Promoting Sustainable Farming Practices in Malawi

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Sector(s): Agriculture

Fieldwork: Innovations for Poverty Action (IPA)

Location: Malawi

Sample: 120 villages

Target group: Farmers

Outcome of interest: Technology adoption

Intervention type: Fertilizer and agricultural inputs Information Insurance Social networks

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Partner organization(s): Malawi Ministry of Agriculture and Food Security , Millenium Challenge Corporation (MCC), World Bank , Yale Center for Business and the Environment

Farmers in lower-and middle-income countries (LMICs) often do not adopt agricultural technologies, even when they carry evident productivity gains. Researchers conducted a randomized evaluation to test the impact of having local farmers share information about two farming practices, pit planting and Chinese composting, on other farmers' adoption of these methods. Providing performance-based incentives to farmers led to higher technology adoption both among themselves and the farmers they communicated with, while adoption rates remained low without incentives. Additionally, farmers were more likely to adopt new technologies from their peers who were similar to them in terms of farm size and shared social groups.

Policy issue

Despite their productivity benefits, adoption of new agricultural technologies remains low among farmers in LMICs, especially in sub-Saharan Africa. According to the 2008 World Development Report, agricultural yields and productivity in the region were stagnant over the previous 40 years. Farmers may choose not to adopt new technologies for various reasons, including a lack of knowledge about how to use them, what their potential benefits are, or their applicability to local agricultural conditions. Many countries hire extension workers to help overcome these information barriers. However, studies suggest that social learning, which leverages existing social networks, can be a more effective way to drive technology adoption. [RC5] [JB6] Farmers face varying constraints and agricultural conditions, making it hard for them to determine the net impact of adopting a particular technology. Farmers may thus find it easier to learn about a new technology by interacting with farmers who face similar agricultural conditions and constraints. What is the impact of having a small group of local farmers share information about new farming technologies and their adoption? When incentives to share information are added, is the approach still cost-effective?

Context of the evaluation

In 2011, the agriculture sector made up 31 percent of Malawi's GDP. The main food crop is maize, with 97 percent of farmers growing maize and over half growing no other crop. Maize consumption also accounts for more than 60 percent of the population's calorie consumption. The maize harvest therefore has a crucial impact on the welfare of the Malawian population, resulting in it receiving substantial policy attention.

The current agricultural extension system in Malawi utilizes government workers called Agricultural Extension Development Officers (AEDOs), employed by the Ministry of Agriculture and Food Security (MoFAS). AEDOs work with individual farmers and host village-wide field days to disseminate information on new farming technologies and practices. While AEDOs are officially responsible for about 15-25 villages, this number is often larger, given the high number of AEDO vacancies. At the time of study in 2009, an estimated 56 percent of AEDO positions were unfilled, and the average extension worker was individually responsible for around 2,450 households. This shortage led MoFAS to begin encouraging AEDOS to work with local Lead Farmers (LFs) from each village, who received training on technologies so that they could also disseminate information within their communities.

Traditionally, Malawian farmers use a technique called ridging, which has been shown to deplete soil fertility and hamper agricultural productivity in the long term. This study promoted two alternative technologies to improve maize yields and increase sustainability: pit planting and Chinese composting. Farmers initially had low levels of knowledge on the two technologies promoted by this study. At baseline, only about twelve percent of farmers in a representative sample had heard of pit planning, and those who were familiar with the technology did not know enough to implement it. Among non-adopters, 85 percent cited lack of information as the main reason for not having used the technology.

A group of farmers in Malawi learn about sustainable practices.

Photo credit: Mushfiq Mobarak

Details of the intervention

Researchers conducted a randomized evaluation to test the impact of social learning, both with and without incentives, on farmers' adoption of new technologies. To create opportunities for social learning, AEDOs identified five Peer Farmers (PFs) from each village from local focus groups. These PFs were seen by the community as average farmers with similar access to resources as other farmers in their village, making them relatively close to their peers both socially and geographically. Farmers identified to be PFs were also open to adopting new technologies. In addition, the evaluation incorporated the existing LF model to compare PF performance with LF performance. To identify LFs, AEDOs selected one farmer per village who was an early adopter of technology and considered by their community to be a leadership figure.

