



Does gender matter in adoption of sustainable agricultural technologies? A case of push-pull technology in Kenya

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Key messages

- Adoption of push-pull technology is equal among men and women, suggesting that this technology is gender neutral.
- The food security status of women and their households can be improved by encouraging the adoption of push-pull technology.
- Promoting complementary technologies together can have positive effects on productivity, food security, and livelihoods.

Low agricultural productivity a key challenge for female farmers in sub-Saharan Africa

Agriculture plays a central economic role in most sub-Saharan African countries, generating an average of 33% of GDP and employing, on average, 65% of the labor force. Most of the agricultural labor force in the region is supplied by women, who are responsible for feeding their families. However, low productivity remains a challenge, particularly among women farmers who tend to have access to fewer resources (such as land, market information, and credit).

The challenge of low agricultural productivity of female-owned farms has mainly been attributed to the lower rate of agricultural technology adoption among women, compared to men. Although most agricultural technologies are gender neutral, the project design and implementation may be biased towards men, hindering female participation. Studies have shown that increased focus on gender equality in production systems can transform agricultural livelihoods and improve development outcomes.

Sustainable maize production in sub-Saharan Africa is also seriously threatened by cereal stemborer pests and the parasitic *Striga* weed, which can cause yield losses up to 88% or 100%, respectively. New agricultural technologies have been developed aiming to overcome these

threats. Push-pull technology – developed by the International Centre of Insect Physiology and Ecology (*icipe*) and partners – involves intercropping rows of a maize with a stemborer moth-repellant forage legume such as desmodium to “push” the pests away. The intercropping is complemented by surrounding the cereal with a “trap crop” such as Napier grass, to attract (pull) the stemborer pests away from the main (maize) crop. Desmodium and Napier grass also provide high-quality animal fodder.

Other methods to increase productivity and improve food security include maize-grain legume intercropping, organic and inorganic fertilizer, soil and water conservation, adoption of improved seeds, and crop rotation.

The objective of this study is to assess the gender differences in the adoption of push-pull technology and other agricultural intensification practices. Providing a better understanding of gender adoption gaps and the causes of these gaps will offer key information for designing promising agricultural policy options to boost cereal productivity, increase income growth, improve food security, and reduce poverty for both male and female farmers in sub-Saharan Africa.

Data and methodology

This study uses comprehensive household and plot-level data from 711 maize-growing farm households operating on 4863 plots over nine counties of Western Kenya where push-pull technology has been promoted. The study area has a favorable climate for cereal production, it also suffers from severe *Striga* weed and stemborer infestations. The data sources used include information on plot manager, farm and farmer characteristics, household resource endowment, access to services, infrastructure, and food and non-food household expenditures, as well as on the access, use and benefits of push-pull technology. Disaggregating data by the gender of the plot manager helps to shed light on the existing technology adoption gender gaps and their causes. A multivariate probit model was used to examine the association between gender dimensions and the adoption patterns of multiple sustainable intensification practices, adopted by female and male plot managers in Western Kenya.

Key findings

The analysis indicates that **the adoption of push-pull technology is equal among men and women, suggesting that this technology is gender neutral**. This is because push-pull technology does not require a high cash outlay, compared to other technologies, once it is established.

Similarly, no gender difference was found in the adoption of maize-grain legume intercropping, fertilizer, and improved maize seeds. Female plot managers are, however, more likely than men to use crop rotation and manure. This is plausible as manure as a fertilizer requires less or no capital compared with other soil improvement strategies.

The results also show that the majority (52%) of farming plots are managed by women, 25% are managed by men, and 23% are managed jointly by men and women.

Push-pull technology and maize-grain legume intercropping are found to have relatively low adoption rates at an average of about 20%. More specifically, about 18% of male-managed and 17% of female-managed plots use push-pull technology, while 26% and 21% of plots managed by men and women, respectively, use maize-grain legume intercropping. The slightly higher adoption rates of maize-grain legume intercropping are attributed to grain legumes fetching a higher price than maize and can be harvested during times of critical food shortages, before the maize crop is harvested.

Adoption of maize-grain legume intercropping is linked to reduced use of push-pull technology, supporting the argument that immediate food security and cash needs may surpass the need to produce livestock feed and that maize-grain legume intercropping is seen as a substitute for push-pull technology.

Use of other technologies, such as inorganic fertilizer, manure, and improved maize varieties increases with push-pull technology adoption, suggesting that these technologies are complementary.

Plots managed by men tend to be larger and located further from the residence than those managed by women. More plots that are perceived to be of good quality (fertile) are managed by men while more plots with medium or poor fertility are managed by women. This may reflect a gender bias when the plots were originally allocated and/or a lack of resources among female farmers to invest in soil improvement.



Implications for policy

The results of this study regarding gender neutrality support **the promotion and dissemination of push-pull technology as a way to increase the food security status of women and their households**. In particular, efforts should be made to **promote awareness and offer training** through field days.

That push-pull technology and other sustainable agricultural practices can complement one another also suggests areas for policy change. **Policy changes that promote push-pull technology adoption can have positive spillover effects on the adoption rates of organic and inorganic fertilizer, as well as of high-yielding seeds. Promoting these technologies together can have positive effects on productivity, food security, and livelihoods.**

Promotion efforts should first be focused on plots that have medium to good fertility, as farmers are more likely to take a preventative approach than attempt to cure degraded plots.



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