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Climate Proofing Africa

Climate and Africa's development challenge

This document is based on the African Climate Report, written by Richard Washington, Mike Harrison and Declan Conway. The report, published in December 2004, was commissioned by the UK government to review African climate science, policy and options for action. This document was written by Mark Weston and David Steven of River Path Associates. It was designed by River Path Associates, and printed by Purely Print.

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ISBN: 1 86192 691 X

Cover Photograph
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Foreword

In 2005 the UK is committed to using the UK's G8 and EU Presidencies to address two great challenges.

We have called on the world's developed countries to work in partnership with Africa to address the continent's profound development needs.

And we are working to develop new approaches to tackling climate change, one of the most critical long-term issues facing the global community.

These two challenges are related.

Africa's development is already hampered by an unpredictable and unforgiving climate. Climate change will make these problems worse, hitting the poorest countries hardest and leaving future generations to cope with even greater climatic extremes.

Droughts will be more frequent and prolonged, and floods more serious. There will be negative impacts on agriculture, health and infrastructure, which will threaten efforts to reduce poverty.

We must therefore act to 'climate-proof' Africa's development. Our main priority must be to reduce vulnerability to climate change today. This will help Africa prepare for the climate-related problems it will face in the future.

A solid foundation of science is an essential starting point. At present there are substantial gaps in our knowledge of Africa's climate. Observation systems in Africa are in a parlous state. There is little capacity for scientific research, or for modelling and interpreting data.

Improving African climate monitoring, forecasting and modelling will require international support. However, the international community should have the foresight to invest in long-term, co-ordinated action, rather than piecemeal and fragmented initiatives.

This is clearly important to Africans, but it matters to the rest of the world too. The global climate is a complex, interdependent system, and a failure to understand Africa's climate properly will leave large gaps in our knowledge of that system.

It is essential that we focus on supporting and developing African capacity. Africa needs scientists and technicians to set up and run climate monitoring systems. Its communities need the ability to interpret and respond to the data those systems produce.

More fundamentally, we need to change the way we handle climate risk in the development process. National and international investment in African development is growing, but without better risk management the effectiveness of this investment is certain to be reduced.

The Commission for Africa is leading calls for a sustained push to overcome barriers to the continent's development. Climate is, without doubt, one of these barriers.

The UK looks forward to working with African institutions and governments, as well as with our EU and G8 partners, on this issue.

Together, we must ensure we have the best possible information about Africa's climate and how it is changing. And we need to harness that information to our ultimate goal, achieving profound and lasting progress towards eliminating poverty in Africa.

Margaret Beckett
Secretary of State for Environment, Food and Rural Affairs

Hilary Benn
Secretary of State for International Development

Key points

- Climate change will hit developing countries hardest.
- Africa has an extreme and unpredictable climate. This already obstructs its development. Climate change will increase vulnerability levels in Africa.
- Developing capacity to deal with today's climate variability is the best way to equip Africa to deal with tomorrow's climate change.
- We know remarkably little about Africa's climate. This has an impact on African development, while also hindering our efforts to understand the global climate system.
- Current data on Africa's climate are inadequate. Observing systems are weak and deteriorating, and climate models are unreliable. There is a serious lack of relevant human capacity and expertise.
- More effective climate information is needed in order to integrate climate risk into the development process, to enable adaptation of development to climate variability and change.

- Long-term collaborative programmes are needed that build Africa's capacity to overcome its climate challenges, and demonstrate real impact on poverty reduction efforts.

One African development and climate change

Africa is the world's poorest continent. Over 45% of sub-Saharan Africans live on less than a US dollar a day, an increase from 44.6% in 1990. Despite recent signs of a renewed effort to tackle Africa's development problems, few African countries are currently on track to meet their Millennium Development Goal targets.

