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Kenya Smallholder Climate Change Adaptation
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2033 K Street, NW, Washington, D.C. 20006-1002 USA • T: +1-202-862-5600 • F: +1-202-467-4439 • www.ifpri.org

Adaptation to Climate Change for Smallholder Agriculture in Kenya: Community-Based Perspectives from Five Districts

Carla Roncoli, Barrack Okoba, Violet Gathaara, Jane Ngugi, and Teresiah Nganga

This project note presents the results of a community-based, participatory assessment of local perspectives on climate change and adaptation in five sites in Kenya. The sites reflect a wide range of climatic, agroecological, and socioeconomic conditions, including humid/semi-humid areas in western Kenya, the humid zone of the central highlands, semi-arid areas in the Rift Valley, eastern Kenya, and arid areas of northeastern Kenya (see Figure 1.)

Figure 1. Study sites

METHODOLOGY

The study uses data collected through participatory interactions with male and female producer groups (a total of 69 men and 71 women) carried out in October and November of 2009. These interactions involved group discussions of the perceived causes and effects of climate change; actual and potential adaptations and the resources needed to implement them; and additional risks and worries faced by rural producers. Participants in each of the focus groups engaged in free-listing, scoring, and ranking exercises. Researchers coded and analyzed quantitatively the outcome of these discussions in terms of differences between men and women and between producers in humid/semi-humid and arid/semi-arid areas.

INDICATORS AND CAUSES OF CLIMATE CHANGE

Participants stated that the climate is changing and that this change is different from natural variability. They identified variation in rainfall patterns—reflected by change in distribution, duration, and amount of rains—as the key indicator of climate change; participants also cited temperature change, but less often, with most farmers referring to an increase in temperature.

The discussion of "causes" of climate change points to significant cultural differences between the ways scientists and farmers understand "cause." While scientists often discuss causal factors in terms of areas one can act upon, farmers in Kenya focus more on the interconnections among different parts of the ecosystem or among the multiple dimensions of environment, society, culture, and morality.

Among the causes of climate change, the farmers mentioned tree cutting most often, usually in conjunction with secondary drivers such as increased human and animal population, trade in charcoal and firewood, and sedentarization of pastoral households. Participants also saw land clearing leading to soil erosion and planting inappropriate trees (such as eucalyptus) as causes of climate change. Some farmers referred to air pollution—due to charcoal production and burning underbrush, household trash, and polyethylene bags—as a cause of climate change. This could be a reflection of messages from the media, NGOs, and government agencies that link (not always accurately) climate change to "pollution" or "contamination." Participants mentioned poor soil management and abuse of chemical inputs, such as fertilizer, as causes of climate change in the two sites that host NGO or project interventions on agroforestry in western Kenya and conservation agriculture in the Rift Valley. Other participants pointed to extraction of sand from river banks (eastern Kenya) and God's will or punishment as climate change causes.

IMPACTS OF CLIMATE CHANGE

All participants reported that climate change impacts their core livelihoods through changes in agricultural and livestock production. In all sites, farmers reported crop failure and low productivity due to drought, particularly for maize and cowpeas. In semi-arid sites, farmers also mentioned cold temperatures and increased wind (which disturbs pollination) as climate-change impacts that reduced agricultural productivity. Farmers in semi-arid and arid areas reported reductions in livestock productivity and higher susceptibility to disease and death because of lack of water and fodder.

In all sites, farmers mentioned impacts of climate change on water quality and quantity, including reduced stream and river flow, lowered groundwater tables, and drying of wells, ponds, springs, and other water sources. Participants noted impacts on soil fertility and vegetation and biodiversity, such as the disappearance of local insects, birds, and animals as well as indigenous trees, shrubs, plants, and fodder grasses.

In addition to the direct impacts on agricultural production and the environment, farmers pointed to many social implications of climate change. Farmers reported that poverty levels increase because of lower yields and lower livestock prices combined with higher food prices and higher production costs (for example, the need to buy fertilizer to compensate for lower yields).

