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The Impact of Agricultural Technologies on Productivity of Smallholders in Ethiopia: A Panel Data Analysis

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Abstract

In Ethiopia, agriculture continues to be the main livelihood for the majority of the population. Poverty and food insecurity are widespread in the country where more than 37 % of the rural households live below poverty line. Growth in the agricultural sector where 80 % of the rural population relies on is therefore critical to alleviating poverty and food insecurity. Improving agricultural productivity through adoption of improved technologies is the only option because there are no additional arable lands to be brought under cultivation in the country. However, despite large-scale government-supported programs for agricultural technology transfer having been in place for decades, the adoption rates of Ethiopian smallholder farmers remain relatively low, even compared with other Sub-Saharan African countries. Consequently, crop productivity remains very low. Therefore, the assessment of the effectiveness of agricultural technologies and practices on farmer's productivity is a relevant question given the significant role they play in reducing poverty and food insecurity. The study utilises three years household-level panel data collected in 2012, 2014 and 2016 from a randomly selected sample of 390 households. In this paper, we assess the potential impact of adoption of agricultural technologies specifically three selected technologies including chemical fertiliser, high yielding varieties and pesticides/chemicals on the productivity of five major crops grown in the country including wheat, maize, teff, and barley over time. Specifically, we estimate a translog production function using the three inputs to analyse the dynamics of crop productivity; change in the extent of adoption over time as well as identify the main constraints of crop productivity for the different poverty and food security profiles of households.

Keywords: Crop productivity, Ethiopia, yield, panel data, technology adoption

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