Villages were randomly assigned to four groups, in which target farmers received information about new technology from different communicator types:

1. AEDO group (25 villages): In these villages, AEDOs were solely responsible for communicating information to target farmers. Half of these AEDOs were randomly assigned to receive incentives.
2. Lead Farmer (LF) group (50 villages): In these villages, LFs were identified by AEDOs and were responsible for communicating information to target farmers. Half of these LFs were randomly assigned to receive incentives.
3. Peer Farmers (PF) group (45 villages): In these villages, PFs were identified by AEDOs and were responsible for communicating information to target farmers. Half of these PFs were randomly assigned to receive incentives.
4. Comparison group (48 villages): Target farmers in these villages did not receive information on new technologies from any of the above communicator types.

Incentives were conditional on farmer knowledge (in the first year) and farmer adoption (in the second year). AEDOs could receive bicycles; lead farmers could receive a large bag of fertilizer; peer farmers could receive a package of legume seeds. To make the three communicator options above budget-neutral, the total value of communicator incentives in every village was set equal to about 12,000 MWK (US$80) at the time of the evaluation.

Primary data was collected using household surveys and direct observation of farm practices. There were three rounds of household surveys: baseline, midline, and endline. Enumerators interviewed 25 randomly selected households in each of the 120 treated villages, including all the LFs and PFs and their spouses. On-farm monitoring was also conducted so as not to rely solely on self-reported data, where trained enumerators visited the farms of 753 households at different points in time. Finally, because PFs and LFs were identified in all villages before randomization, data was also available to compare the endline levels of knowledge and adoption of new technologies by communicators between the intervention groups and the comparison group.

Results and policy lessons

Providing PFs with performance-based incentives led to the highest rates of technology adoption both among themselves and target farmers, while adoption rates remained low without incentives. Additionally, incentivized PFs who more closely resembled village farmers were the most effective at increasing new technology adoption.

Communicating farmers' knowledge and adoption: Tests were administered to assess PFs' and LFs' knowledge levels on the new technologies after they received training on them. Without incentives, PFs generally performed worse in tests than LFs. Unincentivized PFs also did not increase their adoption of technology. However, when incentives were provided, PFs became more knowledgeable and scored just as well on tests as LFs did. PFs' test scores improved by 20 percentage points, a 90 percent increase in scores compared to PFs in comparison groups who did not receive training.

Communicating farmers' efforts to share knowledge with target farmers: Effort was measured by the likelihood that communicators hosted at least one activity to share knowledge with or train target farmers, usually a live demonstration or group training session. Without incentives, all communicator types were similarly likely to have hosted at least one activity, with LFs putting in slightly more effort than others. When incentives were provided, PFs more than doubled their effort, with 81.2 percent of incentivized PFs holding at least one dissemination activity compared to 39.1 percent of unincentivized PFs doing so. PFs also put in more effort when incentivized compared to LFs and AEDOs, who did not put in more effort when they were incentivized.

Technology adoption by target farmers with incentives: PFs who received incentives were most effective at getting target farmers to adopt pit planting and Chinese composting. In villages where PFs received incentives, target farmers self-reported being 14 percentage points more likely to have used pit planting at least once relative to farmers in the comparison group, who almost never used the technology. In comparison, incentivized LFs drove target farmers' adoption rates of pit planting up by 7 percentage points, and AEDOs did not increase target farmers' adoption rates at all. For Chinese composting, incentivized PFs increased target farmer adoption by 39.1 percentage points relative to the comparison group. Meanwhile, incentivized LFs increased adoption by 27.5 percentage points, and incentivized AEDOs increased adoption by 12.6 percentage points.

Unincentivized communicators of all three types were relatively less effective at increasing adoption rates of both technologies. Finally, PFs were most successful at driving higher technology adoption when they had farm sizes that were more similar to those of target farmers, and when they shared social groups with target farmers, such as church groups.

The cost of incentives for PFs, who helped farmers adopt new technologies more effectively than professional agricultural extension staff working alone, was lower than the cost of regular village visits by an AEDO. The results of this study suggest that providing incentives may serve as a viable and cost-effective way to improve the effectiveness of diffusing information through social networks in Malawi.

BenYishay, Ariel, and A. Mushfiq Mobarak. "Communicating with Farmers through Social Networks." Working Paper, August 2013.