Furthermore, greater drought frequency exacerbates intra- and intercommunity conflicts over natural resources, particularly water. Climate change increases migration to towns in search of jobs (Rift Valley), and pastoralists migrate longer distances in search of water and pasture (northeastern Kenya). Respondents also pointed to the human-health implications of climate change, stressing that hunger, heat, and increased mosquito infestations make people more susceptible to disease.

ADAPTATIONS TO CLIMATE CHANGE

Consistent with most findings from adaptive-strategies research in Africa, participants frequently mentioned livelihood diversification as a key adaptation strategy (see Figure 2). This includes an increase in mixed crop–livestock systems and crop diversification, particularly toward income-generating crops, and the importance of off-farm income not dependent on rainfall. Respondents stressed that off-farm diversification options, such as setting up small businesses, require investments of cash and may not, therefore, be immediately feasible.

The second most often mentioned adaptation strategy, especially by women, pertained to changes in crop-management strategies. Participants mentioned planting more drought-resistant crops and early maturing varieties, and using improved or hybrid seed for greater productivity. In addition to changing what they plant, farmers discussed shifts in how and when they plant. Due to the erratic nature of rains, farmers now typically plant when it rains, disregarding traditional planting schedules developed over decades of experience. As a result, farmers face greater risks of losing their seed if a prolonged dry spell follows planting.

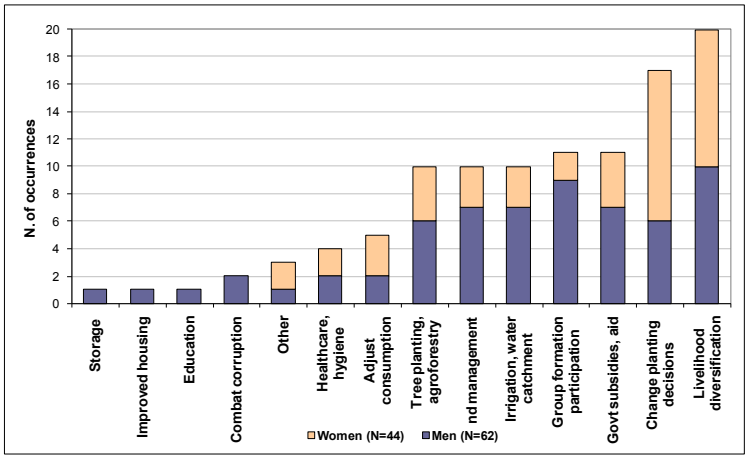


Figure 2. Adaptations to climate change identified by male and female respondents

Because of these long dry spells, as well as other factors, improved access to water for farming and domestic use was another key adaptation strategy voiced in all sites. Among suitable technologies to harness water, farmers cited drip irrigation, tanks for water harvesting, dams, water ponds, and boreholes. Respondents in the more humid/semi-humid sites proposed cutting eucalyptus trees to conserve soil moisture and replacing them with fast-growing and indigenous hardwood trees.

Farmers in most sites stressed soil and water conservation measures and fertility restoration through the use of manure and compost (but also inorganic fertilizer). Men in western Kenya cited planting trees and cover crops that help improve soil fertility and the need to combat soil erosion. Livestock owners in eastern and northeastern Kenya made reference to zero-grazing and sustainable pasture management. Farmers reported planting more Napier grass than maize, giving more emphasis to livestock production, and adopting more drought-resistant livestock breeds.

Respondents in all sites emphasized community-based organizations and farmers' groups as key to adaptation. They recognized that such organizations enable farmers to exchange information, establish rotating credit schemes, access training and technologies, and secure better prices and markets.

RESOURCES NEEDED FOR ADAPTATION

Among needed resources, participants across agroclimatic zones most often mentioned capacity building (see Figure 3). Capacity building includes not only technical training but also group formation and institutional mechanisms, which allow better distribution of government aid and services and easier and safer reporting of corruption and abuses of power.

