Building Trust in Fertilizer Quality Among Farmers in Tanzania

Researchers:

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Sector(s): Agriculture

Sample: 100 markets and 148 associated villages

Target group: Farmers Agro-dealers

Outcome of interest: Technology adoption Attitudes and norms

Intervention type: Fertilizer and agricultural inputs Information

Partner organization(s): Private Enterprise Development in Low-Income Countries (PEDL), University of Illinois at Urbana-Champaign, University of Sussex, Sokoine University of Agriculture (SUA)

Small-scale farmers in many parts of sub-Saharan Africa often do not use recommended amounts of inputs like fertilizer to increase their productivity despite evidence suggesting their effectiveness. One of the factors that can limit farmers' purchase of fertilizer is a lack of trust in the quality of fertilizer available in local markets. Researchers conducted an evaluation to test the impact of an information campaign about fertilizer quality on farmers' beliefs and their purchase and use of fertilizer. The information campaign led farmers to change their beliefs about the quality of fertilizer available in local markets and to buy more fertilizer.

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Small-scale farmers in many parts of sub-Saharan Africa often do not use inputs like fertilizer to increase their productivity despite evidence suggesting their effectiveness. There are a variety of reasons why small-scale farmers do not adopt or under-adopt fertilizer, including limited access to agricultural input markets, the high cost of fertilizer, barriers to credit access, and limited information about its benefits and how to apply it effectively.[1] An additional factor that often limits farmers' purchase of fertilizer is a lack of trust in the quality of fertilizer available in local markets. Farmers purchase fertilizers and other inputs from agro-dealers who operate small stores in often unregulated markets. Due to this perceived lack of regulation and since fertilizer quality is not visually apparent, farmers have low levels of trust in agricultural markets, which limits farmers' willingness to make input purchases. As a result, farmers' productivity may be sub-optimal and negatively affect their livelihoods.

Providing farmers with information about productive inputs like fertilizer is a common policy in many low- and middle-income countries. Information is primarily provided through extension services managed by ministries of agriculture. However, extension services generally provide information about the benefits and use of productive inputs rather than the quality of inputs available in local markets. Can providing both farmers and agro-dealers with information about the quality of fertilizer from their markets improve trust and lead more farmers to purchase and use fertilizer?

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Agricultural productivity in Tanzania is limited in part due to low fertilizer use. Small-scale farmers in Tanzania use between 15 and 20 kilograms of fertilizer per hectare, well below the government's recommended amount. Fertilizer is available for purchase in local markets from agro-dealers. Agro-dealers mainly source fertilizer from wholesalers who buy imported fertilizer from the Dar es Salaam port. The Tanzania Fertilizer Regulatory Authority (TFRA) regulates the quality of fertilizer; however, the agency is underfunded and does not have the capacity to carry out widespread testing.

Eighty percent of farmers surveyed in the study believed that the fertilizer available in local markets is of low quality, a belief that is reinforced in local media. However, research has proven some common perceptions are inaccurate. Previous research[2] tested the quality of fertilizer available in local markets in Tanzania and found that less than 1 percent of fertilizer samples had low quality.

Small-scale agriculture accounts for 80 to 90 percent of economic activity in Morogoro, an agricultural region of eastern Tanzania where this evaluation took place. In Morogoro, small-scale farmers primarily cultivated maize. Sixty percent of farmers in the study area were male, with an average age of 45, and with families of five to six members. They owned on average seven acres of land, and 37 percent of farmers reported having purchased fertilizer in the last season. Most agro-dealers in the study were also male, had at least secondary education, and had been operating their shops for over four years. Only about half of the shops had the required government TFRA license to sell fertilizer.

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In partnership with Tanzania's Sokoine University of Agriculture (SUA), a well-trusted, public university, researchers conducted an evaluation to test the impact of an information campaign about the quality of fertilizer available in local markets on farmers' beliefs about quality and their purchase and use of fertilizer. Researchers randomly assigned half of the 100 markets in the Morogoro agricultural region of Tanzania to receive pamphlets and posters with information that the fertilizer tested in that market was of high quality. The other 50 markets did not receive any pamphlets. Additionally, researchers assigned 74 villages close to the markets that were selected to receive the information campaign to also receive the intervention. In these villages, in-person meetings were held to share information about the high quality of fertilizer available in their local markets. These meeting reflected traditional extension services with an emphasis on fertilizer quality and allowed farmers to ask questions about the quality testing. The other 74 villages near Morogoro's markets did not receive in-person meetings.

Researchers carried out both the market-level and village-level components of the intervention between December 2018 and January 2019. To measure whether the market and village information campaigns had an impact on farmers' belief about the quality of fertilizer and subsequent purchase, researchers collected data through surveys of farmers and agro-dealers both before and nine to twelve months after the intervention. Researchers surveyed farmers in-person to collect information on beliefs of fertilizer quality, fertilizer purchase and use, as well as maize production. They also surveyed agro-dealers to understand shop and owner characteristics, inventory, and fertilizer sales.

In addition to receiving ethical review and approvals from an institutional review board, researchers made efforts to address and account for ethical questions by inviting all farmers from the comparison group in the village to a common location and conducting the information meetings after the completion of the study so not to exclude any farmers form receiving information. For more on the researchers' discussion of ethical considerations, see the ethics appendix starting on page 84 of the working paper.

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The information campaign led farmers to change their beliefs about the quality of fertilizer available in local markets and led more farmers to buy fertilizer. Agro-dealers sold more fertilizer, but fertilizer prices did not increase as a result of the information campaign.

Beliefs about Fertilizer Quality: Partaking in the village information sessions reduced the probability that farmers had any concern about the quality of fertilizer by 10.5 percentage points from a base of 80 percent (a 12 percent decrease). Fifty percent of farmers who received the information campaign still reported concerns of fertilizer quality demonstrating that while many farmers changed their views, some farmers in each village continued to believe the available fertilizer is low quality.

Fertilizer Purchase and Use: Farmers who participated in the village information sessions were 10 percentage points more likely to purchase fertilizer compared to those who did not receive the information campaign (a 27 percent increase). Researchers posit the increase is largely driven by farmers buying fertilizer for the first time, since participation in the information sessions did not significantly increase the amount of fertilizer that farmers purchased. The information campaign also persuaded farmers to use more fertilizer. Farmers who participated in the information sessions used 5.6 kg more fertilizer per acre from a base of 11.988 kg per acre (a 46 percent increase).

Maize Yields: Providing farmers with information on fertilizer quality did not lead to higher maize yields. Researchers explain this is expected as the potential impact on yields may take multiple agricultural seasons.

Price and Quantity of Fertilizer Sold: The information campaign did not affect the market price of fertilizer, which is to be expected as fertilizer prices are controlled by the government in Tanzania. The information campaign increased the amount of fertilizer

agro-dealers sold in local markets, but only when a fat-tailed data econometric method was applied.

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1. Abdul Latif Jameel Poverty Action Lab (J-PAL). 2018. " Evidence for Transformation: Framing a Research Agenda in Agricultural Development." ATAI Framing Paper. https://www.atai-research.org/atai-framing-paper/.

2. Michelson, Hope, Anna Fairbairn, Brenna Ellison, Annemie Maertens, and Victor Manyong. 2021. "Misperceived Quality: Fertilizer in Tanzania." *Journal of Development Economics*, 148, No. 102579. (January). https://doi.org/10.1016/j.jdeveco.2020.102579
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