to manage and adapt technologies; lack of an enabling environment including the issue of intellectual property rights discussed above; investment risks; lack of financing or access to credit; high cost of technology and insufficient investment. This has led to suggestions for more capacity-building and training, information exchange and knowledge-sharing programmes including regional technology excellence centres to promote technology development, deployment and transfer, stimulate capacity building, improve access to information and establish an appropriate international cooperation environment. Developed countries on the other hand, stress the importance of the role of the private sector and research institutions, and on enhancing enabling environments for technology transfer.

In other words, technology may only be effective when it works as a whole package which includes hardware (devices, equipment, process and complementary technological system etc); software (awareness, knowledge, information, know-how, intellectual property rights, designs etc); human resources; financial resources to make development, diffusion and transfer happen and an enabling environment (regulatory framework by both developed and developing countries, appropriate institutional arrangements and infrastructure).

A more fundamental issue concerns the institutional framework for technology with two approaches:

- (i) the continuation of existing arrangements and mechanisms enhancing financial and technology cooperation, without creating any new institutions; or
- (ii) establishing a new technology mechanism as an umbrella entity to guide overall technology development and transfer activities under the Convention. Different options are under discussion including the creation of a specialized technology mechanism and dedicated multilateral funds for technology development and transfer to support the delivery of technology and finance to enhance actions on mitigation and adaptation in developing countries.

Recommendations

Support efforts to develop and share technologies for adaptation;

- Support the effective diffusion and transfer of technology in areas of particular relevance to Africa such as REDD, land uses, and small-scale renewable energy (i.e. small hydropower and rural electrification);
- Support the development of a suitable IPR regime for their transfer and deployment in developing countries; and
- Support Africa's efforts to promote and facilitate the gathering and sharing of climate information, of indigenous technology including other South-South collaboration on adaptation including through ClimDev-Africa and the Africa Centre for Climate Analysis.

IV. Enhanced action on the provision of financial resources and investment

Introduction

Current estimates of adaptation cost range anywhere between the World Bank's USD 40 billion in 2020 to the UNDP's 2007 estimate of USD 86 billion per year in 2015. Compared to these large requirements, total commitments to funds that have been set up with voluntary contributions by developed countries under the UNFCCC Convention⁸² to assist developing countries amount to about USD 300 million -- of which only half have been disbursed. In addition to the above, modest resources have been made available from one of an array of financing instruments that are designed to achieve multiple climate-related objectives. With the exception of the Adaptation Fund⁸³, which was established under the Kyoto Protocol with funding derived primarily from the proceeds of a two percent levy on the proceeds from Clean Development Mechanism (CDM) projects, all the other financing initiatives are funded by public sector pledges.

The large shortfall of funding for adaptation in developing countries has made financing an important issue in the context of climate negotiations. It also highlights the fact that voluntary contributions and official and concessional resources that cover most of the existing financing initiatives will only be able to cover a small share of the needs by developing countries to address climate challenges. The need for new sources of funding was made explicit in the Bali Action Plan. Thus, besides underlining the need to provide developing countries with adequate, new and additional financial resources from official and concessional sources, the BAP also emphasized 'innovative means of funding' and the 'mobilization of public- and private-sector funding and investment, including facilitation of carbon-friendly investment choices'.

Besides the large funding shortfall, there are equally significant challenges concerning the structure, governance and allocation of the funds. Most common among concerns by developing countries are the disproportionally larger voice of developed countries in decisions on allocations and disbursements, complex and lengthy procedures that render access to funding difficult, and in certain cases, the lack of appropriateness of some of these instruments to low-income countries where the economies are predominantly based on agriculture, forest resources and natural resources. This has led to developing countries expressing a strong preference for having all financing institutional arrangements under the control of the UNFCCC's Conference of the Parties (COP), an option which may not be feasible at least in the short- to medium-term given that, at present, there are significantly larger climate-related resources available outside of the UNFCCC framework than within it.

In view of the complex situation regarding climate funding, this section will have two parts. Part 1 covers the Present Context, including: i) a review of existing climate change funding mechanisms for developing countries including the market-based CDM and related carbon finance voluntary market; and ii) how to improve access to existing financing. Part 2, Options for the Future, includes: i) considerations on a future financial framework that reflects Africa's priorities; and ii) a description of the main new financing proposals.

⁸² Thus the term Convention funds.

⁸³ The Adaptation Fund is expected to become operational later in 2009.

PRESENT CONTEXT

Existing financing mechanisms

There has been a recent proliferation of new climate-related funding initiatives covering both adaptation and mitigation which can be grouped into two categories depending on the sources of funding: 1) initiatives funded by international public contributions - the majority of existing mechanisms and 2) those that rely on market-based carbon finance including the Adaptation Fund.

Table 2 provides a summary of all existing climate-related funds, grouped into funds established under the Convention or outside of it. It does not, however, cover initiatives such as the Clean Energy Investment Frameworks of the World Bank and the AfDB, which are frameworks to attract financing including private sector investments rather than funding *per se*. Most of the funds in the table are global, with no pre-allocations by region. Also, with the exception of a few financing instruments that focus exclusively on adaptation funding, most funds cover both mitigation and adaptation with, based on the description of the funds' objectives, a stronger focus on mitigation.

The following sections briefly review the three funds established under the UNFCCC and Kyoto Protocol and the Clean Development Mechanism (CDM). The first two are managed by the GEF. They are the Special Climate Change Fund (SCCF) and Least Developed Country Fund (LDCF). Concerns have been expressed by developing countries about the governance structure of the GEF including domination by donor concerns; complex, time-consuming procedures and difficult access; lack of transparency in decision-making, and an emphasis on projects at the expense of more programmatic approaches.

The third financing mechanism under the Convention, the *Adaptation Fund*, was established to finance adaptation projects and programmes in developing countries that are Parties to the Kyoto Protocol. Funding is derived primarily from the proceeds of a 2% levy on transactions under the CDM. After lengthy debates about its governance structure, the Adaptation Fund is receiving support by many developing countries which feel more ownership because of a majority representation for developing countries on the governing body. Created in 2001, the Adaptation Fund is only expected to become operational toward the end of 2009.

The *Clean Development Mechanism (CDM)* was established under the Kyoto Protocol to assist developing countries Parties in promoting sustainable development and to facilitate developed Parties in complying with their emission reduction commitments. In 2007, proceeds from the sale of emission credits from CDM projects amounted to USD 7.4 billion, or triple the value in 2005. The CDM thus provides developing countries with a significant source of carbon finance to help promote sustainable development. But although the CDM has proven successful in generating emission reduction projects in many developing countries, only 30 out of the registered⁸⁴ 1600 projects worldwide were located in Africa, with 15 of them in South Africa.⁸⁵ Only South Africa has issued Certified Emission Reduction (CER) receipts, or in other words, now has credits available to sell.

While in terms of the resources currently available to Africa the CDM has so far provided insignificant resources for Africa to address its climate challenges, recent information shows an encouraging upward

⁸⁴ The approval of CDM projects goes through a rigorous process of review; only registered projects can start issuing Certified Emission Reduction receipts (CERs) which are then available for sale.

⁸⁵ The other African countries with registered CDM projects are Egypt and Morocco (4 projects), Nigeria and Tunisia (2 each), and Kenya, Tanzania and Uganda (1 each). Source: IGES CDM Project Database (May 2009).

trend in the number of new CDM projects. As of April 2009, 23 African countries have submitted a total of 102 CDM projects⁸⁶ in the CDM project pipeline. It is therefore essential that African governments both capitalise on existing carbon market opportunities, and develop a clear position for post-2012 negotiations, in order to increase the flow of resources needed to meet the challenges of climate adaptation and sustainable development (see Box 4). More importantly, as countries will need to demonstrate that they are taking the necessary steps to work towards the development of national policies, strategies and processes as pre-conditions to access the 'next generation' of climate funds, developing the capacity to prepare projects aiming to enhance sustainable development while claiming credits for mitigation efforts has become even more urgent. Creating carbon market opportunities was identified as a priority at the recent Third African Ministerial Conference on Financing for Development on Climate Change (see Box 5).

Table 2: Summary of existing climate change funding initiatives

FUND	SOURCE & AMOUNT OF FUNDING ^{a/}	SHORT DESCRIPTION
Convention Funds		
Adaptation Fund (AF) of the UNFCCC	Mainly 2% levy of CDM transactions, USD300m (millions)	Multilateral fund administered by the Adaptation Fund Board, focusing on adaptation.
Least Developed Country Fund (LDCF) of UNFCCC	GEF Trust Fund, USD172m	Multilateral fund managed by the GEF, to address the special needs of the LDCs and includes the preparation of NAPAs.
Special Climate Change Fund (SCCF) of UNFCCC	GEF Trust Fund, USD107m	Multilateral fund managed by the GEF, focusing on long-term adaptation measures to build resilience.
The GEF Trust Fund – Climate Change focal area	Total GEF replenishment since 1994 of USD10.9 billion.	Multilateral fund governed by the GEF, focusing on adaptation and mitigation (renewable energy, energy efficiency etc.) in developing countries and economies in transition.
Clean Development Mechanism (CDM)	N/A ^{b/}	CDM allows emission-reduction projects in developing countries to earn emission credits which can be used by developed countries to meet part of their emission reduction targets.
Non-Convention Funds		
Climate Investment Funds (CIF) that encompasses the Strategic Climate Fund (SCF) and the Clean Technology Fund (CTF)	USD6.3 billion	A funding framework serving as vehicle for the receipt and disbursement of donor funds managed by the World Bank for piloting new approaches or scaling up activities aimed at specific climate change challenge or sectoral responses.

⁸⁶ UNEP Risoe (2009), CDM/JI Pipeline Analysis and Database, May.