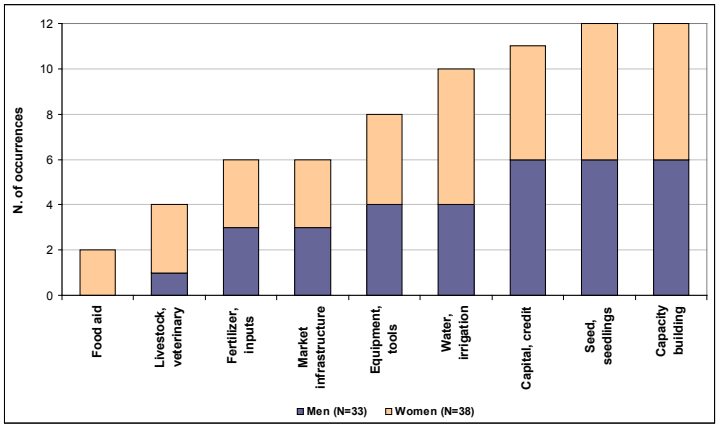
Participants recognized timely access to seed and seedlings for appropriate crops and varieties as a key resource needed for adaptation. Farmers requested that researchers develop and make available seed for drought-resistant, short-cycle (two to three months) varieties, particularly for common crops such as maize, beans, and potatoes.

The need for capital and credit was mentioned, particularly in relation to other resources such as seed (and seedlings for agroforestry), fertilizer, equipment, veterinary services, and irrigation, indicating that farmers see these inputs as unaffordable rather than unavailable. Women expressed some apprehension about the risks and costs associated with credit and a preference for market access and support that would help them earn income rather than borrow money.

The need for water (for irrigation and domestic use) was a prominent topic in all sites, especially for women. Respondents pointed to the need for boreholes for drinking water, watering points for livestock, and motorized pumps. Farmers in all sites except northeastern Kenya requested irrigation infrastructure for horticulture (and credit to operate it).

In addition, farmers appealed for government support for improving farming techniques, imposing price controls on agricultural produce, buying livestock from drought-stricken farmers, digging dams, and planting trees. Some women in the semi-arid site of Njoro and the arid site of Garissa suggested that food aid would improve household food security, thus freeing up cash for more productive investments and diversification of income-generating activities.

Figure 3. Resources needed for adaptation identified by male and female respondents



Participants cited low income and food insecurity as the key barriers to adopting innovations and adaptations and diversifying their livelihoods. Other constraints highlighted by farmers included poor soil quality, land fragmentation, poor road infrastructure, shortage of labor, and pests and disease.

Participants emphasized social and political issues, such as the growing rate of theft, crime, insecurity, violence, and conflict, and governance issues, such as corruption and the poor quality of government services, as constraints to adaptation. Men ranked corrupt practices and poor governance second among constraints to adaptation; farmers in arid/semi-arid areas ranked this item first.

CONCLUSION

Climate is just one dimension of the many uncertainties that characterize the ecological, economic, social, and political environment in which farmers operate. All the communities visited struggle with different combinations of stresses and threats, including but not limited to climate variation. Participants recognized the linkages among multiple dimensions of vulnerability and adaptation and emphasized the need for multisectoral interventions and adaptations, including technical as well as institutional supports. They emphasized the need for enhancing human and social capital at the local level, not only to promote understanding of predictive information and adoption of adaptive technologies but also to bolster farmers' bargaining power in transactions with traders, lenders, and officials; strengthen local organization and planning; and facilitate community participation in development and democratic processes.

Ultimately, the challenges of climate-change adaptation and mitigation will only be addressed by an integrated approach to tackle the systemic interactions between environmental conditions, technical options, policy mechanisms, and political processes. This will require not just tree planting or seed delivery but empowered citizenship and responsive and accountable governance.

Carla Roncoli is an associate research scientist at the University of Georgia, Athens, United States; **Barrack Okoba**, **Violet Gathaara**, and **Jane Ngugi** are senior research scientists at Kenya Agricultural Research Institute-Kabete; and **Teresiah Nganga** is a graduate student at Wageningen University, the Netherlands. The authors gratefully acknowledge World Bank support of the project.