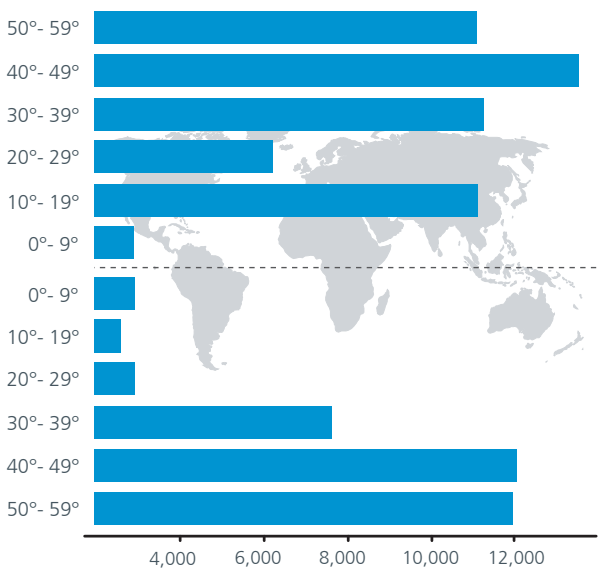
Africa is critically vulnerable to shocks that disrupt lives and livelihoods. Vulnerability is a cause of poverty, with sudden loss of income and assets condemning millions to existing on the margins of society.

Poverty, in turn, increases vulnerability. Poor people often live in places and work in sectors that are susceptible to natural calamities or adverse economic factors. Poverty limits their ability to cope with and recover from shocks. Climatic events such as floods and droughts therefore have a disproportionate impact on poor people.

Africa is greatly affected by its climate. Africans are heavily dependent on agriculture, which accounts for nearly half of employment in the region. Africa accounts for 90% of global malaria cases and over 90% of cholera cases, while nearly half of Africans lack adequate access to sanitation

and clean water. Future economic development will be highly dependent on water availability. Health services, meanwhile, are ill-equipped, while poor governance leaves African societies struggling to cope with existing problems, let alone new ones.

Figure 1 – GDP per capita by latitude (US$)



Source: Bloom and Sachs (1998).

Africa's disappointing development record is explained, in part, by its disadvantageous geography, climate and

environment. Ninety-three per cent of Africa lies in the tropics – a much higher proportion than any other region. As figure 1 shows, across the world tropical regions are less affluent than temperate regions. Much of the rest of the continent is arid, with droughts and dust a constant menace. The disease burden is notably high, even when income levels are taken into account.

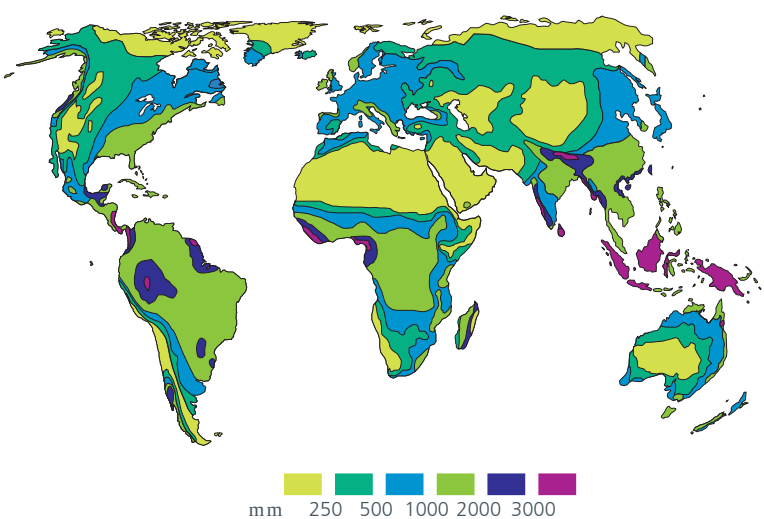
Climate change is projected to exacerbate Africa's existing climatic variability. Global carbon dioxide emissions have quadrupled in the past 50 years, and atmospheric CO_2 concentrations have climbed rapidly. Temperatures have already risen as a result of human activity, while the Intergovernmental Panel on Climate Change (IPCC) predicts a further rise of between 1.5 and 5°C by 2100.

