



Weathering drought in the Greater Horn of Africa



The Greater Horn of Africa, in the continent's east, depends on rain-fed agriculture and is highly vulnerable to drought. Even with normal rainfall, the region does not produce enough food to meet its needs. Devastating droughts occurred in 1973–74, 1984–85, 1987, 1992–94, 1999–2000, and 2005–06. The failure of the rains in 2009 led to massive food shortages in East Africa and destroyed 40% of Kenya's maize harvest. Failure of the rains in late 2010 and in 2011 has precipitated a humanitarian crisis once again.

Responses to these crises focus largely on short-term emergency aid. More needs to be done to encourage farmers to prepare for drought and changing rainfall patterns, which are intensifying. Much is at stake: the region is densely populated, with some of the world's highest levels of malnutrition.

Since 2007, a research initiative led by Tanzania's Sokoine University of Agriculture has been working to improve seasonal forecasting information for farmers, extension workers, and development organizations in Ethiopia, Kenya, Sudan, and Tanzania. Teams have assessed vulnerability to drought in different contexts, and have designed and tested tools to help agricultural producers and local officials make well-informed decisions about crops, water, and soil management techniques to reduce risk. As the project concludes in 2011, they are adopting soil conservation and water-harvesting technologies that have proven effective. In study zones in all four countries, producers and district-level agricultural officials are demanding and using more accurate climate information to plan seasonal activities.

Narangamwake Lusuguiya, member of an indigenous weather forecasting group in Ruvu village of Tanzania's Same district
Photo: IDRC / Thomas Omondi

By the numbers

212 million¹ people living in Ethiopia, Kenya, Sudan, and Tanzania in 2010

11.5 million people needing emergency aid during the 2011 drought

less than 30% Rainfall for March–April–May 2011 compared with the average over the last 15 years²

Sources:
1. UN DESA population database.
2. OCHA Humanitarian Snapshot, July 20, 2011.



Avelini Valeriani Msoka, station manager at Same meteorological station, checks a wind speed sensor.

Photo: IDRC / Thomas Omondi

In each country, farmers were consulted on their perceptions of climate variability and change, their coping strategies, and the options they wanted to test. In field schools within study sites, researchers and extension officials worked with farmers to discover the effect on yields of different options, under variable conditions. In some sites, the research involved private-sector service providers and stockists (of seeds, fertilizers, and pesticides) so farmers could incorporate high-performing cultivars. This approach also brought the producers' practical expertise into the research equation.

Below, we look at some major achievements by country for testing and implementing improved adaptation strategies.

In Sudan – developing new equipment to improve water harvesting

Research took place in Sudan's northern Gedarif State, near the Ethiopian border. The site has a short season and low seasonal rainfall (300–400 mm/year). Some 100 farmers helped identify options for trials aimed at improving yields in dry conditions.

In arid and semi-arid areas, farmers can improve the soil penetration of water by ploughing deep furrows between rows. To facilitate on-site water harvesting, researchers with

Sudan's Agricultural Research Corporation (ARC) developed a specialized seed planter: the Water Harvesting Inter-row Planter, or WaHIP. The lightweight planter makes ridges and plants crops in a single operation; it can be transported and drawn by the most commonly available tractor in Sudan.

The private sector is now looking into commercializing the WaHIP, along with improved seed varieties and hybrids developed by ARC.

In Kenya – whetting appetites for localized climate information

Research in Kenya was undertaken in Kitui, Mwingi, and Mutomo districts. Farmers were surveyed on their perceptions about climate variability and change, and their impressions were compared with long-term rainfall records from nearby meteorological stations. The exercise revealed that, while farmers are well aware of the general pattern of climate variability in their location and its impacts on crop production, they tend to overestimate longer-term climate risks.

Researchers gained a better sense of the strength and limits of farmers' perceptions of climate variability and designed improved seasonal advisory information for them. Demand for localized seasonal information increased as agro-meteorological advisory bulletins were developed and widely disseminated in the districts before each planting season. Farmers were thus better equipped to tailor their crop management to climate conditions.

Over 80% of respondents in all three sites were willing to pay for such crucial information.

Table 1: Farmer perceptions of the usefulness of localized information and advisories

Location	Willingness to pay
Kitui	81%
Mwingi	85%
Mutomo	96%

In Tanzania – pairing meteorological with indigenous forecasting knowledge

In Tanzania, the project worked with 70 producers in seven villages in Kilimanjaro's Same District. Many farmers in the area use indigenous knowledge (IK) of weather patterns to decide on agricultural activities. Increased variability has reduced confidence in these traditional ways.

