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## Push-pull technology as a climate-smart integrated pest management strategy in southern Ethiopia

ZEWDU AYALEW ABRO<sup>1</sup>, GEBEYEHU MANIE FETENE<sup>2</sup>, MENALE KASSIE<sup>3</sup>, SOLOMON BALEW<sup>4</sup>,  
TADELE TEFERA<sup>5</sup>

<sup>1</sup>*International Center of Insect Physiology and Ecology (icipe), Social Sciences and Impact Assessment Unit, Ethiopia*

<sup>2</sup>*Addis Ababa University, Dept. of Economics, Ethiopia*

<sup>3</sup>*International Center of Insect Physiology and Ecology (icipe), Social Sciences and Impact Assessment Unit, Kenya*

<sup>4</sup>*Wageningen University, Development Economics group, The Netherlands*

<sup>5</sup>*International Centre of Insect Physiology and Ecology(icipe), Ethiopia*

### Abstract

Push-pull technology (PPT) is developed for integrated pest and weed management in the smallholder farming systems of sub-Saharan Africa. There are several studies that document the agronomic benefits of PPT at the experimental level. However, rigorous evaluation of the technology in abating losses and increasing maize productivity outside of the experimental context in western Kenya is yet to be made. The objective of the study is to estimate the impact of PPT on insecticide use, production losses, and maize yield using data from southern Ethiopia. The study aims to contribute to a very few but emerging literature on a broad range of agroecological strategies for controlling pests, such as push-pull strategies in sub-Saharan Africa. By exploiting plot-level variation in PPT adoption among maize farmers in southern Ethiopia, we estimate the effect of PPT on production loss, insecticide use, and maize yield using correlated random- and fixed-effects regression models. We use comprehensive household (1,181)- and plot-level data (2,135 plots) to control for plot-invariant unobserved heterogeneities that may drive adoption decisions of PPT and yield losses and insecticide use. We find that PPT reduces maize production loss by about 11–19%. We find no statistically significant effect of PPT on insecticide use. This is because farmers and the local government were in panicking mood due to the arrival of a devastating new pest called fall armyworm and indiscriminately applied insecticides regardless of PPT adoption, which is supposed to reduce insecticide use. Our results further show that PPT increases maize yield by 12–16%. The findings suggest that PPT can contribute to food security by enhancing farmers’ resilience to shocks due to pests.

**Keywords:** Fixed effects , insecticide, maize yield, pests, push-pull technology, weeds, yield loss