Non-Convention Funds		
<i>Strategic Climate Fund</i> (SCF, \$1.7 billion) in turn covers: - Pilot Program for Climate Resilience (PPCR, \$325 m) - Forest Investment Program (FIP, \$58 m) and - Scaling-Up Renewable Energy Program (SREP, \$110 m)	(USD1.7 billion)	-The PPRC helps the most vulnerable developing countries explore practical ways to increase climate resilience in core development planning and budgeting. - FIP finances investments in developing countries to reduce GHG emissions from deforestation and forest degradation (under consideration, not yet approved). - The SREP demonstrates the economic, social, and environmental viability of low-carbon development pathways in the energy sector.
<i>Clean Technology Fund</i> (CTF)	(USD4.2 billion)	Multilateral fund administered by the World Bank, focusing on mitigation activities and demonstration and transfer of low carbon ion technologies.
Forest Carbon Partnership Facility (FCPF)	USD165m	Multilateral fund administered by the World Bank, focusing on mitigation through REDD.
Carbon Partnership Facility (CPF).	USD470m	Aims to support developing countries towards lower carbon development paths. FCPF and CPF are part of the World Bank's Investment Framework for Clean Energy and Development (CEIF).
Congo Basin Forest Fund (CBFF)	USD200m	Multi-donor fund with the AfDB as the implementing agency, to help promote biodiversity conservation, natural resource management and mitigation through REDD in Central Africa.
Strategic Priority on Adaptation (SPA)	USD50m	A 3-year pilot programme for adaptation planning administered by GEF.
UN-REDD Program	USD35m	Multi-donor trust fund managed by UNDP (jointly with UNEP and FAO), focusing on mitigation through REDD.
MDG Achievement Fund – Environment and Climate Change window (MDG)	USD90m (by US as part of multi-country UN pledges, most not confirmed).	Multilateral fund, administered by UNDP, focusing on adaptation and general mitigation.
EU-Global Climate Change Alliance (GCCA)	USD300m (€220m)	Designed to build a new alliance between the EU and developing countries, the initiative focuses on adaptation, general mitigation and REDD.
Cool Earth Initiative (Japan)	USD10 billion	A bilateral fund administered by the Government of Japan, focusing on adaptation and mitigation activities.
Environmental Transformation Fund (UK)	USD1.2 billion (£800m)	A bilateral fund administered by the UK Government, focusing on adaptation and mitigation with some components administered via the World Bank and the AfDB (Congo Basin Forest Fund).
International Climate Initiative (Germany)	USD170m (€120 m)	A bilateral fund administered by the Government of Germany, focusing on adaptation and general mitigation.
International Forest Carbon Initiative (Australia)	USD180m (AUD200m)	A bilateral fund administered by the Government of Australia, focusing on mitigation through REDD.

Notes: a/ Pledged amounts, actual disbursements are smaller and in some cases, significantly so. b/ Proceeds from the sale of emission reduction credits from CDM projects, which reached USD7.6 billion in 2008 are not resources that are available to climate-related activities but instead are income flows accruing to CDM project developers.

Source: Adapted from Brief (no author) produced for Financing for Development Conference on Climate Change, Kigali, 21-22 May 2009.

Box 4: How to make the carbon market more relevant to Africa

A review of the CDM commissioned for the 11th meeting of the APF in Addis Ababa highlights a number of factors which explain Africa's low share of CDM transactions. They include barriers related to CDM procedures and modalities (pre-2012); barriers related to CDM approach and scope in the post-2012 period; financial barriers; and institutional and capacity barriers within host countries. These are briefly summarised below:

- 1) Encourage further simplification of the general CDM procedures such as 'small-scale CDM' and 'programmatic CDM' that allow for more flexible modalities and reduced transaction costs to CDM project development;
- 2) Encourage broadening the range of eligible CDM projects in agriculture, forestry and other land uses (AFOLU) which are currently limited to narrowly defined afforestation/reforestation activities. The land use sector that accounts for 73 percent of total emissions from Africa holds very significant potential both for emission mitigation and for carbon finance in Africa. The likely integration of REDD in the post-2012 climate agreement lends further weight to the above.
- 3) Support the concept of a sectoral approach to CDM that is being actively discussed and would allow countries to shift from a project-based to a sector-based approach by establishing sectoral baselines and granting carbon credits for emission reductions relative to these sectoral baselines. The sectoral approach would provide financing opportunities for sectors that are presently under-represented under the CDM in Africa, such as transport.
- 4) Strengthen the institutional and technical capacities of African countries to better engage in the CDM process and make more finance, including new mechanisms, available for CDM project development.

Note: ^{a/} These recommendations are supported by a longer analysis which is accessible at www.africapartnershipforum.org/dataoecd/40/15/41646964.pdf.

The complexities and time-lags evident in the CDM project registration process have diverted many small project developers to the *voluntary carbon market* whose value of transactions grew by 240% in 2007 to USD 331 million. The voluntary market trade is driven mainly by heavy emitting companies wanting to prepare for expected mandatory emissions trading rules in their jurisdiction, firms offsetting their emissions as part of a green marketing strategy and environmentally-motivated individuals and households. Controversy over the integrity of carbon offsets being generated in the unregulated voluntary market has given rise to a range of independent third-party administered standards for the validation of offset projects and the verification of their carbon and wider benefits. Paramount among these is ensuring real and permanent carbon sequestration, promoting wider environmental sustainability and delivering positive outcomes for local communities. Access to the voluntary carbon market could be a good learning path towards the more regulated clean development mechanism and future similar market-based mechanisms for REDD.

Box 5: Selected priorities for African governments in the short term

The recent Third African Ministerial Conference on Financing for Development on Climate Change (Kigali, May 21-22, 2009) agreed that greater attention must be given to actions by African governments and in particular by central ministries such as finance and economic development in order to improve access to existing finance, as recognised in the Communiqué from the Conference:

- Integrate climate issues into national and sectoral development strategies through greater cross-sectoral coordination and mobilisation of domestic resources;
- Create carbon market opportunities: building awareness about carbon finance and recognising the important contribution of the private sector – which will require a more favourable domestic investment environment and access to financing -- to addressing climate challenges;
- Be more proactive and responsive in meeting increasingly demanding requirements of existing climate funds such as evidence of country's potential to generate global environmental benefits;
- Stronger capacity building efforts both at the national and regional levels.

OPTIONS FOR THE FUTURE***Considerations on a future financial framework that reflect Africa's priorities***

The Bali Action Plan underlines the need for financial support for developing country Parties and, more specifically, emphasises that future climate funding be 'adequate', 'predictable', 'sustainable' and 'new and additional'. The BAP also recognised that official and concessional funding will not be sufficient and therefore the need to promote 'innovative means of funding' and further efforts to mobilizing private-sector funding and investment, including carbon finance.

Based on these key principles, the specific concerns for Africa as expressed in the submission by Algeria to the UNFCCC on behalf of the African Group focused on the following issues:

- (i) Level of overall financial resources: reflecting the Bali key principles of 'adequate', 'sustainable' and 'new and additional' and predictable together with a preference for grants over loans;
- (ii) Equitable sharing of the burden highlighting the need for African countries to pursue their sustainable development goals and a focus on funding for adaptation; and
- (iii) Governance and access: funding to be accountable to the COP, monitorable, reportable and verifiable – the MRV concept introduced in Bali and discussed earlier under Enhanced Mitigation -- direct access with minimal management by intermediaries and avoiding fragmentation.

More focus on capturing opportunities to contribute to the global mitigation effort. Various mechanisms for financing climate change are being proposed for negotiations:⁸⁷ some of these have a large potential to benefit African economies and should be actively supported. While adaptation is a high priority for Africa, opportunities to contribute to the global mitigation effort through funding for Reduced Emissions from Deforestation and Forest Degradation (REDD), which is part of the African Group proposal, could be given more emphasis. Also, given Africa's very low access to modern energy – currently, less than 25% of African households have access to electricity - pursuing a low-carbon growth path relying on the large potential of renewable energy– only 7% of Africa's hydropower potential is exploited – would strengthen Africa's claim for its fair share of existing and future climate resources in exchange for its

⁸⁷ Details of proposals by Parties are available in the negotiating text for the June COP meeting which is accessible at: unfccc.int/resource/docs/2009/awglca6/eng/08.pdf.

active participation in the global mitigation effort, as well as having a positive growth and employment impact.

Governance of funding mechanisms. As noted above, significantly larger resources are currently available outside the UNFCCC framework than within it. The option of bringing all arrangements under the control of the UNFCCC may not be feasible at least in the short- to medium-term. Against this background there are strong arguments in favour of reforming the existing framework rather than creating an entirely new financing institution, with the aim of ensuring greater cohesiveness and coordination of financial and investment flows inside and outside the Convention, stronger coordination and harmonisation of procedures and practices, and the reduction of transaction costs to a minimum.

Table 3: Summary of new climate change funding initiatives

FUND	SOURCE OF FUNDS	CLIMATE FUNDS FOR DEVELOPING COUNTRIES/YEAR	OBSERVATION
AUCTIONS OF EMISSIONS ALLOWANCES			
Norway's auctioning of allowances	Part of Annex I Party's allowances withheld, auctioned by international body	USD20-30 billion (bn) annually	Auctioning of allowances appears to be relatively well accepted. The EU has aligned its position with that of Norway.
Germany's International Climate Initiative	9% of emissions permits auctioned domestically	USD80 million (m) for adaptation/forestry; USD80 million for sustainable energy	
US Adaptation & National Security Fund	Portion of revenue from allowance auctions	N/A	

Table 3: Summary of new climate change funding initiatives (continued)

FUND	SOURCE OF FUNDS	CLIMATE FUNDS FOR DEVELOPING COUNTRIES/YEAR	OBSERVATION
CARBON MARKET-BASED LEVIES			
Extending the levy to Joint Implementation and/or International Emission Trading	Extending the 2% levy on CDM to JI/IET	2008–2012: USD5.5–8.5bn 2013–2020: USD3.5–7.0bn	Parties were unable in Poznan to reach consensus. Low probability for resubmission.
CHARGES, LEVIES OR TAXES ON EMISSIONS OR SPECIFIC ACTIVITIES			
International Air Passenger Adaptation Levy (IAPAL)	USD6 per ticket (Economy class), USD62 per ticket (business/first class)	USD8–10 bn annually, for first five years of operation.	
International Maritime Emissions Reduction Scheme (IMERS)	Levy using the global average price of carbon.	USD9 bn annually if applied world wide.	IMERS has been reviewed and broadly endorsed by various organizations, including UNFCCC, WWF, OXFAM, and UNDP.
Swiss Global Carbon Adaptation Tax	Tax (USD2/t CO ₂ e) on emissions from fuels. A free emission level of 1.5 tons of CO ₂ per capita is applied to all countries	USD48.5 bn annually	There appears resistance to a carbon tax, especially if the tax has to be collected nationally for external use.
Tuvalu's Burden Sharing Mechanism (Adaptation Blueprint)	01% levy on int'l airfares, maritime transport freight charges operated by Annex I 001% levy on int'l airfares, maritime transport freight charges operated by non-Annex I (LDCs / SIDS exempt)	USD40 m from Annex II; USD30 m from non-Annex I	Additional funding for the UNFCCC Least Developed Country Fund and the Special Climate Change Fund.
Mexico's World Climate Change Fund	Mexico suggests the creation of a new fund (USD10 billion per annum) and recommends a 2% adaptation levy	USD200 m per annum.	
ASSESSED CONTRIBUTIONS OF DEVELOPED COUNTRY PARTIES			
G77 plus China	0.5% to 1% of Annex I countries' GNP	USD201–402 bn annually	
OTHER INNOVATIVE FINANCING INITIATIVES			
EC Global Climate Financing Mechanism			

Description of the main new financing proposals

Proposals by the Parties can be regrouped into five categories. These are summarised in Table 3, with indicative amounts of funds that could be raised:

- *Auctions of emissions allowances:* Each of the Annex I countries receive a number of greenhouse gas units they can release and/or trade (*Assigned Amount Units*, AAUs). The underlying funding principle of this scheme is to auction a certain share of these AAUs to generate revenue rather than

giving them out for free. The Norwegian proposal is the broadest with the auction occurring upstream before the AAUs are allocated to national registries. Germany has already implemented such a scheme at the national level while the US is also considering such a scheme.

