

## Using Science To Improve Adaptation in Africa

### Key Findings

- **Vulnerability to climate change in Africa is caused by the combination of direct dependence on the natural environment for livelihoods, a lack of infrastructure and high levels of poverty.**
- **Climate change places considerable additional stress on the biophysical, economic, political and social systems that determine livelihood security in Africa.**
- **There is a risk that adaptation to changing environmental circumstances will focus on climate variability and fail to take into account anthropogenic climate change.**
- **There are very few examples of decision makers successfully drawing on climate change projection data to take decisions that have improved agricultural productivity or human well-being.**
- **There are issues over how climate information is reported, and over how it is perceived in terms of its reliability and relevance to agriculture. There are also difficulties in accessing and understanding such data.**
- **Many organisations in Africa, at local, national and regional levels, lack the capacity and support network that they need to be fully effective.**

### Introduction

The 2008 study *Climate change and adaptation in African agriculture*, commissioned by the Rockefeller Foundation, set out to identify and understand the extent to which, and ways in which, information from climate change models is being integrated into agricultural development practice and decision making in Africa.

### Vulnerability to climate change in Africa

Climate change is expected to intensify existing problems and create new combinations of risk with potentially grave consequences. This is particularly true in Africa where direct dependence on the natural environment for livelihood support combines with a lack of infrastructure and high levels of poverty to create vulnerability in the face of all types of environmental change. In regions of Eastern and Southern Africa, vulnerability is particularly high due to the large number of households that depend on the already marginalised natural resource base for their livelihood.

Climate change is expected to place considerable additional stress on the biophysical, economic, political and social systems that determine livelihood security in Africa. Accordingly there is a growing need for ‘anticipatory adaptation’, in other words, proactive rather than reactive management of climate change risk.

### Use of climate data

Successful anticipatory adaptation requires the best available information concerning the nature of future climate risks. Therefore it is vital that climate science is used more effectively in adaptation decision making. Whilst African agriculture

has always had to, and continues to, adapt to changing environmental circumstances (including climate), there is a danger that this adaptation with its focus on climate variability, will not take into account the trends imposed by anthropogenic climate change.

The development of climate projections for Africa is evolving rapidly. The science of climate modelling is complex and efforts to communicate this science to agricultural users remain rudimentary and fraught with what are perceived to be contradictory and unreliable messages. The climate data available to agricultural users vary greatly in terms of usefulness for specific decisions. Current use of the data is based on the accessibility and familiarity to the users, rather than suitability to the specific problem or research question being addressed. Within the climate science community there is an emerging effort to make findings more suitable for decision making, but as yet there is very little consensus as to how data may be relied on for decision making.

Amongst farmers, applications of the existing downscaled data in decision making are limited to a few progressive and long-term farming schemes and agribusinesses. This is unsurprising as there is currently very little evidence that short-rotation crop farmers stand to benefit from using the available climate data in their decision-making due to the temporal and spatial scale at which this data are reported. What is conspicuous is that very few agricultural policy makers, crop breeders and donor agencies - whom one might expect to adopt a longer-term and more strategic focus – apply the available climate data in their program formulation.



Photo: Trevor Samson/World Bank

### Communication between decision makers, scientists and farmers

There are currently very few “proofs of concept” – that is examples of agricultural decision makers that have successfully drawn on climate change projection data to take decisions that have improved agricultural productivity or human well-being. This is a function of the temporal and spatial at which climate data are provided as well as the way in which they are reported, perceived in terms of the reliability of the data, questions of their relevance to agriculture, and difficulty in accessing and understanding the data.

There is a need to bridge the gap between information producers and information users. Users must be equipped to appropriately interpret and apply climate change projections while also clearly understanding the possibilities and limitations. Climate scientists must develop a better understanding of the information needs of different user groups so that output can be effectively targeted. Those working as intermediaries between users and producers must be able to translate the scientific concepts into language that users can understand and apply.

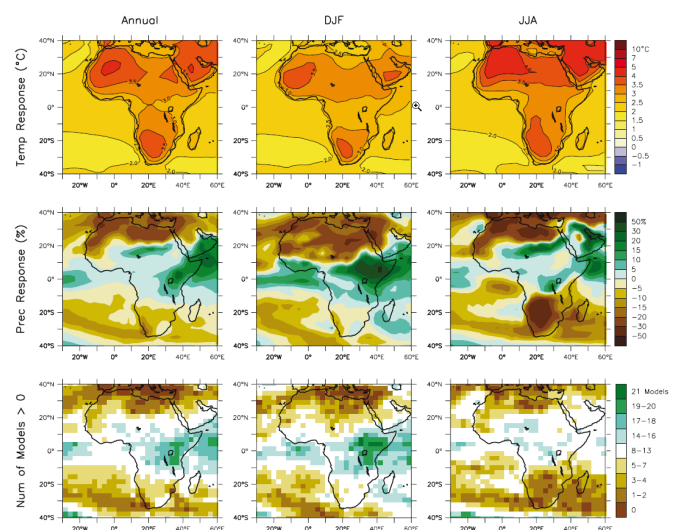
### Climate science capacity in Africa

While awareness of and references to climate change are both increasing, the climate data that are used within African agriculture are generated by a few key international organisations, while modelling from within Africa is limited. The use of these data is based on their accessibility and familiarity to the users, rather than their suitability to the specific problem or research question being addressed. As such there is very little discernment of the relative merits of different climate models for specific regions or purposes, even though models differ markedly in their utility for specific regions and parameters.

