

# Enhancing resiliency to drought in Kenya's arid and semi-arid lands



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Drought events associated with climate change and climate variability have become more pronounced in Kenya in recent years, adversely affecting the lives and livelihoods of smallholder farmers in its arid and semi-arid lands (ASALs). In response, a pilot project has been undertaken that links together the provision of downscaled weather forecasts, improved agricultural practices, increased access to reliable water sources and the promotion of a revolving microcredit system for women's self-help groups. The project's interventions are contributing to improved and diversified livelihoods as well as facilitating the integration of adaptation to climate change into policies related to disaster management and sustainable development of arid and semi-arid lands.

## Country Context

In the sub-location of Sakai, in Mbooni East District, Kenya, the long rains of 2009 performed poorly. Drought and food insecurity are always a worry in this part of south-eastern Kenya. Like other smallholder farmers who live in the arid and semi-arid lands that cover approximately 80 per cent of Kenya, the people of Sakai have long experienced water shortages and drought due to unreliable and poorly-distributed rains. However, the rains have become more unpredictable since the 1980s.<sup>1</sup> This pattern is consistent with projections that Kenya's vulnerable ASALs will experience an increase in the frequency and severity of droughts and significant declines in rainfall and river flows due to climate change.<sup>2</sup>



Photo Credit: CSTI

A farmer shows district officials the progress of her drought-tolerant maize crop after having applied the training she received in seed selection and improved planting practices.

## The Problem

The poor performance of the 2009 rains between March and May marked the fourth consecutive drought season in south-eastern Kenya. As in other years, the 2009 drought adversely affected rainfed subsistence farmers and livestock producers living in Kenya's ASALs—resulting in a growing level of household food insecurity due to a combination of poor or non-existent harvests and higher food prices.<sup>3</sup> Drought also contributes to growing conflict between households over reduced quantities of grazing land, water and other natural resources. Children leave school to help search for water, and their vulnerability to disease increases as their nutrition declines. As drought becomes more frequent and prolonged in Kenya, and water shortages more severe, the lives, livelihoods, health and well-being of rural subsistence farmers and their families are at greater risk.

Yet the current vulnerability of rural Kenyans to climate change stems not just from increasingly uncertain rainfall patterns. Rather, climate change is an additional stress that compounds persistent development challenges such as a swelling population, land fragmentation, the migration of people into sparser and drier lowlands areas, and inadequate infrastructure and provision of social services. These factors combine to contribute to the region's considerable vulnerability to current climate variability and long-term climate change. As such, efforts to increase the capacity of rural farmers to cope with and adapt to a greater prevalence of drought due to climate change requires a holistic approach that addresses their need for information, access to technology, capacity building, new livelihood opportunities and a supportive policy regime.

1 Awuor, Cynthia. 2009. Increasing drought in Kenya. In *Understanding Climate Change Adaptation: Lessons from community-based approaches*. J. Ensor and R. Berger, eds. *Practical Action*: 101-114.

2 Kenya. 2002. First National Communication of Kenya to the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). <http://unfccc.int/resource/docs/natc/kennc1.pdf>

3 In August 2009, the World Food Programme estimated that 3.8 million Kenyans, or about one-tenth of the population were in need of access to emergency food assistance. <http://www.wfp.org/news/news-release/wfp-seeks-urgent-assistance-kenya-sinks-deeper-crisis>

# The Project

To demonstrate actions that can be taken on the ground to increase resiliency in the ASALs of Kenya to climate change, a pilot project was launched in the sub-location of Sakai, Mbooni East District, in 2006. The project seeks to demonstrate how an integrated approach that brings together the provision of weather information, improved knowledge of agronomic practices, greater access to drought tolerant seeds and water resources, livelihood diversification, and the engagement of policy makers can strengthen the capacity of rural Kenyans to cope with drought today and in the future. It is driven by a participatory process through which the people of Sakai have identified their priority concerns and desired responses, and linked with technical knowledge and support provided through the district and national government as well as academics. By bringing these groups together, the project aims to demonstrate measures at the field level that can be taken to reduce the vulnerability of smallholder farmers to climate variability and climate change. It also aims to feed this knowledge into national policy processes to facilitate the integration of climate change considerations into national sustainable development policies and practices.

