



NOTE

Kenya Smallholder Climate Change Adaptation
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Coping with Climate Variability and Adapting to Climate Change in Kenya: Household and Community Strategies and Determinants

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Kenyan farmers' livelihoods are closely linked to climate conditions. Almost three-quarters of the labor force depend on agriculture for their livelihoods, and almost all farmers depend on timely and adequate rainfall for crop production and husbandry, as only 2 percent of cultivated area is equipped for irrigation. Thus, climate variability and change will have an increasing impact on agricultural livelihoods and food security in the country, making adaptation essential for rural areas in Kenya. This note is based on a report on the coping and adaptation strategies of farmers in seven districts in Kenya covering the arid, semi-arid, temperate, and humid agroecological zones (AEZs) of the country. The report draws on data collected through household and community surveys and participatory rural appraisals (PRAs) to identify ways to encourage agricultural adaptation to climate change

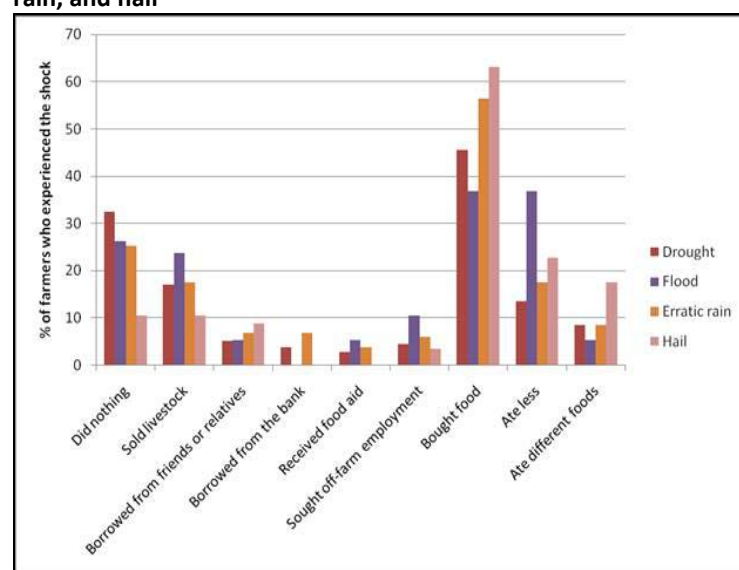
Climate Shocks and Coping Responses

Drought as the key climate-related shock in all districts and AEZs studied, with more than 80 percent of households in all districts stating they had experienced drought within the last five years. Erratic rainfall ranks as the next most common shock, with a third or more households experiencing it in five out of seven study districts over the last five years. Surprisingly, floods affected only a small share of households across all AEZs, and hailstorms affected some households in three of the study districts. Climate-related shocks most often resulted in a crop yield reduction and, in some cases, loss of an entire crop. Other effects reported by farmers include increased food shortages, food price increases, death of livestock, and loss of income and assets.

The main coping responses involve purchasing additional food, reducing consumption, or consuming different foods. Purchasing food was particularly important; between 37 and 63 percent of respondents reported purchasing food in response to climate-related shocks. Households consider livestock an important asset that can be turned into money in response to adverse climate shocks. Between 11 and 24 percent of households reported selling

livestock in response to various climate-related shocks. Some households also depended on formal and informal sources of credit, social safety programs, or off-farm employment to cope with climate shocks. Thus, climate shocks often deplete assets and resources of poor rural households. Nonclimatic shocks, such as illness or death in the family, can worsen such resource depletion. Moreover, coping with short-term climate shocks hinders long-term adaptation, because climate-related shocks deplete resources and reserves year after year.

Figure 1: Coping strategies in response to droughts, floods, erratic rain, and hail



Source: Authors.

Eighty-seven percent of households in the arid area reported they did nothing in response to climate shocks—a significantly higher number than in semi-arid, temperate, and humid sites. This suggests that households in the arid areas have already

adjusted to more difficult climate conditions and have limited additional options at their disposal.

