



PN 53: FOOD AND WATER SECURITY UNDER GLOBAL CHANGE – DEVELOPING ADAPTIVE CAPACITY WITH A FOCUS ON RURAL AFRICA

Long-term changes in climate will disproportionately affect regions in tropical zones, countries where a majority of the population is employed in agriculture, where rainfed agriculture is the predominant agricultural production method, and that are poor. As a result, poor farmers and livestock herders in Sub-Saharan Africa will likely bear the brunt of adverse impacts from climate change.

The objectives of this project are to understand the impacts of global change on agriculture and water resources at the global, national, and river basin levels, to assess the effects on water and food security in vulnerable rural areas of Africa, particularly rural Ethiopia and South Africa, and to assist in the development of adaptive capacity to respond to these impacts. Case studies include the Limpopo basin in South Africa and the Nile Basin in Ethiopia. The research results developed will provide policymakers and stakeholders in Ethiopia and South Africa with tools to better understand, analyze, and inform policy decisions for adaptation to global change.

The project combines vulnerability to climate change and determinants of adaptation analysis at the local, farm level with implications of climate change at the basin and national levels and links these components with both a national-level and global level CGE model for impact analysis (on poverty outcomes) as well as with a global water-food projection model to analyze

alternative adaptation strategies to 2050 for both Ethiopia and South Africa.

The project is coordinated by the International Food Policy Research Institute in Washington DC. The Ethiopian Development Research Institute (EDRI) and the Ethiopian Economics Association / Ethiopian Economic Policy Research Institute in Addis Ababa are the major partners in Ethiopia, and the Center for Environmental Economics and Policy in Africa (CEEPA) in Pretoria is the main partner in South Africa. Hamburg University is also a partner.

Preliminary results from surveys on farming practices in the Limpopo and Nile Basins suggest that although many farmers are aware of long-term changes in temperature and rainfall, and have suggestions on how to adapt to these long-term changes, they are faced with barriers to making these adjustments [see also Box 1, enclosed].

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If farmers are aware of climate change and variability ...Why are they not adapting?

A majority of farmers in the Limpopo (90%) and the Nile Basin (60%) perceive and are aware of long-term changes in precipitation and temperature. In response to higher temperatures and decreased rainfall, farmers have developed different adaptation strategies to mitigate some of the negative impacts of climate change. They range from irrigating more, changing crop varieties or crops, shifting planting dates, to stopping farming as an activity and instead investing in livestock.

Farmers adopt different adaptation strategies in response to changes in rainfall and temperature changes. While adopting a new crop variety is the main strategy used to adapt to increasing temperatures, building water harvesting schemes and increasing irrigation is the primary adaptation strategy to decreased precipitation.

However, about 40% of farmers do not change farming practices. *Why aren't there more farmers adapting?* The preliminary results of the survey suggest that there are two distinct constraints to adaptation in the case study sites: In the Limpopo Basin, lack of credit was the main factor that was cited by almost half the farmers. Other reasons included no access to water (18%), no property rights (9.5%), and lack of market access (4.3%). It is striking that only 1.7% of respondents cited a lack of information as a constraint in adapting in South Africa/Limpopo. We find a very different picture in

Ethiopia, where a majority of farmers cite lack of information and knowledge as the primary factor preventing them from adapting to long-term changes in temperature and rainfall (20%). Like in South Africa, access to credit and money (20%) is also an impediment to adaptation.



Irrigated Field in the Limpopo River Basin
Source: Claudia Ringler

These results suggest that although climate change adaptation strategies need to focus on the provision of improved access to water, and enhanced crop varieties, in order to be effective, policies must also address market imperfections such as access to information, credit and markets in order to help small-scale subsistence farmers to adapt to climate change.