- *Carbon market-based levies:* adaptation funding can be generated by applying a levy to the Kyoto Protocol's tradable units generated from the CDM, Joint Implementation projects (CDM-like but where projects are domiciled in Annex I Parties) or other emissions trading. The 2 percent levy on CDM proceeds to raise funds for the Adaptation Fund is an example of a carbon market-based levy.
- *Charges, levies or taxes on emissions, or on specific activities (such as air travel),* in which funds are raised by charging individuals and companies, based on their responsibility for climate change and/or their capability to pay. The charges or levies could be applied to air travel, fossil fuel production, or electricity use.
- *Assessed contributions of developed country Parties taking into account, for instance GDP, current emission levels or historical contribution to GHG concentration in the atmosphere.* Based on the principles of equity, common but differentiated responsibilities and respective capabilities, developed country Parties are assessed in the range of 0.5 to 1% of GDP. The G77 plus China's proposal has gained some attention politically as the main proposal put forward by the constituent governments from developing countries.
- *Other innovative ways of financing adaptation, such as the issuing of bonds based on the creditworthiness of the bond emitter as guarantees.* The European Commission's proposed Global Climate Financing Mechanism is one proposal in this category.

Recommendations

On accessing funding, external partners to be more pro-active in helping to promote Africa's access to information and procedures and African countries to be more responsive to the requirements for access to existing climate funds;

On making the carbon market more relevant to Africa,

- Encourage the development of additional simplified methodologies for sectors with high potential in Africa,
- Support a broader programme rewarding all relevant emissions from the agriculture, forestry and land use sectors (AFOLU) in the post-2012 period;

Ensure that future climate financing provide new, additional, predictable and sustainable resources including through the new climate change funding initiatives currently under discussion;

Ensure that future funding responds to the long-term sustainable development priorities of Africa, and that transaction costs are kept to a minimum.

Acronyms

AMCEN	Africa Ministerial Conference on the Environment
BAP	Bali Action Plan
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO ₂ e	CO ₂ equivalent
COP	Conference of the Parties (UNFCCC)
DDR	Disaster risk reduction
EGTT	Expert Group on Technology Transfer
EPA	US Environmental Protection Agency
EST	Environmentally Sound Technology
GEF	Global Environment Facility
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual property rights
LDC	Least Developed Countries
LULUCF	Land use, land-use change and forestry
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Program of Action
NEPAD	New Partnership for Africa and Development
ODA	Official development assistance
OECD/DAC	Organisation for Economic Cooperation and Development/Development Assistance Committee
PRSP	Poverty Reduction Strategy Paper

REDD	Reducing Emissions from Deforestation and Forest Degradation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SIDS	Small Island Developing States
TNA	Technology Needs Assessment
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change

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Carbon finance in Africa

This paper* was prepared as a background reference document for the APF Special Session on Climate Change in Addis Ababa, 3 September 2009. It reviews institutional and capacity barriers to carbon finance in Africa as well as clean development mechanism procedures and financial barriers. It then goes on to discuss new and innovative funding for climate change in the region.

* The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD or of the governments of its member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Executive summary

This cover note provides a quick overview of two short further notes on accessing climate finance for Africa, prepared as a background reference document for the APF Special Session on Climate Change in Addis, 3 September 2009.

THE CLEAN DEVELOPMENT MECHANISM (CDM)

The CDM has been successful in generating emissions reduction projects in several developing countries. The attached note is a synthesis of points drawn from a larger study, undertaken by consultants and co-managed by UNECA, the NEPAD Secretariat and the APF Support Unit (available at: www.africapartnershipforum.org/dataoecd/40/15/41646964.pdf). It argues that there is potential for significantly increasing the contribution that the CDM and potential future carbon market mechanisms can make to Africa's development. Key recommendations fall into four categories:

- (i) Actions that can be taken by African governments with Nairobi Framework partners to improve institutional capacity to take advantage of the CDM within the current framework;
- (ii) Actions that can be taken by the CDM Executive Board and Parties to the Kyoto Protocol to improve the procedures governing the CDM within the current framework;
- (iii) Actions that can be taken under the COP discussions to broaden the CDM approach and coverage in the new post-2012 framework, in a way which would increase the potential benefits for Africa;
- (iv) Actions that can be taken by multilateral organisations and development partners, in order to make core finance more readily available for CDM projects in Africa.

BEYOND THE CDM: NEW PROPOSALS FOR GENERATING ADDITIONAL CARBON-BASED REVENUE

While the CDM is potentially an important contributor to accessing carbon finance and should be reformed to improve applicability for Africa, there is a large possibility for the continent to tap into new and additional financial resources for both mitigation and adaptation.

The second paper takes a broader look at various proposals for generating additional revenue, either from the current carbon finance market or through broader charges, levies or taxes, which would be included in a post-2012 agreement. It is intended to be a synthesis of the main elements in these proposals, which it groups into six categories:

- (i) Auctions of emissions allowances, either at international or regional/national level;
- (ii) A global tax on CO₂ emissions;
- (iii) Levies on emissions from international maritime transport and on air travel;
- (iv) Carbon market-based levies (such as extending the current 2% CDM levy to emissions trading more broadly);
- (v) Issuance of bonds; and
- (vi) Frameworks for assessed contributions.

A common feature of most of these proposals is that they are based on generating revenue through market-based mechanisms, or more broadly through carbon or international travel-related taxes or levies, as distinct from conventional ODA funding sources derived from public financing (typically funded from domestic revenue streams and part of national budgets).

A number of these proposals are currently receiving broad international attention, in the context of the UNFCCC negotiating process leading up to Copenhagen in December 2009.

CARBON FINANCE IN AFRICA: THE CLEAN DEVELOPMENT MECHANISM

The Clean Development Mechanism¹ (CDM) was established under the Kyoto Protocol to assist non-Annex I Parties² to the UN Framework Convention on Climate Change (UNFCCC) in promoting sustainable development through low-carbon projects and to facilitate Annex I Parties in complying with their emissions reduction commitments. While the recent financial crisis and softer energy prices caused a dip in the value of CDM transactions in 2008³, the CDM market remains an important and useful mechanism for investing in mitigation activities in developing countries and a significant source of finance to help promote sustainable development. But although the CDM has proven successful in generating emissions reduction projects in several developing countries, and more particularly in large emerging economies, Africa currently holds less than 3% of registered CDM projects. It is therefore imperative that African governments both capitalise on existing carbon market opportunities and develop a clear African position for post-2012 negotiations in order to capture larger flows of carbon finance.

Challenges and recommendations

There are many reasons why Africa's share of CDM transactions is still relatively small. These include factors related specifically to how the CDM is structured and to complex and stringent procedures to safeguard the integrity of emissions reduction credits, but also reasons attributable to the African context itself, such as the small size (and therefore small volume) in relative global terms of emissions reductions that could be generated by projects in Africa, perceptions of investment risk, lack of institutional capacity, lack of financing and information, etc.

The purpose of this paper is to summarise key barriers related to CDM activities in Africa, with the objective of highlighting recommendations that African policymakers, negotiators and experts can use, in concert with development partners, to make the changes necessary to expand CDM activities in the African context. This paper draws on the main findings from a longer analysis available at: www.africapartnershipforum.org/dataoecd/40/15/41646964.pdf. The barriers (and accompanying recommendations) are divided into four sections:

¹ Under the CDM, buyers from developed countries acquire Certified Emission Reductions (CERs) for each tonne of greenhouse gas that is prevented from entering the atmosphere through the CDM project. The CDM provides companies and governments which have legally binding greenhouse gas targets under the Kyoto Protocol the option to buy verified CERs.

² Non-Annex I Parties to the UNFCCC are mainly developing countries which, unlike Annex I Parties, are not subject to emissions reduction commitments under the Kyoto Protocol.

³ CDM transactions declined 12% to around USD6.5 billion, compared with USD7.4 billion reported in 2007.

- (i) Barriers associated with weak national institutional capacity;
- (ii) Barriers related to CDM procedures and modalities within the current Kyoto framework (before 2012);
- (iii) Barriers related to constraints on the types of projects eligible for the CDM, to be addressed in the negotiations of a post-2012 framework; and
- (iv) Barriers related to financing CDM projects.

I. Institutional and capacity barriers

Institutional capacity within host countries is an important factor that can help or hinder development of CDM projects. Many complex legal, financial, procedural and technical issues require assessment and understanding, and most developing countries with limited institutional capacity will face challenges in taking a proactive stance towards CDM project development. Some countries have devoted significant resources to support CDM activities and created CDM promotion offices that work separately from but in coordination with the office of the CDM Designated National Authority (DNA). Some countries with stronger capacity, such as Egypt and South Africa, have organised awareness programmes on the CDM within government. Others, such as Zambia and Swaziland, are focusing efforts on organising capacity training and have established a governmental CDM office/committee to ensure that the CDM is incorporated and integrated within government policies and priorities. Timely and transparent completion of CDM transactions also plays an important role in expediting the approval process.

MAIN PRIORITIES: African Governments, with Nairobi Framework Partners

The Nairobi Framework⁴ (NF) has identified five pillars in its support to African countries to enhance participation in the CDM. These include:

- Build and enhance the capacity of DNAs;
- Build capacity in developing CDM project activities;
- Promote investment opportunities for projects;
- Improve information sharing, outreach, education and training; and
- Improve interagency coordination.

