Consumer information to reduce counterfeit agricultural goods in Kenya

Researchers:

Eric Hsu

Edward Miguel

Anne Wacera Wambugu

Sector(s): Agriculture

Fieldwork: REMIT Kenya

Location: Kenya

Sample: 282 rural market areas

Initiative(s): Agricultural Technology Adoption Initiative (ATAI)

Target group: Farmers Agro-dealers

Outcome of interest: Market access Technology adoption

Intervention type: Consumer protection Information Improved seeds

AEA RCT registration number: AEARCTR-0005510

Partner organization(s): Center for Effective Global Action (CEGA), Kenya Plant Health Inspectorate Service (KEPHIS), Private Enterprise Development in Low-Income Countries (PEDL)

Agricultural productivity in Africa is significantly hindered by the use of low-quality inputs, including seeds. In Kenya, researchers assessed the impact of training farmers to verify seed quality on their seed purchasing decisions and productivity, and the responses of seed markets to these changes. Trained farmers became better able to detect seed quality, more selective about where they bought seeds, and experienced higher yields. Sellers, however, did not improve seed quality or adjust their prices in response to the shifts in farmer demand, possibly due to the high cost of doing so. Instead, many opted to exit the market.

Policy issue

Certain agricultural inputs can increase agricultural productivity and improve farmers' livelihoods. Hybrid seeds, for example, can enhance yields by offering greater resilience to weather shocks. However, access to high-quality inputs remains limited and inconsistent in many rural markets in Africa, with products often adulterated, expired, or damaged due to improper storage.

One reason low-quality products may prevail in these markets is that buyers struggle to verify input quality. For seeds, this difficulty arises from different factors. First, farmers have limited opportunities to assess seed performance, as certain crops are harvested only once or twice a year. Second, external factors like weather and soil conditions can also affect yields, masking the true effectiveness of the seeds. Lastly, while existing regulations set minimum standards, governments often lack the capacity to enforce these standards along the supply chain.

Can providing farmers with information on how to detect high-quality seeds equip them to purchase and use better seeds, thereby improving their productivity? Moreover, do shifts in farmer behavior encourage suppliers to offer higher-quality inputs in the market?

Context of the evaluation

Maize is a staple crop in Western Kenya and across parts of Africa and the Americas, where it provides over 20 percent of calorie supply. However, maize productivity in Kenya remains low, partly due to the low quality of seeds available in local markets.

To combat this issue, the Kenya Plant Health Inspectorate Service (KEPHIS) certifies seeds before they are available in the market, including as part of the certification process testing seeds for high germination rate. Certification is required for all seeds sold in the market, but it takes place before distribution to retailers, leaving post-distribution risks like counterfeiting, inadequate storage, and expiration, unaddressed. Due to limited capacity, the government is unable to monitor these additional risks.

This monitoring challenge prompted KEPHIS to launch an e-verification system in 2018, aimed at enhancing oversight along the seed supply chain. This new initiative required every seed packet sold in Kenya to have a scratch-off sticker with a unique code. Farmers could submit this code via SMS to receive key information about the seeds, including details such as the packaging or expiration dates. To prevent fraudulent reuse of codes, SMS checks would signal if a code had been used before.

Despite these efforts, the study documents that over 40% of packets observed in retail markets are problematic in one or more ways. Additionally, over 92 percent of farmers in the study farmed maize and 47 percent reported facing food insecurity.



A farmer picks tea leaves in a tea plantation near the city of Kericho, Kenya.