To address the “disconnect” between climate science and African agriculture, adequate capacity to link existing climate data

and agricultural decision-making must be created. This is as much an institutional challenge as it is a technical and human resource challenge.

Despite Africa’s institutional deficit, there is a range of existing organisations and networks that have emerged to respond to local challenges. These should be the starting point for building adaptation responses. Typically, existing organisations have a long-standing presence in the region and have built effective networks, credibility and trust among stakeholders. These organisations are often grounded in the local reality. They understand local needs and know how to deal with the institutional constraints in the country in which they operate. Discussions should take place between newcomers and existing donors to ensure an effective response.



Source: IPCC Fourth Assessment Report, Climate Change 2007: The Physical Science Basis

An example of global climate modelling. Such large-scale data is used in ‘downscaling’ to provide finer resolution projections that are often more suited to use at the local level.

### Support for African agriculture

The nature of climate change adaptation demands that efforts to support African agriculture in the face of climate change incorporate a multi-disciplinary set of stakeholders including climate science experts, agricultural practitioners and technicians, local communities/civil society, donors and policy makers. A key challenge involves extending the capacity that currently exists in agro-meteorological disciplines to include agro-climatic competency.

Local 'climate change adaptation platforms' have been proposed by a number of development agencies, as a means of promoting collaboration between scientists and practitioners, and enhancing local adaptation capacity. These platforms can provide a space for collaborative action, mutual learning and the exchange of a range of material, for example from mailing lists, e-conferences, academic papers, policy briefs or information sheets. It is essential that these institutions design their activities around local needs and not the funding or reporting requirements of the international climate change community.

### Funding and donor support for climate change adaptation

Climate change adaptation is, at its best, a social learning process that equips local decision-makers to respond to a wide range of difficult to predict contingencies brought on by perturbed climates. Although one-off projects are capable of delivering technical capacity and social learning, experience has shown that creating the capacity to apply climate information is a resource intensive process that takes time. It is important that funding for climate change adaptation goes beyond pilot projects and one-off interventions, and instead allows local institutions to explore the relevant issues and develop the broad set of institutional capacity and technical skills that will equip them for the challenge.

Developing the necessary independence and stability will require much input from different stakeholders. For donors this presents the challenge of ensuring that funding for processes, which is more difficult to monitor than funding for projects, still delivers robust benefits and value for money.



Photo: Adèle Arendse

This policy brief is based on the findings and recommendations of the report *Climate Change and Adaptation in African Agriculture (2008)*, prepared by Ziervogel, G, Cartwright, A., Tas, A., Adejuwon, J., Zermoglio, F., Shale, M. and Smith, B., and supported by the Rockefeller Foundation. This policy brief was prepared by Gina Ziervogel, Tom Downing and Molihi Shale.



Photo: Morne van Wyk

## Recommendations

### **Improve access to historical climate data**

By improving access to and availability of historical data, the quality of local level projections would be enhanced and past climate trends could be more closely examined. 'Rescuing' historical data and converting these to workable (digital) formats would support this.

### **Strengthen skills for applying climate science**

Climate scientists in Africa need to be better trained to apply climate change models, particularly at the local scale. Increased employment opportunities at the post-doctoral level are required. Regional climate-science centres should be established that have the necessary technology and institutional capacity to support climate modelling and downscaling.

### **Improved links between information producers and information users**

Communication between users of climate change model output (e.g. decision makers) and producers of data (climate scientists) should be strengthened. This requires a focus on building the capacity of users; improving climate scientists' understanding of the information needs of different user groups; and supporting the 'translators' who act as information conduits between the two groups.

### **'Platforms' for collaborative action and information sharing**

A 'platform' for climate change adaptation provides space for collaborative action, mutual learning and the exchange of a range of material. A successful platform should be multi-disciplinary and have clear links to policymakers.

### **Build on existing organisations and networks**

Existing organisations and networks that have emerged to respond to local challenges benefit from a long-standing presence in the region and have effective networks, credibility and trust among stakeholders. Discussions should take place between newcomers and existing organisations to ensure an effective response and avoid overlaps in roles and responsibilities.

### **Develop and communicate examples of 'good' adaptation**

Evidence of 'good adaptation' should be recorded, catalogued and promoted to encourage local people, policymakers and development agencies to implement adaptation responses. Such records could also help to measure and assess the value of using climate change projections.

### **Focus aid to better support adaptation**

Resources should focus on the needs that are emerging from within Africa. Aid should support longer-term processes and help integrate 'climate-driven' and 'development-first' approaches in institutional processes. Support is required for both independent adaptation projects and development projects that integrate climate adaptation.