These pillars of the NF continue to be some of the main priorities for African governments and supporting multilateral agencies. To ensure effective implementation of the NF, it will be important to address other needs of African countries and involve pan-African and regional African institutions in this dialogue, e.g. the African Development Bank (AfDB), the UN Economic Commission for Africa (UNECA), the African Union Commission (AUC), the New Partnership for Africa's Development (NEPAD) and the regional economic commissions. In addition to those outlined above, other priorities for African governments include:

- Refine the NF to provide more opportunities for South–South transfer of capacity;
- Provide additional capacity building for appropriate government officials outside of the DNA itself, e.g. people working in energy, environment, finance and agriculture;
- Establish national regulatory frameworks conducive to the effective implementation of CDM activities;

⁴ A multi-donor initiative set up under the aegis of the UNFCCC to provide support to Africa in CDM activities.

- Work to improve the overall domestic investment climate to encourage participation in market-based activities.

II. Barriers related to CDM procedures and modalities: Current (pre-2012) changes

The international governance structure agreed for the CDM was intentionally set up to involve several steps, actors and checks, and includes detailed guidelines on specific methodologies and proving additionality⁵. While the process is required to ensure the integrity of this market-based mechanism, the working of the CDM approval process has been criticised for being too rigid and cumbersome, and involving high transaction costs for poor developing countries. Two initiatives that have been launched – small-scale CDM and programmatic CDM – are designed to allow for more flexible procedures and modalities, and to reduce transaction costs for CDM project development.

Small-scale CDM allows for a simplified application of the general CDM procedures in order to reduce the development costs for projects with emissions reductions below the threshold of 60,000 tonnes of CO₂ equivalent. A set of “simplified procedures” was developed allowing for the use of simplified project design documents, streamlined methodologies and reduced registration costs. This development boded well for Africa, given that the majority of abatement potential is in smaller-scale projects. But the impact has so far been minimal. Recent information shows that sub-Saharan Africa only accounted for less than 1% of the small-scale projects listed. Part of the lack of progress owes to higher transaction costs and the preference of project developers, brokers and traders (mainly from Annex I countries) for projects with larger carbon revenue potential at the expense of small-scale projects.

Programmatic CDM (pCDM) is a relatively new concept which allows project developers to create programmes involving many smaller project activities of the same kind, which can be bundled together into a larger programme. New project activities that fit the programme can simply be added on at a later date, using a simplified documentation and approval process. Programmatic CDM is still in its infancy, and only four programmes of activities have been submitted for validation from African countries. The South African national energy efficiency programme, through the phased expansion of solar water heaters and energy efficient light bulbs, is such an example of pCDM. Currently, the main barrier to the increased use of pCDM is simply lack of knowledge and experience. Interim financing for pCDM could help develop knowledge capacity and scoping studies.

While engaging in the negotiations on a post-Kyoto treaty, African countries should press for a number of short-term goals, listed below, that can be adopted and implemented before 2012, and prepare the way for a more comprehensive post-Kyoto deal.

MAIN PRIORITIES: CDM Executive Board and Conference of the Parties (COP) to:

- Encourage the development of additional simplified methodologies for sectors with high potential in Africa;
- Encourage bundling of small-scale projects to be more attractive to investors;
- Further simplify the requirements of small-scale CDM activities and standardise baselines to reduce transaction costs;
- Develop an interim financing facility for pCDM to provide seed capital.

⁵ For a CDM project, emissions reductions must be beyond – or in addition to – what would have happened in the absence of the project.

III. Barriers related to future CDM approach and scope: Post-2012 considerations

Sectoral CDM is a new approach, being actively discussed, which would allow countries to shift from a project-based to a sector-based approach, by establishing sectoral baselines and granting carbon credits for emissions reductions relative to these. In addition to providing an easier path to quantifying emission reductions, sectoral CDM would encourage policy interventions aimed at emission-intensive sectors such as cement, chemicals or transport, and allow governments to reward high-achieving companies. By reducing the transaction costs for individual companies, this new approach would provide new financing opportunities for sectors that are presently underrepresented under the CDM in Africa. However, there are still many controversies over the use of sectoral approaches to mitigation, as some developing countries fear that they could potentially be used as a way to replace national overall targets (for Annex I countries) or lead to trade restrictions.

A major inhibiting factor to the growth of the CDM in Africa is the limitation on types of activities currently eligible for the CDM. The land use sector holds the greatest potential for carbon finance in most African countries. Under the current rules, however, project activities implemented in agricultural, forestry and other land use sectors (AFOLU) are limited to narrowly defined afforestation/reforestation (A/R) activities. The lack of AFOLU projects under the Kyoto Protocol owes primarily to the fact that rules and methodologies for crediting these activities are very complex (involving issues such as the permanence of credits and “ring fencing” projects), and A/R credits are not currently an eligible asset class in the European Union (EU) Emissions Trading Scheme (ETS), the largest market of carbon credit buyers.

On the international level, there is increasing recognition of the importance of the forestry and agricultural sectors for any successful climate policy. The negotiations leading up to Copenhagen have continued to focus on reducing emissions from deforestation and forest degradation (REDD) in developing countries. While the specific methodological requirements and incentive structures remain unknown, it is clear that the momentum behind REDD remains strong; discussions now include “REDD+”, a mechanism which includes not only deforestation and degradation but also incentives to support sustainable forest management, conservation and enhancement of carbon stocks in existing forests. Many argue that an agreement in Copenhagen may not transpire without the inclusion of such a mechanism. The inclusion of REDD (or REDD+) will allow Africa’s role in carbon abatement and as an actor in global carbon markets to be greatly enhanced. However, the mechanism needs to be designed in such a way that it accommodates different national circumstances and respective capabilities. Efforts to address inadequate technical capacity in the management of REDD will need to be realised.

MAIN PRIORITIES: COP to:

- Support the concept of sectoral CDM in post-2012 negotiations to promote CDM activities and help Africa to achieve emission reductions in a more cost-effective manner;
- Support a REDD or REDD+ agreement to augment the role of Africa in global carbon markets, designed in such a way as to accommodate for different national circumstances and respective capabilities;
- In the meantime, establish pilot projects that could be rewarded for early action.

IV. Financial barriers

Lack of financing is a common barrier to project development. As previously mentioned, the majority of Africa's CDM potential will be in smaller-scale projects, for which it is difficult to attract funding given the smaller returns on emissions reductions. Many projects often have long lead times, and are perceived to have higher financial risks. In addition, transaction costs, including negotiation of purchase agreements, preparation of documents for registration and payments for validation and registration, are incurred at an early stage in the lifecycle of a CDM project, whereas carbon revenues are available only annually, following verification. Moreover, the recent financial crisis has made project financing extremely difficult to obtain.

There are a number of initiatives to make finance for CDM projects in Africa more readily available. Buyers of CDM credits, especially large institutional or national carbon funds, have helped CDM developers overcome this barrier by offering different types of advance payments. Regional institutions are also beginning to play an important role. For example, the **Economic Community of West African States (ECOWAS)** has established an African investment fund that can purchase carbon credits upfront. The Central African States Development Bank (BDEAC) has also developed instruments to facilitate access by CDM project developers to funding. The Millennium Development Goal (MDG) Carbon Facility represents an innovative collaboration between the UN Development Program (UNDP) and an international financial services provider, Fortis Bank, offering prospective emission reduction projects a comprehensive "one-stop-shop" package of services, with UNDP providing project development services and Fortis purchasing and marketing emission offsets.

But the amount is insufficient, and other financing mechanisms, including insurance against non-delivery of emission credits, need to be considered. There is a need to find ways to help CDM project developers access additional finance. These include the use of official development assistance (ODA), insurance mechanisms and export credit guarantees. The Marrakech Accord of 2001 stipulates that support for climate change in general and for CDM activities must not result in a diversion of ODA. Investment guarantee agencies have recently started to offer services to mitigate CDM risk in developing countries. For example, the Multilateral Investment Guarantee Agency (MIGA) of the World Bank Group has provided coverage against the risk that a CDM project in El Salvador fails to deliver the agreed upon amounts of certified emissions reductions (CERs). Guarantees by bilateral export credit agencies could provide another form of risk insurance. The ongoing review of the Organisation for Economic Co-operation and Development (OECD) Recommendation on Common Approaches on the Environment and Export Credits will hopefully result in more favourable treatment of exports of renewable energy equipment by OECD countries.

MAIN PRIORITIES: Development and Nairobi Framework Partners to:

- Further develop guarantee products and guidelines;
- Seek private sector organisations to partner in guarantee products;
- Increase budgets available for DNAs;
- Spread knowledge about the CDM to financial intermediaries and work to diminish investment risk through education and information sharing.

NEW & INNOVATIVE FUNDING FOR CLIMATE CHANGE

I. Introduction

While the CDM has proven to be an innovative financing mechanism for climate change mitigation in some developing countries, it has a limited role in providing the finance needed for mitigation activities, and overlooks adaptation completely. The expected future costs of climate change for developing countries are high, estimated in the hundreds of billions of dollars per annum. Mitigation and adaptation funding raised to date (including the CDM) will cover a trivial amount of total projected costs. Against this background have been a number of bilateral and multilateral proposals to raise additional revenue to address climate change in developing countries. These proposals aim to generate income by tapping into some of the revenue from the carbon market, or more broadly through carbon or international travel-related taxes or levies, rather than from conventional ODA funding sources derived from public expenditure (typically funded from domestic revenue streams and part of national budgets). At present, most international climate funding instruments, with the exception of the Kyoto Protocol's Adaptation Fund, which is financed through a 2% levy on CDM proceeds, rely on the latter – conventional ODA. The following proposals are distinct and noteworthy because they involve a degree of automaticity and autonomy. They relate to wider discussions on innovative financing schemes in the context of the UNFCCC, on both the implementation of the Bali Action Plan and a post-Kyoto framework beyond 2012.

This paper details and distils the various current proposals for climate financing. It does not attempt to provide a critique or assess the robustness of revenue estimates, both of which would need to be the subject of a separate exercise.

The rest of the paper is organised as follows. Section II offers a categorisation of the recent finance proposals, while Section III describes each proposal, using a table to illustrate the key elements of each scheme. Section IV discusses some options for the emerging institutional arrangements of international climate finance, followed by Section V, which conveys recent political support for certain financing proposals. Section VI provides useful criteria for evaluating the different climate finance proposals. The paper concludes in Section VII with a brief discussion of relevant issues pertaining to the implementation of climate change funding.