The IPCC has forecast that tropical areas are likely to become wetter and non-tropical areas drier, although considerable variation is expected. It is possible that warming will occur more rapidly than the global average in the Sahara region and in western and southern Africa. The frequency of extreme weather events is also likely to increase, and rises in sea level may imperil some coastal areas.

Two Africa's climate

Africa's is a climate of unpredictable extremes. While the continent is the world's hottest and driest land mass, some areas are subject to periods of heavy and unpredictable rainfall (figure 2). The timing of monsoon rains varies year by year, and variations in their intensity lead to both flooding and drought.

Figure 2 – Generalised global pattern of rainfall:



Source: River Path Associates

Africa's climate is influenced by the Atlantic, Indian and Pacific oceans.

El Niño, a natural climatic phenomenon linked to changes in atmospheric pressure and sea temperature in the Pacific, has a dominant impact on year-to-year climate variability in Africa. It is associated with reduced summer rainfall in southern Africa and increased rainfall in the eastern part of the region. El Niño is crucial to seasonal forecasting in Africa and to understanding the global climate system, but global circulation models are currently not able to predict its evolution well.

El Niño is also associated with extreme weather events, to which Africa is especially vulnerable. In 1991 it caused a drought in southern Africa; in 1997, large-scale flooding in Somalia and Kenya.

Other aspects of the African climate have received less attention, but many severe climatic events have blighted the continent in recent years, including:

- the long-running drought and famine in the Sahel region of West Africa in the 1970s, which is estimated to have killed nearly 200,000 people;

- the devastating floods caused by tropical cyclones in Mozambique in 2000, which destroyed much of the country's infrastructure;

- the East African drought of 2000, which drastically reduced Kenya's hydroelectric power output, leading to blackouts and severe power shortages.

Both long-term climate-induced economic damage and sudden catastrophes can have serious effects on Africa's development. Soil degradation, which affects 65% of the continent's agricultural land, threatens agriculture, while water scarcity is expected to increase sharply in Africa by 2025, with climate a major contributory factor.

The economic impacts are significant and do not take into account the human costs, including loss of life, health impacts, and other effects on the livelihoods of the poor:

- the floods in Mozambique slowed annual economic growth from 8% to 2% between 1999 and 2000;

- floods and droughts experienced by Kenya at the turn of the century cost the economy an average of 16% of GDP per annum over a 2.5-year period.

- an analysis by the International Monetary Fund (IMF) of six African countries showed that the 1991–92 drought cut incomes by amounts ranging from 2% in South Africa (a relatively diverse economy) to over 8% in Malawi (where agriculture accounts for 45% of economic activity).

Africa, in other words, must cope with extreme climate variability today, at the same time as it plans for additional climate stresses that it will face tomorrow. An understanding of climate risk and how to manage it must be integrated into its development planning. This task requires effective, reliable and timely information.

Three African climate science

A sound platform of climate science and information is essential if assessment and management of climate-related risks are to be incorporated into development planning.

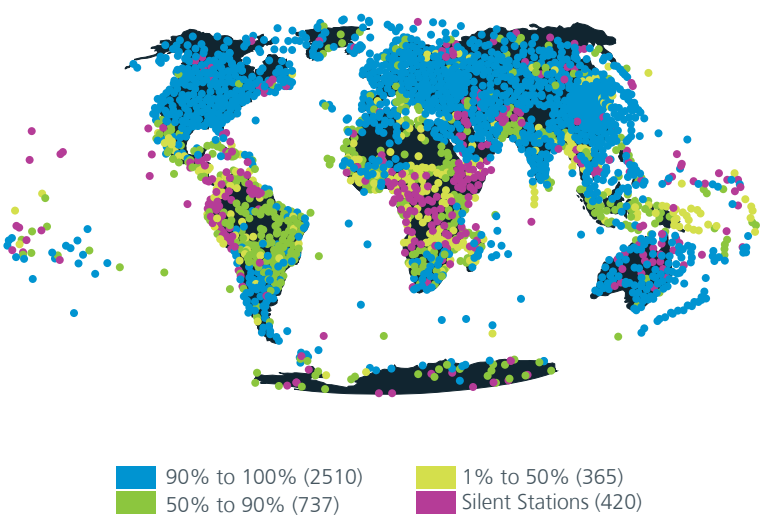
There is some capacity to assess climate risks in Africa. Early warning systems have been set up in several areas, and national meteorological services and regional centres, such as the Southern African Development Community Drought Monitoring Centre in Harare, gather some valuable data.

