International Initiative for Impact Evaluation

Impact evaluation brief

Agriculture

Does information on agricultural technology encourage adoption?

Agricultural productivity remains a challenge in Sub-Saharan Africa. The region has experienced large gaps between potential and realised yields,[1] including for staple crops, which also raises issues about household food security. Agricultural technologies can help to close this gap, but the adoption and use of these technologies among smallholder farmers remains a challenge.

Lack of information is often cited as the primary reason for not adopting agricultural technologies, and extension services have met with limited success in facilitating large-scale adoption. The challenge is especially daunting in the Kenyan context, where women account for 80 per cent of all food production labour. Female farmers are systematically less likely to receive extension services, compared with their male counterparts,[2] and experience larger knowledge gaps. Additionally, where public agencies have employed potentially scalable approaches to extension, the evidence on their effectiveness remains limited.

In 2014, 3ie supported researchers at Innovations for Poverty Action to evaluate the impact of two extension approaches piloted by Kenya Agricultural and Livestock Research Organization (KALRO) to improve agricultural practices and increase adoption of technologies in western Kenya.

Highlights

- Farmer field days increased awareness of soil testing and lime use.
- Knowledge about recommended fertilisers did not increase its use.
- E-extension did not show any significant effects.
- No differential benefits were observed for female farmers.

KALRO's integrated soil fertility management intervention

Towards the end of 2014, KALRO launched a multi-component programme to encourage the adoption of integrated soil fertility management in western Kenya through public–private partnerships. It involved linking farmers to productive value chains and markets, training extension workers and agricultural supply dealers, and providing information on agricultural best practices.

Over the years, the soil fertility in the region has depleted, lowering crop productivity, especially for maize, the primary staple crop. Tests of soil samples indicated low levels of nitrogen, carbon and phosphorous, and high levels of acidity.

The baseline data collected in 2014 showed that 86 per cent of the 1,249 farmers who participated in the survey had never been visited by an extension worker. Friends and social networks and radio were cited as the primary sources for information on improved agricultural practices. Given this lack of access to information, the programme included a component focused on providing farmers with information on locally relevant agricultural inputs and management practices. The programme invited maize farmers to participate who were in charge of farming activities in their household and who owned a mobile phone. KALRO experimented with two information delivery methods: farmer field days (FFDs) and e-extension.

The FFDs were large gatherings organised on pre-specified days around demonstration sites where KALRO showcased agricultural technologies appropriate to the area's agro-ecology. Farmers were advised to conduct soil tests, apply lime (if the soil was acidic), intercrop maize with legumes, and use fertilisers, such as calcium ammonium nitrate, diammonium phosphate and Mavuno.

The e-extension intervention consisted of farmers receiving 15 messages on their mobile phones timed to the agricultural cycle to ensure relevance. The recommended agricultural practices were similar to those provided to FFD participants. However, messages did not provide information on the benefits of the practices promoted; they simply stated the recommendation.

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Main findings

Awareness and knowledge: The intervention increased awareness about the existence of certain inputs and farmers' knowledge about them. Farmers who participated in the FFDs were more likely to know about testing soil acidity and the use of lime as an important input. However, awareness about the fertilisers did not increase.

Beliefs about yields and profitability: In order to assess how farmers valued the information provided, researchers elicited their beliefs about the yield and profitability derived from different agricultural inputs. The study finds that FFD participants were more likely to express willingness to spend money on buying Mavuno if provided with a KES1,000 voucher. They were also more likely to report Mavuno as the most profitable fertiliser.

Use of recommended inputs: Farmers' belief in the profitability of using Mavuno did not lead to its increased use. While FFD participants reported increased use, administrative data from local agricultural input shops did not show any increase in its purchase. Farmers in the FFD and e-extension group were found to purchase additional quantities of diammonium phosphate. Although it was a recommended input, it was already widely used in the area prior to the intervention.

Lessons for future research and programming

The study finds that the FFDs had a positive impact on farmer knowledge and beliefs about recommended inputs. However, given the high cost of organising FFDs, it is important that there are large economic benefits, such as increased income, as a result. Alternatively, future research can focus on identifying the most effective aspects of FFDs and suggest ways to strengthen and replicate them at lower cost.

The e-extension component did not have any impact. At the end of the intervention, only 55 per cent of the farmers surveyed mentioned receiving the messages. It is not clear if the lack of impact had to do with flawed messaging, which focused on general management practices rather than explicit instructions on use of lime or fertilisers, or the delivery method and the associated technological challenges. Further thinking is needed on better designing e-interventions to enhance their effectiveness.

Lastly, neither the FFDs nor the e-extension had any differential impact on farmers based on gender. This requires a closer look in future programming, given that women farmers are in the majority and face greater barriers to information access and adoption.

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About this impact evaluation

This brief is based on an impact evaluation report published in 2017, *Evaluating agricultural information dissemination in western Kenya, 3ie Impact Evaluation Report 67* by Raissa Fabregas, Michael Kremer, Jon Robinson and Frank Schilbach.

Endnotes

[1] Mueller, ND, Gerber, JS, Johnston, M, Ray, DK, Ramankutty, N and Foley, JA, 2012. Closing yield gaps through nutrient and water management. *Nature,* 490(7419), pp.254–257.

[2] African Development Bank (AfDB), 2007. *Kenya Country Gender Profile.* Human Development Department, African Development Bank. Available at: <https://www.afdb.org/en/documents/document/2007-kenya-country-gender-profile-13286/>.

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