II. Categorising proposals on revenue raising

Financing proposals can be grouped into six categories:

- i. **Auctioning of assigned amounts or emission allowances:** Each Annex I country receives a number of greenhouse gas units to release and/or trade (assigned amount units, AAUs), in accordance with the Kyoto Protocol, during the 2008-2012 commitment period. The underlying principle of this scheme is to auction a certain share of AAUs to generate revenue, rather than giving them out for free to Annex I domestic firms that have to comply with emissions reductions. This plan to auction AAUs is represented in the Norwegian proposal.

- ii. **A uniform global tax on CO₂ emissions:** Funds are raised by placing a global tax on all carbon emissions, but with a per capita exemption for least developed countries (LDCs). This revenue raising mechanism is the basis for the Swiss Global Carbon Adaptation Tax.
- iii. **Levies on emissions from international maritime transport and on air travel:** Funds are raised by charging individuals and companies, based on their responsibility for climate change and/or their capability to pay. The charges or levies could be applied to international aviation and maritime transport or air travel. Charge/levy schemes include:
 - The International Air Passenger Adaptation Levy on fuels (IAPAL);
 - The International Maritime Emissions Reduction Scheme (IMERS); and
 - Tuvalu's Burden Sharing Mechanism (BSM) (Adaptation Blueprint).
- iv. **Carbon market-based levies:** Funding can be generated by applying a levy to the Kyoto Protocol's tradable units generated from the CDM, Joint Implementation (JI) or emissions trading (a form of "climate currency", with each tradable unit representing one metric tonne of CO₂ equivalent). The 2% CDM levy mechanism used to raise funds for the Kyoto Protocol's Adaptation Fund is an example of a carbon market-based levy. There is interest in extending or increasing the levy to other aspects of the carbon market. Proposals include:
 - Extending the levy to JI and/or International Emissions Trading (IET)⁹³; and
 - Pakistan's proposal to raise the CDM levy from 2% to 3-5%.
- v. **Issuance of bonds:** Funds can be raised through bonds issued on the international markets available for immediate use. The EU's Global Capital Fund Mechanism (GCFM) proposes such a mechanism.
- vi. **Frameworks for assessed contributions:** There are two other important proposals, which do not recommend a specific revenue raising mechanism but are often grouped in with the above proposals, given that they propose a framework for contribution assessment. Such proposals include Mexico's World Climate Change Fund (WCCF or the "Green Fund") and the G77 plus China's Enhanced Financial Mechanism.

Each proposal is discussed below.

III. Description of proposals on revenue raising

AUCTIONING OF ASSIGNED AMOUNTS OR EMISSIONS ALLOWANCES

- **The Norwegian proposal** to auction AAUs: Norway has designed a proposal to generate finance through auctioning a portion of emission permits. The auction would occur at the international level before the AAUs are allocated to national registries, and would be auctioned by an appropriate international institution. The resulting revenue would then be placed in a fund. The Norwegian Ministry of Foreign Affairs (MFA) projects that revenue to be raised is of the order of USD20-30 billion per annum. This figure is based on assumptions that 2% of AAUs are auctioned and all developed countries take on quantified economy-wide commitments corresponding to the

⁹³ IET forms one part of the three emissions trading schemes allowed under the Kyoto Protocol – the other two mechanisms are the CDM and JI – through which Annex I countries can exchange carbon credits.

mitigation actions required, according to the scenarios of the Intergovernmental Panel on Climate Change (IPCC), to prevent warming in excess of 2°C scenario.

- An auction of allowances can also occur domestically, as is the case in the EU ETS. However, while the money raised from the domestic auction could go towards climate finance in developing countries, as is the case with Germany's International Climate Initiative, this is by no means guaranteed. This is because the use of the revenue generated from domestic auctioning of allowances is at the discretion of each individual national government that raises the money, and cannot be subject to any international mandate.

A UNIFORM GLOBAL TAX ON CO₂ EMISSIONS

- **The Swiss Global Carbon Adaptation Tax:** Switzerland has put forward a proposal to finance climate change policy programmes and measures. This proposal would establish a low-level financing tax on worldwide emissions from the production and use of fossil fuels. The revenue for this proposal would be raised through a uniform global levy on carbon of USD2 per tonne of CO₂ on all fossil fuel emissions. This corresponds to a burden of about 0.5 US cents per litre of liquid fuel. A free emission level of 1.5 tonnes of CO₂ per capita would be applied to all countries, creating an exemption for those with extremely low emissions levels (primarily the LDCs). The revenue generated from this tax, which is expected to be around USD48.5 billion per annum, would flow into: (1) National Climate Change Funds (NCCF) established in all countries that contribute payment (all but LDCs), to be used according to domestic priorities; and (2) a Multilateral Adaptation Fund (MAF), where funds would be spent exclusively on adaptation in low-income and middle-income countries (LIC/MICs)⁹⁴. The MAF is further divided into two pillars: an insurance pillar and a prevention pillar. The share of MAF revenues generated depends on the economic situation of the countries, with high-income countries (HICs) paying the most.
- While the Swiss propose a uniform global tax, there is a possibility to consider a graduated carbon tax depending on the level of income and development. Such a proposal could be more attractive to emerging economies.

LEVIES ON EMISSIONS FROM INTERNATIONAL MARITIME TRANSPORT AND AVIATION OR ON AIR TRAVEL

- **The International Air Passenger Adaptation Levy on fuels:** The IAPAL (previously known as the International Air Travel Adaptation Levy, IATAL) was proposed by the Maldives on behalf of the Group of LDCs within the Framework of the UNFCCC Bali Action Plan on 12 December 2008. The IAPAL recommends that a fee per international airline ticket be adopted, set at USD6 per economy class ticket and USD62 per business/first class ticket. The set fee addresses both "personal responsibility", with all international air travellers paying regardless of their origin, and "personal capability", which is demonstrated by the ability to bear the costs of flying internationally and differentiated by class of travel. The main objective of the IAPAL is to raise revenue to compensate for the impacts of air travel emissions, with revenue collected by airlines and then paid to the Kyoto Protocol Adaptation Fund. The IAPAL would have minimum impact on demand for air travel, and this would enhance its political acceptability. (A comparable model

⁹⁴ The Swiss MAF is proposed to become part of the financial architecture developed under the Bali Action Plan, and would be able to operate complementarily with other similar facilities. It would be governed by the already existing structure under the Kyoto Protocol Adaptation Fund, at least in the start-up phase.

is provided by the similarly structured French “solidarity” airline tax that finances UNITAID, the international drug purchase facility.)

- **The International Maritime Emissions Reduction Scheme:** Under the proposed scheme, a carbon levy on fuel used for carrying cargo to destinations with emissions reduction commitments (currently Annex I countries) is established. IMERS proposes to establish the levy using the global average price of carbon. IMERS could raise USD9 billion annually for climate action if applied worldwide and collected centrally (bypassing national coffers).
- **Tuvalu’s Burden Sharing Mechanism (Adaptation Blueprint):** Tuvalu proposes a mechanism whereby funding would be raised through levies on international aviation and maritime transport. Specifically, Tuvalu’s BSM proposes:
 1. A 0.01% levy on international airfares and maritime transport freight charges operated by Annex II countries (a subset of Annex I countries mandated to provide financial resources to developing countries);
 2. A 0.001% levy on international airfares and maritime transport freight charges operated by non-Annex I countries; and
 3. Exemptions to (1) and (2) would apply to all flights and maritime freight to and from LDCs and Small Island Development States (SIDS).

CARBON MARKET-BASED LEVIES

- **Extending the levy to Joint Implementation and/or International Emissions Trading:** As the current levy on the CDM is used to raise funds for adaptation, a levy on JI or IET could similarly be applied. Most assessments of these options assume a 2% levy would be applied to mirror the CDM levy. Some countries, such as Costa Rica and South Africa, are in favour of including a levy on both JI and emissions trading. Other countries, like New Zealand, have stated reservations about applying a levy to JI and IET, as this could lead to market distortions. This was a hot topic at the December 2008 COP 14 in Poznan. However, parties were unable to reach consensus on a levy on either the JI or the EIT. According to the UNFCCC Executive Secretary, failure to reach consensus was because countries that host JI projects thought a levy might make the projects more expensive and therefore create a market disincentive.
- **Pakistan’s proposal to increase the CDM levy:** In March 2008, Pakistan submitted a proposal to the UNFCCC to increase the current levy on the issuance of CDM credits from 2% to 3-5%. The proceeds would go to the Kyoto Adaptation Fund to finance developing country adaptation.

BONDS

- **The EU’s Global Capital Fund Mechanism:** This proposal applies the idea of an International Financing Facility (IFF) – a tool that has, to date, been used to address urgent large-scale vaccination funding needs – to fund climate change. To raise funds, a bond would be issued on the international markets by an appropriate financial institution, enabling ‘frontloading’ of funding for immediate use. Future repayment over a long period (e.g. 20 years) would be financed through revenue of EU Member States derived from the future auctioning of emission rights. The idea has been recommended in the context of the European Commission’s (EC’s) initiated Global Climate Change Alliance (GCCA). The possibility of putting this idea into action is being explored in collaboration with the World Bank and the European Investment Bank. A fund of €1 billion

(USD1.3) billion per year for five years would justify the overhead costs. The funds could be channelled for disbursement to existing initiatives such as the Adaptation Fund, the World Bank's Climate Investment Funds or the GCCA.

FRAMEWORKS FOR ASSESSED CONTRIBUTIONS

- Mexico's World Climate Change Fund:** Mexico's proposal for the Green Fund recommends that countries contribute on the basis of their historical emissions, population and income. Put forward within the framework of the Bali Action Plan, Mexico suggests the creation of a new fund (at least USD10 billion per annum for mitigation in the initial start-up phase, increasing over time). Some of the money could be raised through budgetary contributions from each country determined by the above criteria, and some could come from new financial resources, such as auctioning permits in domestic cap and trade systems, taxing air travel, etc, to avoid putting excessive pressure on public financing. In this way, the Green Fund offers a framework for effort sharing rather than proposing a new mechanism to raise revenue.
- G77 plus China's Enhanced Financial Mechanism:** The G77 plus China's proposal is the main proposal put forward by the constituent governments from developing countries, including the African Group. The group proposes that developed (Annex I) countries should contribute no less than 0.5% of gross national product (GNP). The funds would reflect Annex I commitments under Article 4.3 of the UNFCCC and would go towards mitigation; deployment and diffusion of low-carbon technologies; research and development; capacity building; preparations of national action plans; patents; and adaptation for developing countries. The proposal does not suggest any specific revenue raising mechanism, but it does suggest the revenue would be channelled through national budget agencies.