In general, however, there is a paucity of information on which policy-makers, businesses and individuals can base decisions. Knowledge of existing climate conditions is, at best, sketchy, while there is little consensus on how climate change will affect the continent. Reliable extreme weather forecasts remain out of the reach of most climate centres.

Observing systems are the foundation of all climate science. They are necessary for calibrating climate data produced by satellites. African systems are in a bad state and are continuing to deteriorate. The World Weather Watch network is intended to provide near-instantaneous exchange of weather information across the globe. But the density

of weather watch stations in Africa is eight times lower than the minimum level recommended by the World Meteorological Organization, and reporting rates are the lowest in the world (figure 3). Weather stations are unevenly distributed, and useful networks of secondary stations often do not report data internationally. Data deterioration is a further pressing problem, with many irreplaceable records currently at risk.

Figure 3 – Number of synoptic reports received by the World Meteorological Organization from World Weather Watch Stations, 1998–2002



Source: World Meteorological Organization (2003).

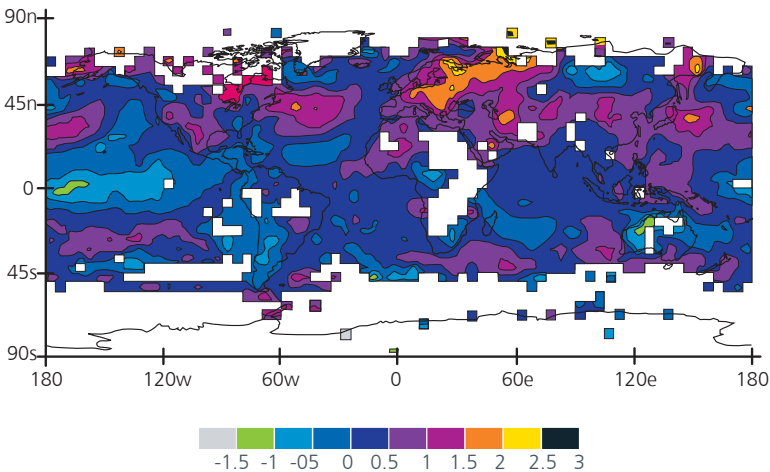
Climate monitoring is not only a problem on dry land. Understanding of the state of oceans is vital to climate prediction on all time scales. The Indian Ocean is thought to have a major influence on African climate, but its monitoring systems are inadequate compared with the systems in place for the tropical Pacific and Atlantic oceans.

Climate models, which are run using climate observation data, are a crucial tool for prediction, but their use in Africa is severely limited. Few baseline data are available and technical expertise is lacking. African data are, by and large, not provided as an input for global models.

The weakness of models also makes forecasting future climate changes and variability difficult. There is little consensus, for example, on future rainfall patterns in southern, western and eastern Africa, and limited agreement on the likely impacts on them of El Niño.

Globally, gaps in our knowledge of Africa's climate inhibit our ability to construct reliable models of the global climate system. Even for parts of the region that are vital to the global climate system, such as the Congo basin, the knowledge base is remarkably weak (see figure 4; white sections show missing data). This has an impact on our understanding of climate variability and change.

Figure 4 – Near-surface temperature anomalies, 2000: Difference (°C) from 1961–90



Source: Hadley Centre for Climate Prediction and Research (UK Met Office).