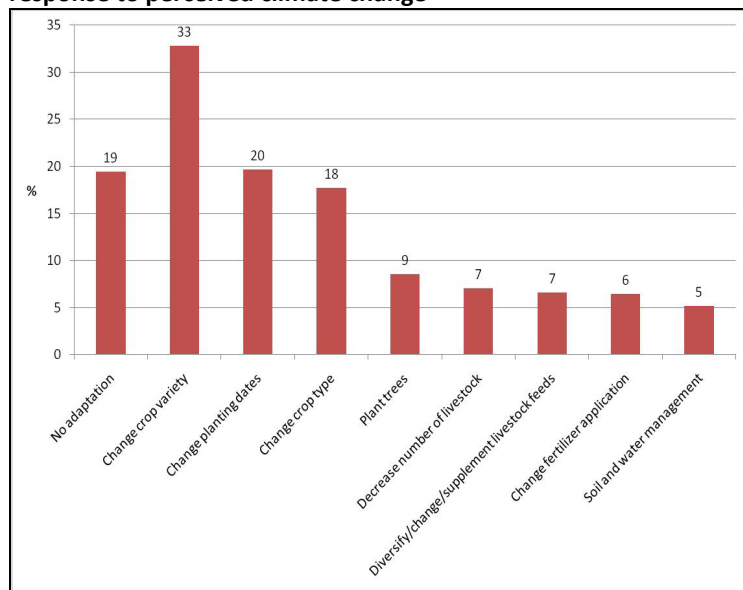
Perceptions of Climate Change and Adaptation

An overwhelming majority of farmers in the study sites perceived an increase in average temperatures (94 percent) and a decrease in average precipitation (88 percent) over the last 20 years. Moreover, 91 percent of farmers reported a long-term increase in rainfall variability, across all districts and AEZs. Farmers' climate perceptions are likely based on an observed decline in water availability due to temperature increases as well as other environmental and social drivers such as an increase in population density. Perceptions may also be influenced by more recent climate trends such as the prolonged and severe droughts and rising temperatures experienced during the 1990s.

Moreover, farmers reported drought and climate change as the two main reasons for the appearance and disappearance of various feed sources for livestock over the past 10 years. However, perceptions of the causes differ by AEZ, reflecting the agricultural potential of different districts.

Key adaptation strategies chosen by Kenyan farmers include changing crop variety (33 percent), changing planting dates (20 percent), and changing crop type (18 percent). Other, strategies reported less frequently include planting trees, reducing livestock, changing livestock feed, changing fertilizer use, and practicing soil and water conservation (SWC).

Figure 2: Changes in agricultural practices reported by farmers in response to perceived climate change



Source: Authors.

Farmers living in the arid area were far less likely to adapt to perceived climate change and those that did implemented a very limited range of adaptation strategies. On the other hand, households in the temperate, coffee-producing areas were most likely to adapt. In the arid zone, households adapted mainly by moving animals, while changing planting decisions, including crop variety and type, and planting dates was most important in the other zones. Community-based adaptation strategies include

development of soil and water conservation structures, sinking boreholes, constructing earthen dams, and protecting springs.

Desired Adaptations and Constraints to Adaptation

Almost half of all farm households listed irrigation as the most desired adaptation, followed by planting trees (39 percent). Irrigation and, to some extent, tree planting require government and private sector/NGO support. Government support provides the enabling conditions (e.g. governance of water use; investments in infrastructure; and extension), while the private sector is important for designing and constructing irrigation systems, making irrigation technologies available, and providing knowledge development. NGOs, the private sector, and the government all have roles to play in providing other rural services that support irrigation development and tree planting, such as credit, education, and health services. In fact, survey results identified lack of money or access to credit and lack of access to water as key constraints for irrigation development; and lack of access to land, water, inputs, and information were key constraints cited for adoption of agroforestry.