Table of proposal attributes⁹⁵

PROPOSAL	SOURCES OF FUNDS	CLIMATE FUNDS FOR DEVELOPING COUNTRIES PER YEAR IN BILLIONS (USD)	SOURCE OF ANNUAL FUNDING ESTIMATE	MITIGATION VS. ADAPTATION	REVENUE FLOWS TO NEWLY CREATED VS. EXISTING FUNDS
AUCTIONS OF EMISSIONS ALLOWANCES					
Norway's auctioning of AAUs	Annex I allowances withheld, auctioned by international body	USD20-30 annually	Proposal originator (Norwegian MFA) (assumes 2% levy, Annex I commitments correspond to IPCC's lowest emission scenarios)	Primarily adaptation, but does not rule out mitigation and technology transfer	Unclear where the money would be transferred/held
A UNIFORM GLOBAL TAX ON CO₂ EMISSIONS					
Swiss Global Carbon Adaptation Tax	Tax (USD2/t CO ₂) on emissions from fuels ≤1.5 t CO ₂ /capita exempt	NCCF: USD20.7 MAF: USD18.4	Proposal originator (Swiss Confederation) based on 2010 data	NCCF: Both MAF: Adaptation	NCCF: national governance MAF: existing; Kyoto Protocol Adaptation Fund

⁹⁵ It is important to note that each proposal uses its own unique set of assumptions (e.g. carbon price, carbon cap, etc) when estimating revenue figures. While streamlining the assumptions can create a truer comparison, the current figures provide a general idea of the sheer scale of funds likely to be generated from each proposal.

PROPOSAL	SOURCES OF FUNDS	CLIMATE FUNDS FOR DEVELOPING COUNTRIES PER YEAR IN BILLIONS (USD)	SOURCE OF ANNUAL FUNDING ESTIMATE	MITIGATION VS. ADAPTATION	REVENUE FLOWS TO NEWLY CREATED VS. EXISTING FUNDS
LEVIES ON EMISSIONS FROM INTERNATIONAL MARITIME AND AVIATION TRANSPORT, OR ON AIR TRAVEL					
IAPAL	USD6 per ticket fee (economy class), USD62 per ticket fee (business/first class)	USD8-10 annually, for first five years of operation	LDC Group (based on International Air Travel Association figures and French levy estimates on travel class breakdown)	Adaptation	Existing: Kyoto Protocol Adaptation Fund
IMERS	Emission charge, "cap and charge" for Annex I	USD9+ (assumes USD15 as price of carbon using anticipated price in US economy-wide cap-and-trade scheme. The lower growth of emissions owing to the current downturn has been reflected, with total emissions for international shipping estimated at around 1 billion tons of CO ₂ in 2013)	Proposal originator (Stochniol)	Adaptation	Existing: Kyoto Protocol Adaptation Fund
Tuvalu's BSM	(1) 0.01% levy on international airfares, maritime transport freight charges operated by Annex II (2) 0.001% levy on international airfares, maritime transport freight charges operated by non-Annex I (LDCs/SIDS exempt)	USD0.04 from Annex II; USD0.003 from non-Annex I	Müller (based on total UN Conference on Trade and Development (UNCTAD) 2007 freight costs for 2005)	Adaptation	Existing: Special Climate Change Fund (SCCF) and LDC Fund (LDCF)
CARBON MARKET-BASED LEVIES					
Extending the levy to JI and/or IET	Levy on JI and/or IET	2008-2012: USD5.5-8.5; 2013-2020: USD3.5-7.0 (based on unit issuance, AAUs only)	UNFCCC (2008) Funding Adaptation in Developing Countries	Adaptation	Existing: Kyoto Protocol Adaptation Fund
Pakistan's CDM levy	3-5% levy on CDM	USD0.2-0.5 at levy of 5%	World Resources Institute (WRI)	Adaptation	Existing: Kyoto Protocol Adaptation Fund
BONDS					
GCFM	High rated bonds, as	USD1.3 for next five years	Proposal originator (EC)	Adaptation	Existing

PROPOSAL	SOURCES OF FUNDS	CLIMATE FUNDS FOR DEVELOPING COUNTRIES PER YEAR IN BILLIONS (USD)	SOURCE OF ANNUAL FUNDING ESTIMATE	MITIGATION VS. ADAPTATION	REVENUE FLOWS TO NEWLY CREATED VS. EXISTING FUNDS
	stopgap until other finance is operable				
ASSESSED CONTRIBUTIONS					
G77 plus China	0.5% to 1% of Annex I countries' GNP – unspecified revenue raising mechanism	USD201-402	UNFCCC (2008) Investment and Financial Flows to Address Climate Change: An Update	Both, primarily mitigation	New
Mexico's WCCF	Multiple sources	Initially USD10 for mitigation, scaling up to USD95 in 2030 (plus a 2% adaptation levy per annum fund)	Proposal originator (Mexico Secretary of the Environment)	USD10-95: mitigation; USD0.2 -1.9: adaptation	Existing: Kyoto Protocol Adaptation Fund

IV. Institutional arrangements

A separate but equally important consideration for meeting climate finance commitments surrounds the institutional arrangements involved, including the structure, governance, allocation and disbursement of the funds.

Parties to the UNFCCC have proposed numerous options for the future financial framework. The proposals can be roughly divided into: (1) proposals that support the creation of a new institutional arrangement, including funds, which is fully accountable to and potentially managed by the COP; and (2) proposals which prefer to use existing institutional arrangements by “making efficient and effective use of current institutions, including the Global Environmental Facility [GEF], multilateral development banks, specialized UN institutions and other existing funds .with financial support provided by developed country Parties and availed of by developing country Parties through bilateral, regional and other multilateral channels”⁹⁶. The latter therefore includes financial institutions which are “outside” the COP. It is also possible that a future financial mechanism relies on existing institutional arrangements, but also commands institutional reform as well as a degree of new institution building as well.

In relation to the decision on institutional arrangements of climate finance, another important consideration is how the required finance should be both aggregated and delivered. There are two very different systems that can deliver climate finance which reflect how funds will be used by recipient countries: one option is an *integrated approach* to delivering funding; another is a *disaggregated approach*, which links funding directly to sector-specific needs. The advantage of an integrated approach is flexibility in allocating funds, with less dependence on individual fund flows and better coordination to ensure consistency with national development strategies. In contrast, a disaggregated approach with self-standing vertical funds, each with their own dedicated funding uses (with separate funds for technology, adaptation, etc), can fit more easily with existing institutional structures and avoids the need to create new institutions.

⁹⁶ From the AWG/LCA.6 Finance Text, 2009.

The Bangladeshi Multi-donor Trust Fund (MDTF) offers an example of an *integrated* approach to climate finance, where the financial disbursement for climate change is at a scale that makes it possible to have a country-led programmatic approach aligned with national development plans. The Bangladeshi MDTF Model supports the implementation of Bangladesh's Climate Change Strategy and Action Plan, which was launched on 10 September 2008. According to the MDTF Concept Note, benefits of the fund include: high-level coordination, elimination of overlaps, donor harmonisation, flexibility in fund management and transparency⁹⁷. The MDTF is designed to be a "one-stop" mechanism for large-scale climate change financing in Bangladesh and creates the potential to strongly ally the funding with national development plans. Similar approaches could be considered for African countries. However, this supposes that countries have clear strategies on climate change, which many LDCs currently do not.

V. State of play on financing proposals

Many national governments and regional/economic coalitions have come out in support of certain proposals for a future international climate finance mechanism. At the recent Major Economies Forum on Energy and Climate, which included the G8, the declaration of the leaders included the following statement on the future of climate finance:

"The expertise of existing institutions should be drawn upon, and such institutions should work in an inclusive way and should be made more responsive to developing country needs. Climate financing should complement efforts to promote development in accordance with national priorities and may include both program-based and project-based approaches. The governance of mechanisms disbursing funds should be transparent, fair, effective, efficient, and reflect balanced representation. Accountability in the use of resources should be ensured. An arrangement to match diverse funding needs and resources should be created, and utilize where appropriate, public and private expertise. We agreed to further consider proposals for the establishment of international funding arrangements, including the proposal by Mexico for a Green Fund."

At the conclusion of the meeting, US Special Envoy for Climate Change Todd Stern conveyed both support for the Mexican proposal as well as sustained interest in the Norwegian proposal. The support for the Mexican Green Fund is based partly on its ability to take advantage of existing institutions, such as the World Bank. Stern reported "I think they [the World Bank and other international financial institutions] have good notions about governance which in our view ought to be fair and balanced between developed and developing countries, and they have good ideas about accountability of funding."

In a recent statement made by the British government, Gordon Brown indicated that the country is willing to support an international mechanism for the setting aside and auctioning of a small percentage of national emissions allowances, as Norway has proposed. Brown also mentioned interest in exploring other means of raising international finance, such as through aviation and maritime emissions, as well as the use of "forest-backed bonds" to bring early finance into sustainable forest management.

On the governance considerations of a future climate finance mechanism, the 2009 G8 Statement promoted efforts to ensure that the governance of mechanisms disbursing funds is transparent, fair, effective, efficient and of balanced representation among developed and developing countries. The

⁹⁷ The Major Economies Forum on Energy and Climate includes the leaders of Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Russia, South Africa, the United Kingdom and the United States.

statement also stressed the importance of “building on existing instruments and institutions, such as the GEF, multilateral development banks, adaptation funds and bilateral assistance agencies and the Climate Investment Funds” for a future international climate finance mechanism.

VI. Criteria for evaluating proposals

In order to ensure that proposals for revenue raising are internationally acceptable, they must satisfy the UNFCCC’s criteria of being adequate, predictable, additional to current ODA funding commitments and based on the “polluter pays principle”. These criteria were further emphasised in the Bali Action Plan and in the African Group’s submission to the UNFCCC in April 2009. As such, an assessment of the proposals against these criteria is essential.

- **Adequacy:** Funds generated are equal to the scale of the task identified;
- **Predictability:** Funding is secure (without unexpected fluctuations) over the medium term;
- **Additionality:** Funds provided are more than existing aid commitments;
- **Polluter pays:** Financial contributions are relative to the quantity of emissions produced.