## On the Ground

The project was initiated in 2006 by the Centre for Science and Technology Innovations (CSTI), which partnered with the Arid Lands Resource Management Project (ALRMP), a community-based drought management project of the Government of Kenya. In consultation with the local District Steering Group, the five villages in Sakai sub-location were

selected as the site of the project. Sakai was selected because of its vulnerability to drought, existing local institutions and the willingness of the community. The approximately 4,800 people living in the sub-location rely on marginal mixed farming fed by rains that fall in March/May (the long rains) and in November/December (the short rains). However, residents report that the long rains have become less predictable since the 1980s, leaving the community increasingly dependent on only the short rains for one reliable annual harvest.

Consultations with community members and a baseline survey revealed key sources of vulnerability to drought. These included: farmers' inability to access weather information appropriate to their agricultural planning; poor access to reliable water sources, as nearly 90 per cent of households depended upon water from streams or rivers in the dry season; agronomic practices that relied heavily on varieties of maize, millet and cowpeas that are sensitive to drought; and a low diversification of livelihoods, particularly those of women. To address these sources of vulnerability to climate change, the project implemented five interlinked activities.

### Linking meteorological and agricultural information more effectively

Since late 2006, staff from the IGAD Climate Prediction and Analysis Centre and the Kenya Meteorological Department have worked with the ALRMP to provide farmers with downscaled weather forecasts. These forecasts of the onset, cessation, quantity and distribution of rains have been translated into agronomic advice on

the timing of land preparation, planting, seed selection, seed spacing etc. Farmers were encouraged to plant a portion of their lands in crops suitable for the projected rainfall, but also to enhance their resilience to unexpected events by planting varieties that would grow if the rains were greater or less than forecasted. Based on these experiences, a Farmers' Handbook tailored specifically to Sakai's agro-ecological conditions has been produced — the first of its kind in Kenya.

Like many of Kenya's arid and semi-arid areas, water shortages and drought are a perpetual risk in Sakai. The use of appropriate maize varieties and proper agronomic practices can help ensure that healthy maize crops continue to be produced in a future increasingly influenced by climate change.



Photo Credit: CSTI



Sand dams constructed in Sakai and other parts of Kenya have proven to be reliable sources of water for people, livestock and plants during the dry season and in times of drought. By slowing the flow of creeks or rivers, these dams trap sand (which prevents evaporation) and cause water to percolate underground, where it remains available for future use.

## Improving agronomic practices

Working with the Kenya Agricultural Research Institute, the Ministry of Agriculture and community members, the project re-introduced seeds from traditional crops (e.g., gadam sorghum and pearl and finger millet) and drought-resistant, open-pollinated varieties of maize. Farmers have been trained in appropriate methods for sowing seeds, weeding, rotating crops, mulching and fruit tree husbandry. The practice of seed bulking was introduced through the provision of training in identification, retrieval, selection, bulking and storage of good-quality local and hybrid seeds. Beginning with 40 farmers (65 per cent of whom were women), household demonstration sites were established. Through farmer-to-farmer learning, more than 80 per cent of the households in Sakai had adopted the practices promoted through the project by the second planting season in 2007.

Mangos produced using knowledge about planting and grafting gained through the project are enabling Sakai farmers to increase production of a drought-tolerant crop and diversify their sources of income.



## Enhancing access to water

In dry periods, the women and children of Sakai used to travel an average of approximately four kilometres to collect water. To overcome this challenge and improve agricultural production, three sand dams were built. During the 2009 drought, these dams directly enhanced the resilience of Sakai. One of the dams provided water to 382 households and 1,146 cattle drawn from four neighbouring villages. An integrated system of covered shallow wells and drip irrigation is being introduced to further increase agricultural productivity while promoting water conservation.

## Diversifying livelihoods

To diversify the livelihoods of women, the project introduced a merry-go-round micro-credit scheme in partnership with the District Social Development Office. Five women's self-help groups were trained in accounting and business plan development, and provided loans based on the content of their completed plans. The groups are now producing, buying and selling eggs, cereals and vegetables as well as selling kerosene, enhancing the community's ability to access food stuffs at the local market centre.