A further problem derives from a failure to communicate climate data adequately to key stakeholders. Policy-makers do not use climate information effectively in planning. Development programmes are therefore vulnerable to climate variability and change. Infrastructure projects, for example, such as road building and provision of housing, do not always factor in climate risks, leaving them vulnerable to the effects of extreme weather events or long-term climate change. Ineffective projects impede development and threaten to deepen poverty.

Rural communities are even more detached from the data. Farmers need short- and medium-term rainfall forecasts and information on the timing of the rainy season. However, a survey of pastoralists in Ethiopia and Kenya found that only one-fifth had heard a forecast about the onset and duration of the long rains. This contributes to uncertainty around planting and harvesting decisions, and means communities are unable to prepare for events such as flooding or cyclones.

Behind all these problems lies a lack of human capacity and expertise. The level of published activity from Africa on climate science is among the lowest in the world, with only seven publications from the region between 2002 and 2004 in two leading climate journals. Deteriorating working conditions and a lack of government commitment to climate research mean African scientists have few incentives to remain in the region – brain drain to wealthier regions threatens to weaken the knowledge base further.

Weak funding structures are largely responsible for the paucity of human resources. National-level support for climate-related activities in Africa is the lowest for any continent, and international support is patchy. Funding available for developed-country projects in Africa tends to exclude funding for Africans, and African-funded projects exclude non-African scientists. This prevents the collaborative capacity building that is vital to support the development of African science.

Integrating climate risk management into development planning will ensure the long-term sustainability and resilience of livelihoods and assets, and Africa's lack of capacity to do this work by itself makes international collaboration vital.

Four Responding to the challenge

Efforts to accelerate African development have intensified in recent months. The New Partnership for Africa's Development and the Commission for Africa are examples of increased international attention to the region's problems, which include climate variability and change.

New investment will have to take account of climate. Failure to address it properly could threaten the sustainability of development projects, meaning that lives and livelihoods are not improved and money is wasted.

Some international agencies have begun to address climate issues in development planning. The World Bank, for example, is developing tools for screening project activities for climate risks. The US Agency for International Development is piloting a framework for mainstreaming climate-related risks into development planning. These efforts need to become more co-ordinated and widespread. This is a process which the G8 countries could help to promote among bilateral and multilateral donors.

For development planning to adapt and become 'climate proofed', however, major improvements are needed in the following areas:

- Better monitoring and data interpretation capacity: managing today's climate variability and adapting to climate change must be based on reliable data. Africans need climate information in order to develop effective risk-management strategies. Engaging end-users of the data and building ownership of the climate monitoring process are vital for sustainable improvements in the region's climate research capacity.

- Better scientific collaboration: for scientific collaboration to enhance the development process, Africa must be treated as an equal partner. Developing modelling and prediction capacity in Africa will enable better use of that data in development planning.

- Better integration of climate information and science into the development process: risk assessment and management underpin effective development planning. New investments should take account of current climate variability and future climate change. Multiple stakeholders, including scientists, policy-makers and communities, should be involved, so that integrating climate considerations into development planning becomes a society-wide rather than a piecemeal effort.

Some action to strengthen African climate information and science is already under way. The continent's Regional Climate Outlook Forums have begun to combine monitoring with seasonal forecasting. The Forums have provided a successful link from science to social needs, by bringing together forecasters and users. Building on the successes of these existing institutions to establish regional climate centres that tailor modelling, seasonal forecasting and prediction capability to the needs of users will enhance African ownership of climate research and increase its impact on development planning.

Such centres are likely to raise the demand for climate information. In the long-term, national funding for climate services in Africa should meet that demand; in the short-term international assistance is required. Climate is an issue that crosses borders, so a multilateral approach is needed to complement targeted bilateral support.

Improved climate information and science in developing countries will have important positive impacts on sustainable development. Climate information can and should have a greater influence on decision-making in Africa, and it is also vital for our understanding of the global climate system. Much needs to be done to bring African climate research up to speed with other regions. The scale of climate information and scientific deficiencies in the continent requires a long-term, multilateral international response.

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ISBN: 1 86192 691 X