Similarly, in order to understand the full implications of the proposed institutional arrangements for climate finance, the different options can be evaluated according to their accountability, representation, transparency and coordination. These criteria are described here:

- **Accountability:** Fund management is accountable to the COP;
- **Equitable representation:** There is a balanced representation of stakeholders involved in the decision making of the funds;
- **Transparency:** All information regarding the financial institution and its decision making processes are clear and available to the public;
- **Coordination:** Funding streams are coordinated with other sources of funding, to avoid fragmentation and overlap.

VII. Issues for consideration

A few crosscutting issues relevant to Africa are important to highlight when considering the future of climate finance.

COORDINATING CONVENTION AND NON-CONVENTION FUNDS

Given the current momentum of both bilateral and multilateral climate funds established outside the UNFCCC and the preference of some donor countries for channelling funds according to their own priorities, it is likely that there will be a coexistence of both Convention and non-Convention funds available for Africa. As such, African governments may need to manage multiple funding streams, creating an environment not dissimilar to the current flows of development assistance, leading to high transaction costs to the recipients. Closer harmonisation of the various funding efforts will need to be closely managed and monitored.

BUILDING CAPACITY

Within the context of “scaling up” financial flows for climate change, institutional capacity needs to be built up in the recipient country so that it can absorb and use new funds effectively. Even when adequate funds are raised and properly allocated to countries most in need, institutional, technical or managerial capacity constraints can prevent successful implementation. This should be taken into account in the design and implementation of any new financial framework of the post-2012 regime. Aside from this, the issue of procedural complexity common to international funding instruments merits some attention. A move towards simplification in access to funding could be beneficial.

Moreover, given that financing needs are likely to outweigh available resources significantly, Africa will be competing with other regions for a limited pot of funds. Building capacity, including sharing information on funding alternatives and procedures, is one way African governments can gain a competitive advantage to attract such funds.

INTEGRATING ADAPTATION FINANCE WITH DEVELOPMENT FINANCE

There are strong links between adaptation and development, from both a theoretical and a financial perspective. Development is an essential component of adaptation, as it enhances resilience and increases capacity. More often than not, adaptation to climate change will be carried out alongside development interventions. Lord Nicholas Stern argues that funding for development and for adaptation should be complementary, given that “adaptation is essentially development in a more hostile climate”. He states: “It is disruptive, and practically and conceptually confusing, to attempt a rigid and comprehensive separation of elements of investments in physical or human capital which are marked for ‘development’ or ‘adaptation’”. Efforts to streamline adaptation finance with ODA should be made, while avoiding displacement of current ODA streams essential for development.

Acronyms

A/R	Afforestation/Reforestation
AAU	Assigned Amount Unit
AfDB	African Development Bank
AFOLU	Agricultural, Forestry and Other Land Use
AUC	African Union Commission
BDEAC	Central African States Development Bank
BSM	Burden Sharing Mechanism
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
COP	Conference of the Parties
DNA	Designated National Authority
EC	European Commission
ECOWAS	Economic Community of West African States
ETS	Emissions Trading Scheme
EU	European Union
GCCA	Global Climate Change Alliance
GCFM	Global Capital Fund Mechanism
GEF	Global Environment Facility
GNP	Gross National Product
HIC	High-income Country
IAPAL	International Air Passenger Adaptation Levy on fuels
IATAL	International Air Travel Adaptation Levy
IET	International Emissions Trading
IFF	International Financing Facility
IMERS	International Maritime Emissions Reduction Scheme
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
LDC	Least Developed Country
LDCF	LDC Fund
LIC	Low-income Country
MAF	Multilateral Adaptation Fund
MDG	Millennium Development Goal
MDTF	Multi-donor Trust Fund

MFA	Ministry of Foreign Affairs
MIC	Middle-income Country
MIGA	Multilateral Investment Guarantee Agency
NCCF	National Climate Change Funds
NEPAD	New Partnership for Africa's Development
NF	Nairobi Framework
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
pCDM	Programmatic CDM
REDD	Reducing Emissions from Deforestation and Forest Degradation
SCCF	Special Climate Change Fund
SIDS	Small Island Development State
UNCTAD	UN Conference on Trade and Development
UNDP	UN Development Program
UNECA	UN Economic Commission for Africa
UNFCCC	UN Framework Convention on Climate Change
WCCF	World Climate Change Fund
WRI	World Resources Institute

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Co-Chairs Summary from the 10th APF meeting

The 10th Africa Partnership Forum was held on April 7-8, 2008. Participants of the meeting were fully engaged in the meeting and had a fruitful discussion on the three themes, namely, Environmental Issues and Climate Change, AU/NEPAD Africa Action Plan, Boosting Economic Growth and Poverty Reduction. The attached papers are the chairs summary of the meeting. We, co-chairs of the meeting, will communicate this chairs summary to relevant competent organizations.

- Annex 1: Environmental Issues and Climate Change
- Annex 2: AU/NEPAD Africa Action Plan
- Annex 3: Boosting Economic Growth and Poverty Reduction

(Signed by)

Ambassador Gebreab Newai, Co-chair for Ethiopia
Ambassador Barfuor Adjei-Barwuah, Co-chair for Ghana
Ambassador Masato Kitera, Co-chair for Japan
Ambassador Remo Gautschi, Co-chair for Switzerland

[Annex 1]: Environmental Issues and Climate Change**SITUATION IN AFRICA**

Climate change presents a major threat to economic growth and the achievement of the Millennium Development Goals in Africa. Although Africa contributes least to greenhouse gas emission, it is most vulnerable to climate change. Political will is necessary. Cost of inaction is much higher than cost of tackling this issue now. Adaptation, capacity building, technological transfer are keys to address this issue. Good meteorological observatory systems for climate information are also fundamental for climate risk management. Moreover it is advisable for Africa to develop clean and renewable energy sources using affordable technologies and to utilize private sector. The implementation of the Bali Action plan will help address these challenges, which will be included in the agenda at future UNFCCC meeting.

Currently, Africa receives very little from the Clean Development Mechanisms. Though forests remain a major economic resource for most African countries, avoiding deforestation is not currently included in the Clean Development Mechanisms. The potential of forests in Africa as a carbon sink is largely untapped. African women are particularly vulnerable to the impact of climate change, because of their central role in socio-economic development.

STEPS FORWARD

Bearing the above-mentioned in mind, co-chairs noted calls from participants at the 10th APF for the following actions;

- (i) More focus on adaptation measures in Africa;
- (ii) Additional resources in support of adaptation and mitigation;
- (iii) Mainstreaming climate change issues into Africa's economic planning and management, while taking into consideration situations in each country;
- (iv) Further recognition of Africa's development needs;
- (v) Support for effective Africa's representation in future negotiations on climate change;
- (vi) Conducting joint study among African Union Commission, NEPAD Secretariat and the APF Support Unit to promote greater access for Africa to the world carbon market and report it to the 11th APF;
- (vii) Establishing through joint efforts, an effective post-2012 framework with participation of all countries;
- (viii) Strengthening support for AU/NEPAD environmental action plan, Clim Dev Africa program, Africa Climate Center as well as initiatives on information and early warning systems and knowledge production.

- (ix) Support for existing multilateral initiatives and consideration of ways to strengthen the international funding architecture while recognizing the need to seek complementarities of funding as well as coordination of donors on the ground;
- (x) Enhanced cooperation between various initiatives in line with the principles of the Paris Declaration.
- (xi) Encouraging partnership for technological transfer including public and private partnership, in particular for cleaner production and renewable energy.
- (xii) Providing additional financial support for capacity building for African institutions and implementation of regional programs;
- (xiii) Supporting programs for reducing vulnerability of women to the impacts of climate change.
- (xiv) Fulfilling commitment already made on environmental initiatives in Africa and further monitoring the progress in a future APF.
- (xv) Promoting WTO negotiations which contribute to solutions of climate change. We also welcome the WTO negotiations on environmental goods and services..

[Annex 2]: AU/NEPAD AFRICA ACTION PLAN

In introducing the AU/NEPAD African Action Plan (AAP), it was stated that

- the AU/NEPAD AAP outlines the current key and aligned priorities for Africa, *which are expected to advance sustainable economic growth and poverty reduction*, particularly those with high potential impact on regional integration and requires co-ordination at the continental level.
- the Plan embodies the AU/NEPAD principles of African ownership and responsibility, good governance, self reliance, gender equality, promotion of partnership with stakeholders within Africa and with the international community. The AU/NEPAD AAP has been developed through extensive continent-wide consultations and represents African minimum priorities for implementation in the short to medium terms.
- the set of programmes outlined in the AU/NEPAD AAP, is part of an integrated interventions with the requirement to keep Africa on track to meet the MDGs.

In this regard:

The APF welcomed being informed about the AU/NEPAD AAP and, co-chairs observed that a number of development partners are already supporting some programs in it and that there is a need to update some of the estimated figures in the Plan. They underscored the importance of identifying alternative and innovative financing arrangement, including private public partnerships.

- Africa, on its part, is exploring various mechanisms for the mobilization of domestic resources for the implementation of key programs. However, there is a need to accelerate the pace of implementation of Africa's priority programs in order to enable the continent to eradicate poverty, and to meet the MDGs.

- The African side undertook to mobilize the relevant institutions, particularly the African Development Bank to update the status of the projects under the AAP, clarifying which projects are already underway, where key critical bottlenecks exist, and what needs to be done to unblock these bottlenecks. The reviewed AU/NEPAD AAP and its constraints will be discussed at the next APF.

[Annex 3] Boosting Economic Growth and Poverty Reduction

SITUATION IN AFRICA

There was a general appreciation of African performance in terms of economic growth but also concerns that it may remain fragile and could not lead to as much poverty reduction as expected. Most of the discussion focused therefore on how agriculture and infrastructure development can strengthen the pro-poor and the gender component of the African growth. Human resource development, science and technology social protection as well as private sector especially SMEs can play important role in creating wealth and employment, as well as reducing poverty.. Progress in governance can also improve the business climate and help increasing local and foreign investment – notably through the APRM. Further attention should be given to productive sectors. There is a need to invest efforts in these sectors, in order to increase production and employment levels.

STEPS FORWARD

In this regards, co-chairs noted calls from participants at the 10th APF for the following actions;

1. Agriculture

- (i) Support for implementing CAADP with emphasis on financial support and analysis on enhanced agricultural investment programs.
- (ii) Further attention to food security given the rise of prices of food.
- (iii) Support for identification of and investment in marketable agricultural products
- (iv) Support for better access of agricultural products to the market.
- (v) Further data and analytical work on renewable resources including bio-fuels and non-food crops in the bio-fuel industry in order to enable informed and appropriate decision making.
- (vi) Better access to fertilizers and storage facilities in line of the actions identified in the AU Summit.
- (vii) Urgent conclusion of the Doha Development Round this year, taking into account Africa's development needs. And strengthened support for the "Aid for Trade" initiative as a valuable complement to Round.