## Policy engagement

The project's continual engagement with district- and national-level policy-makers is also facilitating the integration of adaptation to climate change into sustainable development plans and policies. Specifically, the CSTI and ALRMP implementation teams have worked to influence the content of Kenya's draft National Disaster Management Policy and its revised policy on the sustainable development of arid and semi-arid lands.

# Impacts/Results

Through its activities at the field and policy level, the Sakai pilot project has continually striven to enhance local agricultural production and reduce poverty through livelihood diversification. In doing so, it has increased capacity to adapt to the projected impacts of climate change. By improving access to downscaled weather information, drought-tolerant seeds, water resources and microcredit, the project is strengthening the coping capacity of community members, particularly women. These benefits became more tangible during the 2009 drought. In particular, the sand dams constructed by the project proved to be reliable sources of water. Their success in fact demonstrates the need for a significant scale-up of efforts to construct additional and more diversified water sources, as the number of people and livestock attracted by the sand dams led to greater competition and some conflict between users.

Through its policy engagement activities, the project is also helping to spread its benefits to a much larger population. For instance, based upon the project's experiences, Kenya's Ministry of State for Development of Northern Kenya and Other Arid Lands now requires all 28 of the country's ASAL districts to receive downscaled weather forecasts as part of its drought early warning activities. Changes such as these are helping to increase the capacity of smallholder farmers across the ASALs of Kenya to adapt to drought now and in the future.

Further information about this project may be found at: <http://www.iisd.org/climate/vulnerability/adaptation.asp>

"Back in the 1970s, we used to depend on two rainy seasons—that is the short and the long rains. But since the 1980s, the climate has already changed. The long rains are no longer reliable and we are depending on one single season, the short rains that come in December."

"Definitely the community is affected by famine. And when there is famine, all of the resources, that is the funds they have, are channeled to buying food rather than doing other development activities."

— *Veronika Mutaki, Agriculture Officer (Sakai)*

"We are encouraging other people from arid areas like ourselves to put in practice what we have done."

— *Francis Mbithi Kimeu, farmer (Sakai)*

"We can now plant and sell vegetables using the water from the sand dams. Three years ago we had to buy vegetables from Makueni town. But now we have a period of more than four or five months to plant vegetables and other crops."

— *Onesmus Munyao, farmer (Sakai)*

## LESSON 1:

The recent drought in Kenya tested the measures introduced by the project and their potential usefulness in adapting to long-term climatic changes. It highlighted the need for the Government of Kenya to promote an integrated drought management system that links together:

- the distribution of a diversified mix of locally appropriate, traditional seeds at the community level;
- improved access to water resources (such as sand dams) and water conservation practices (such as drip irrigation systems); and
- the diversification of livelihoods through promoting and using drought tolerant crops, training in small-scale business management, and providing micro-credit.

## LESSON 2:

From its inception, the Sakai project has brought together national and district government officials, academia and enthusiastic community members, creating an environment for mutual learning and knowledge sharing. As well, the direct involvement of district and national government officials in the project has led to continual opportunity to identify and promote policy changes, creating the potential for significant up-scaling of benefits.

## LESSON 3:

By bringing together meteorologists, agricultural extensions officers, seed and livestock specialists, and farmers, the project has demonstrated a process for generating and delivering the information farmers need to make informed planting decisions that takes into consideration the uncertainty associated with rainfall projections. Improving access to meteorological information at the local level and communicating this knowledge to farmers in a manner that is understandable to them helps farmers cope with increasingly unpredictable weather conditions.

## LESSON 4:

Critical to the success of the Sakai pilot project has been the involvement of the ALRMP and district agricultural officers — demonstrating the critical role of agricultural extension services in preparing farmers for the impacts of climate change. There is a need to improve agricultural extension capacity in Kenya and other developing countries, and to raise the capacity of district officials to access sufficient information about climate change, its potential implications and actions they can take to reduce vulnerability in the agriculture sector.