Photo Credit: The Road Provides / Shutterstock.com

Details of the intervention

In partnership with KEPHIS, researchers conducted a randomized evaluation to determine the effect of an information campaign that trained farmers to identify quality-verified hybrid maize seeds on farmers' ability to detect low-quality seeds, farmers'

agricultural outcomes, and seed sellers' behavior. The evaluation took in place in the Kenyan counties of Bungoma, Busia, Kakamega, and Transnzoia, where the researchers identified 282 rural market areas to include in the study. Selected markets had fewer than a hundred shops, were more than two kilometers from a larger market, and had at least one maize seller. Markets were randomly assigned into two groups:

1. *Quality information group* (136 market areas): A community-wide information campaign took place in these markets one month before the planting season in February 2020. Farmers received guidance on using the KEPHIS e-verification system to check the quality of hybrid maize seeds through flyers and at local community meetings. In addition, researchers visited eight randomly selected farming households in each market area to reinforce this message. In half of the markets, farmers also received instructions on how to report substandard products to authorities, though this component was not evaluated due to limited adoption of reporting.
2. *Comparison group* (146 market areas): Farmers in these markets received no information on identifying the quality of seeds or reporting low-quality packages.

Researchers surveyed the 1017 households that received door-to-door information, as well as 1214 randomly selected households in the comparison group, to collect data on farmers' ability to detect seed quality, aspects of their seed purchasing decisions, such as their preferred market to source seeds (local vs. other markets) and propensity to buy hybrid seeds, as well as their agricultural yields. Researchers conducted a survey before planting (in February) and three surveys throughout the agricultural season (between July and January 2021).

To measure seed quality, price, and market entry or exit by sellers, researchers conducted three rounds of market audit activities in March 2020, August 2020, and March 2021. The audits used covert shoppers to collect this information, consisting of members of the research team posing as farmers interested in purchasing seeds.

Results and policy lessons

Farmers who received the information campaign were better able to detect seed quality, more selective about where they bought seeds, and experienced higher yields. Sellers, however, did not improve seed quality or adjust their prices in response to the shifts in farmers' demand, possibly due to the high cost of doing so. Instead, many chose to exit the market.

Farmers' knowledge: Five to six months after the campaign, farmers who received information on quality detection were 19 percentage points more likely to report they had been able to check the quality of hybrid seeds in 2020 (a 105 percent increase with respect to an 18 percent rate in the comparison group). These effects were larger among farmers with primary or secondary education, whose self-reported knowledge rates increased by 28 percentage points.

Farmers' buying decisions: Trained farmers were 5 percentage points less likely to buy seeds in local markets during the planting season, relative to a 31 percent likelihood in the comparison group (a 16 percent decrease). They were also 7 percentage points more likely to purchase seeds in other markets, compared to a 27 percent likelihood in the comparison group (a 26 percent increase). Researchers attribute this shift to farmers seeking higher-quality seeds that were not available in their local markets. Despite these changes, the information campaign did not affect farmers' likelihood of purchasing hybrid seeds, possibly due to credit or insurance constraints or limited expected returns from making the switch.

Farmers' yields: Farmers assigned the information campaign increased their maize yields by 55 kg/acre, compared to an average total yield of 847 kg/acre in the comparison group (a 6.5 percent increase). Yield gains were concentrated in remote areas, where seed quality was lower prior to the campaign and potential gains from quality improvements were likely higher. Effects were also largest among more educated farmers, in line with those farmers having absorbed more information from the training. Additionally, yields increased more for women-led households, demonstrating the potential of information dissemination to close the gender gap in agricultural productivity.

Sellers' behavior: Sellers were no more likely to upgrade the quality of their seeds or update their prices after the intervention. Instead, the information campaign caused one in six sellers to exit their markets. Sellers primarily left markets in the second season, possibly in response to farmers' changed behavior during the first season. These results suggest that the costs of upgrading quality to meet farmers' new demands may have been too high, leading sellers to exit rather than adapt.

Overall, equipping farmers to detect input quality increased their agricultural productivity; however, changes in farmer behavior did not induce sellers to provide higher-quality inputs. To effectively increase the supply of high-quality inputs, policymakers may need to lower the costs that sellers incur to upgrade their products. More research is needed to test interventions within the supply chain that improve the quality of seeds offered by wholesalers or support sellers' access to credit.