2. Infrastructure

- (i) Encouraging further domestic resource mobilization by African countries and other resource mobilization with particular emphasis on private financing, region-wide infrastructure and Africa's political commitment to it by its inclusion in national development plans.

- (ii) Enhanced capacity building, in particular, for project preparation, maintenance and management.
- (iii) Further develop and mobilize schemes for enhancing private sector in Africa.

3. ICT

- (i) Creating private sector enabling environment including independent ICT regulatory frameworks.
- (ii) Developing ICT skills and increased use of ICT applications.

4. Gender

- (i) Capacity development to promote the participation of women in decision making processes.
- (ii) Entrepreneurial development of micro-credit facilities.

Communiqué from the 12th APF meeting

1. The 12th meeting of the Africa Partnership Forum (APF) was held in Rome on 10 June 2009. The meeting was opened by the Minister of Foreign Affairs of the government of Italy, and was addressed by the President of Togo, the Prime Minister of Somalia, Ministers from the governments of the Republic of the Congo, Italy, Japan and Portugal, the Executive Secretary of the UN Economic Commission for Africa, the Commissioner for Economic Affairs of the African Union, and the CEO of the NEPAD Secretariat. The meeting discussed 4 issues: the response to the economic crisis as it affects Africa; peace and security and terrorism, and in particular the problems of drug trafficking and piracy; climate change; and the future of the APF as a forum for dialogue between Africa and its development partners. The conclusions of the Forum are being transmitted to wider political processes, including forthcoming meetings of the UN, G8 and African Union, and the preparations for the next G20 Summit, and the Copenhagen Conference on climate change.

2. The meeting recognised the severe impact of the economic and financial crisis on Africa, putting at risk the hard-won gains of recent years and progress towards the Millennium Development Goals (MDGs). It discussed Africa's concerns on the surveillance and regulation of financial systems, the governance of the international financial institutions, the need for fiscal stimulus, and trade issues. It welcomed the progress made in particular at the G20 Summit in April 2009 in addressing these concerns. It underlined the urgency of delivering on the agenda agreed by the G20, in particular:

- the allocation of Special Drawing Rights (SDRs);
- the acceleration of additional quick-disbursing and flexible assistance from the IMF, World Bank and the African Development Bank;
- consultations on a possible general capital increase at the African Development Bank;
- the delivery of commitments on Official Development Assistance; and
- reaching an ambitious and balanced conclusion to the Doha Development Round.

It further emphasised the importance of:

- making additional resources available to the World Bank and the African Development Fund in order to ensure the continued availability of resources during the remaining two years of IDA 15 and ADF 11.

Additionally, it mandated the co-chairs of the Forum to feed its conclusions on these and other priorities into the G8 and G20 processes. It agreed to monitor progress again at its next meeting.

3. The meeting discussed the problems of drug trafficking in West Africa and piracy off the Horn of Africa. It recognised that these were both examples of the wider problem of international organised crime, facilitated by the supply of small arms, and that the effects crossed boundaries, affecting stability, peace and security, efforts to promote good governance, economic development, and human welfare. It recognised that the problems needed to be tackled at many different levels and called for:

- enhanced international co-operation on peace-keeping, the fight against terrorism, law enforcement and maritime security;

- enhanced support for the African Peace and Security Architecture;
- continued efforts to improve governance and state capacity;
- action to restrict opportunities for the laundering of criminal assets, which it noted would also help address the wider problem of illicit financial flows including stolen assets;
- further efforts to tackle the problem of demand for drugs, which it noted was a problem affecting both sides of the partnership; and
- support from both sides of the partnership for the Transitional Federal Government of Somalia.

4. The meeting recognised the severe impact of climate change on Africa and recognised that, like the economic crisis, this was a problem not of Africa's making. It reviewed the key issues affecting Africa under the 4 pillars of the Bali Action Plan adopted in 2007: mitigation, adaptation, technology development and transfer, and finance. It also discussed the importance of measures to support the sustainable management of forest resources in the Congo Basin. It called for:

- Africa's interests to be fully taken into account in the negotiations on a new post-2012 climate change agreement, leading to the next UN Framework Convention on Climate Change Conference (UNFCCC) in Copenhagen;
- the issues of adaptation and mitigation to be given equal priority in the negotiations and tackled together;
- high priority to be given to the development of new climate change funding; and
- increased support from development partners for the Congo Basin Forest Fund.

Additionally, it mandated co-chairs to transmit its views to the next African Union and G8 Summits in July, and the UNFCCC negotiations. It accepted an invitation from the Executive Secretary of the UN Economic Commission for Africa to host an extraordinary session of the APF in Addis Ababa in September 2009, dedicated specifically to climate change.

5. The meeting discussed ways in which the APF could further improve its relevance and effectiveness as a forum for dialogue between Africa and its development partners. Both sides to the partnership re-affirmed the unique value which they attached to the APF as a forum for bringing together high level personal representatives of Heads of State and Government, or their equivalents, together with other stakeholders, to help prepare discussion by leaders on the key issues affecting development in Africa, and to monitor progress in particular on the delivery of commitments. They have agreed a set of proposals which will strengthen the links of the Forum to key regional and global processes, and its monitoring role.

6. The meeting expressed its appreciation to the government of Italy for hosting the 12th meeting of the Forum and for the warm hospitality provided to all participants. The next meeting of the APF will be held in Africa in late autumn 2009.

gender considerations – as African governments are starting to do, and into the support provided by development partners.

Both adaptation and mitigation will need to be supported by accelerated technology development, diffusion and transfer, and substantial new additional, more predictable and sustainable finance, and capacity building.

5. **Technology** – it is essential to harness the full potential of technological innovation in order to meet the challenges of mitigation and adaptation in Africa and globally.

- More support is needed for the development, diffusion, and transfer of technology: both adaptation and mitigation efforts need to be supported by accelerated technology development, diffusion and transfer, and by intensified efforts to build the capacity needed both to develop and to use new technologies;
- Greater focus should be given to areas of particular relevance to Africa, such as forests, land use, energy efficiency and renewable energy;
- Trade policy should be mobilized in support of technology diffusion : the elimination or reduction of tariff and non-tariff barriers to trade in environmental goods and services is essential to promote the dissemination of cleaner low-carbon technologies worldwide.

6. **Finance** - Existing financial mechanisms need to be reformed and scaled-up.

- Existing carbon market mechanisms should be reformed to make them more relevant and accessible to Africa : This should include action to improve the procedures and modalities, and broaden the coverage of the Clean Development Mechanism in a way that will respond to Africa's initiatives and increase the potential benefits to Africa;
- New, additional, more predictable and sustainable resources need to be provided - in support of both adaptation and mitigation; this will require the development of new financing sources and effective mechanisms, including the new climate change funding initiatives currently under discussion, as an integral part of the Copenhagen agreement;
- Future funding should respond to the long-term sustainable development priorities of Africa: this should inform discussion of the governance and delivery mechanisms of any new financing mechanisms. Transaction costs should be kept to a minimum.

7. The meeting welcomed the nomination of H.E. Ato Meles Zenawi, Prime Minister of the Federal Democratic Republic of Ethiopia, as the coordinator of the African common position for the UNFCCC negotiations at Copenhagen.

8. The key political messages from this meeting, which do not represent a negotiating position, will be communicated to the UN High Level event on Climate Change on the 22nd September, the up-coming G20 Summit in Pittsburgh on 24-25th September, relevant African processes, and the on-going negotiations within the UNFCCC.

9. Participants expressed their gratitude to the UNECA for hosting the meeting and for the excellent arrangements.

Joint statement from the APF special session on climate change

1. The APF held in Addis Ababa on 3 September 2009 a Special Session dedicated to climate change, focusing on Africa's concerns and expectations in the current UN negotiations on this matter. The meeting was addressed by H.E. Ato Meles Zenawi, Prime Minister of the Federal Democratic Republic of Ethiopia, and by distinguished ministers from APF member countries.
2. Participants to this Special Session recognize that climate change is a critical issue globally and for Africa, and see this as a crucial year for taking effective international action. They are committed to reaching an effective and ambitious agreement at Copenhagen.
3. **Mitigation** – Urgent action needs to be taken by the international community to reduce global emissions. Africa is prepared to make a significant contribution to this effort. The Copenhagen agreement must recognize Africa's legitimate development needs.
 - Ambitious global emissions targets are needed : Action needs to be taken to cut emissions. All countries must act, consistent with our common but differentiated responsibilities and respective capabilities. Developed countries among us will take the lead in promptly undertaking robust aggregate and individual reductions. We recognize the broad scientific view that the increase in global average temperature above pre-industrial levels ought not to exceed 2oC.
 - Africa's contribution to this global effort needs to be recognized : Increased funding for reduced emissions from deforestation and forest degradation needs to be an integral part of a Copenhagen agreement;
 - Africa's legitimate development needs must also be recognized: Africa needs to meet its sustainable development objectives, including developing its energy resources. Increased support for low-carbon growth must also be an integral part of a Copenhagen agreement.
4. **Adaptation** – Climate change is already having a substantial impact on Africa. Successfully adapting to these impacts is crucial to achieving its development objectives. This issue needs to be given urgent and increased attention.
 - Adapting to the impacts of climate change will impose massive additional costs on Africa : Africa is the continent least responsible for climate change, but is acutely vulnerable to its effects - on economic growth, poverty reduction, and the prospects for achieving the MDGs. The impacts will spread across all sectors – from agriculture to water, energy and health. The costs will be enormous. Africa has far fewer resources than other regions to meet these;
 - The issue of adaptation needs to be given increased priority in the UNFCCC negotiations: now that climate change is already happening, much more attention needs to be given in Copenhagen to tackling the challenges of adaptation, alongside the challenges of mitigation;
 - Adaptation and development are inextricably inter-linked : adaptation strategies need to be integrated both into national and regional development plans and into sector policies, including

gender considerations – as African governments are starting to do, and into the support provided by development partners.

Both adaptation and mitigation will need to be supported by accelerated technology development, diffusion and transfer, and substantial new additional, more predictable and sustainable finance, and capacity building.

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Communiqué from the 12th APF meeting

Joint Statement from the Special Session on Climate Change

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