One-third of farmers would like to implement changing crop varieties as another important adaptation strategy. Even this relatively modest (in terms of cost) adaptation strategy faces obstacles, including lack of money/credit, lack of access to inputs, and lack of information. Again, the government, the private sector, and NGOs all have important roles in addressing these obstacles, including developing desirable crop traits adapted to Kenya's various AEZs; building capacity and disseminating knowledge through public, private, and NGO extension services; and making better seeds available in remote rural regions.

Determinants of Adaptation

An analysis of the factors influencing adaptation shows these factors vary widely depending on the adaptation strategy chosen. This suggests that different strategies must be used to encourage the adoption of particular adaptation options. Extension services support the adoption of almost all adaptation measures, although certain types of extension are more effective for particular adaptation strategies. For example, field visits encourage the adoption of soil and water conservation measures while farmer-to-farmer exchange programs or field schools influence fertilizer decisions. Climate information is an important determinant for changing planting dates in response to changing weather patterns.

Households with access to means of financing such as credit or off-farm sources of income were more likely to adapt. In particular, access to credit supports the adoption of new livestock practices (destocking and changing feeds) and off-farm sources of income enable farmers to plant trees, change fertilizer application, and construct soil and water conservation structures. Households with access to food or other aid were more likely to change crop variety, change planting dates, and change livestock feeds. This suggests that social safety nets help enable farmers to risk altering their farming practices in response to climate change. However, farmers receiving food aid (usually targeted to the poorest households) were less able to take on larger investments, such as tree planting.

Access to irrigation is an important determinant of whether farmers change crop types, suggesting that investments in irrigation

infrastructure would help farmers switch to higher-value crops. In addition, access to land is important for changing crop variety, planting trees, and constructing soil and water conservation measures.

Individual and household characteristics like gender of the household head, household size, and level of farming experience also influence adaptation. Male-headed households and those with longer farming experience are more likely to change livestock feeds. Larger households and those with farming experience are more likely to implement soil and water conservation measures. In addition, farmers with mixed crop and livestock systems are more likely to change crop variety and fertilizer application.

Conclusions and Policy Implications

Kenyan households face considerable challenges in coping with and adapting to climate variability and change. Many of the reported coping responses to climate-related shocks, such as drought and erratic rain, are “last resort” decisions households are typically reluctant to make, such as selling livestock (particularly when they are not likely to get a good price), reducing consumption, or changing consumption patterns. This suggests the precarious situation of many surveyed households, making their well-being vulnerable to climate shocks’ devastating effects. Greater effort is needed to increase the resilience of households in the face of climate variability over the long term, through the accumulation of assets and wealth, livelihood diversification, and strategic investments in agricultural production.

Coping with climate variability and meeting subsistence needs often means households cannot make productive investments in their farming operation to adapt to climate change or improve long-term productivity. While many households have made minor strategic adjustments to their farming practices in response to climate change (in particular, changing planting decisions), few households can make large investments—in agroforestry or irrigation, for example—although households want to invest in such measures.

This further emphasizes the need for greater investments in rural and agricultural development to support households’ ability to make strategic long-term decisions that affect their future well-being. Investments in infrastructure (such as roads and irrigation), extension services, credit schemes, and climate information systems would help create the enabling conditions for adaptation. Farmers

also need access to essential inputs such as better seeds and fertilizer, as well as other rural services supporting adaptation, such as education and health services.

Adaptations outside of agriculture are also important for livelihood diversification and increasing resilience to climate variability. These adaptations include increasing human and organizational capacity through literacy and technical training in entrepreneurship, income-generation activities, post-harvest processing, and marketing. Off-farm sources of income further support agricultural adaptation by enabling farmers to make additional investments on their farms, including fertilizer, improved seeds, and soil and water conservation measures.

Communities should also work collectively to adapt to climate change. They are already collaborating to develop soil and water conservation structures, sink boreholes, construct earthen dams, and protect springs. Additional measures for collective action communities may consider include raising awareness of climate change impacts and potential adaptation strategies, sharing information about the effectiveness of different strategies, sharing technologies such as seeds, monitoring and forecasting weather within the community, creating informal credit schemes, and generating income collectively.



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