Researchers helped to connect three groups of IK forecasters within the study sites — one in the highlands, one in the middle slopes, and a third in the lowlands — linking them with the national meteorological services to develop a consensus forecasting process. The research validated the IK and helped improve the quality and acceptance of climate information locally. Trials at farmer field schools tested the relative performance of traditional vs. recommended practices (land preparation methods, seed varieties, etc.), with and without consensus and/or indigenous forecasts.

The project resulted in district-wide policy support for consensus forecasts. Improved and accessible climate information for farmers increased their use of forecasts for decision-making. Those in the study zones adopted recommended practices, such as diversifying crops in response to forecasted conditions and using ridging (terracing), soil quality management, improved crop-spacing, and irrigation.

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Same District agreed to fund the development and dissemination of a consensus forecast just before the start of each growing season. The group of seasonal forecasters has since been incorporated into the District Agricultural Development Plan process, with a budget to be sustained by the district council.

Faces behind the research



Project Leader Henry Mahoo, Sokoine University of Agriculture

With a background in hydrology and irrigation engineering, Professor Henry Mahoo leads the Soil Water Management Research Programme at Tanzania's Sokoine University of

Agriculture. He is dedicated to building homegrown expertise to serve a region where water is a matter of life or death.

Mahoo has seen a four-country team develop new skills and knowledge to confront the complexities of a changing climate.

"The institutions that participated in the project are now experts in climate change projections and adaptation studies. They've gained experience in downscaling global

climate change scenarios, using crop simulation models in projecting yields, and developing decision tools for adaptation," says Mahoo. "Several team members are consulting on climate change with other institutions and securing new research funds."

This learning has fed into new curricula at the university to extend the base of expertise: climate change courses have been developed for Ph.D. candidates and for undergraduate students. And this new-found expertise reaches well beyond researchers. According to Mahoo, "Farmers, stockists, policymakers, extension workers, and NGOs are now seeking out seasonal weather forecasts for making agronomic decisions. This started after our project raised awareness. In Kenya, localized seasonal information is now the first agenda item for district development committees."

The team also advocated for consensus forecasts to be adopted more widely. They made their case to national policymakers through presentations to parliamentary committee chairs, the Ministry of Environment, and senior officials at the Ministry of Agriculture and Food Security.

In Ethiopia – integrating climate change issues into agricultural research and development decisions

Rising temperatures and more variable rainfall are of particular concern for Ethiopia, the second most populous country in Africa, where 85% of the population depends on agriculture for their livelihoods. Agriculture accounts for 47% of Ethiopia's gross national product and more than 80% of exports.

Led by the Ethiopian Institute of Agricultural Research (EIAR), researchers are designing decision-making tools to reduce vulnerability and are working with national meteorological departments to improve delivery of locally relevant seasonal forecasts. Research has focused on two districts in the Central Rift valley: Dugeda Bora District (Meki) and Miesso. Village-based climate change committees have been set up, with development workers dedicated to addressing impacts of climate variability and change. Awareness of the issue has greatly increased among farmers and extension service workers.

The team has made significant progress in integrating climate change issues into national agricultural research systems, as well as government and NGO agricultural developmental plans. Top EIAR management, policymakers in the Ministry of Agriculture and Rural Development, and



Mary Mueni Samson of Munyuni village in Kenya's Migwani district keeps track of rainfall in her small hold plot.

Photo: IDRC / Thomas Omondi

officials in Eastern Shoa and Western Haraghe zones are taking account of climate change in their decisions. They have created a task force to develop detailed guidelines for mainstreaming adaptation into national agricultural research and development systems and plans.

An inventory of adaptive agricultural technologies has been compiled. Translated into Afaan Oromo, it was used to train members of vulnerable communities, which are now using adaptation strategies such as soil and water conservation, flood diversion, and integrated soil fertility management. Development workers and farmers worked with researchers to evaluate the impacts of climate change in their agricultural systems. Involvement in participatory action research helped communities drive the process of planned adaptation. The research team has seen encouraging results within study sites.

*The project **Managing Risk and Reducing Vulnerability in the Greater Horn of Africa** illustrates progress toward CCAA outcome area 3: **The poor in rural and urban environments apply their experience of adaptation with the knowledge and technologies generated by research to implement improved and effective adaptation strategies.***