

Selective Trials for Agricultural Technology Adoption and Experimentation



Farmers may vary in their suitability as experimenters with new agricultural technologies. For example, farmers likely differ in their beliefs regarding the possible returns of the technology, in their willingness to take risks with an unknown product or process, and in their social skills and willingness to share information with others. Researchers are investigating how important these differences are when it comes to increasing the use irrigation pumps in western Kenya, and whether subsidies for experimentation can be targeted based on certain skills or traits to more effectively increase technology adoption.

Policy Issue

Local experimentation is believed to be a necessary condition for smallholder farmers to learn about the potential benefits and costs of a new agricultural technology. Governments and development organizations often indirectly subsidize experimentation through extension workers, whose demonstrations can at times substitute for local experimentation. Another option is to directly subsidize experimentation either by providing discounts on technologies to a few farmers per village. Little evidence exists, however, as to whether farmers vary in their suitability as experimenters. That is, farmers likely differ in their beliefs regarding the possible returns of the technology, in their willingness to take risks with an unknown product or process, and in their social skills and willingness to share information with others. Researchers are investigating how important these differences are when it comes to spreading the use of new technologies, and whether subsidies for experimentation can be targeted based on certain skills or traits to more effectively increase technology adoption.

Evaluation Context

This study takes place in Busia and Bungoma counties in rural western Kenya, among small-scale farmers who farm on plots 20 meters or less from a water source. Even during long dry spells, there is low adoption of efficient irrigation technologies among these farmers. Many farmers use “bucket irrigation”—carrying buckets of water from a well, river, or other water source to their fields—which is extremely time-consuming and limits the area that can be irrigated. In Busia county, only 3 percent of farmers in the study sample were using a manual pump when the study began, and none had a

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PROGRAM AREA

Agriculture

TOPIC

Technology Adoption

TIMELINE

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motorized pump.

Details of the Intervention

Researchers are conducting a multi-arm, multi-stage, randomized evaluation to study experimentation with, and adoption of, small-scale irrigation pumps among smallholder farmers in western Kenya. This study aims to determine if significant differences exist across farmers in experimental skills; if these skills are known to farmers, and/or to their neighbors; if information about these skills can be elicited; if targeting based on experimental skills promotes information creation and diffusion; and whether better information diffusion leads to faster spread of technology. IPA field officers are collecting all the data for this study.

A total of 191 villages, each with an average of 23 participants, were randomly assigned to either a pure comparison group or one of four experimental arms. In all arms (including the comparison), farmers were told that a study to facilitate experimentation with a new technology in the neighborhood was occurring, and each farmer received a voucher for a slightly discounted pump, redeemable locally within 6-9 months.

Each of the four experimental arms is a randomized evaluation itself, with one or two individual farmers per cluster assigned to treatment—access to a free pump—while the rest of farmers have access to pumps for cash at a small discount. Thus, within each group, researchers can estimate the magnitude of the “first stage” effect—the difference in short-run adoption and experimentation rates between free pump recipients and non-recipients. The differences in the magnitude of the first stage across these groups will be one of the outcomes of interest – it will tell researchers how the mechanism used to select free trial recipients affects take-up of the free trial itself.

The experimental groups vary in how the experimentation promotion is introduced into clusters. Following an initial survey, on average 1.4 farmers per cluster are chosen as “experimenters” to receive a free pump. These experimenters are either selected completely randomly, as in a standard lottery with equal odds, or through what we call a “selective trial,” where the odds of being selected increase with a participant's likely experimental skills. Three different selective trials are being tested, each corresponding to a different way of eliciting participants' proclivity for experimentation with the technology: one is based on whether farmers are willing to pay for a higher chance of winning the free pump (in cash or grain), one based on whether farmers are willing to work for a higher chance of winning the free pump, and one based on how many votes farmers receive from their neighbors when their neighbors are asked to vote for the best experimenter.

There are two main sets of outcomes of interest. The first is the rate of pump usage among those farmers sampled to receive the free technology sample, as well as changes in yields and income. The second and main outcome of interest is the village-level rate of pump usage among other farmers (those not sampled for a free pump). Knowledge of how to use the pump and beliefs about the returns to using a pump will also be measured for all farmers. These outcomes will be measured through follow-up surveys to be started in February 2015.

The project is being implemented in two waves. Wave 1 began in November 2013 with approximately

1,700 participants in 85 villages in Busia county. Wave 2 began nine months later among 2,400 participants in 106 villages in Bungoma counties.

Results and Policy Lessons

Results forthcoming.

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