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RECEIVED 10 April 2024

ACCEPTED 16 October 2024

PUBLISHED 13 November 2024

CITATION

Gebiso T, Ketema M, Shumetie A and
Feye G (2024) Impact of farm mechanization
on crop productivity and economic efficiency
in central and southern Oromia, Ethiopia.
Front. Sustain. Food Syst. 8:1414912.
doi: 10.3389/fsufs.2024.1414912

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Impact of farm mechanization on crop productivity and economic efficiency in central and southern Oromia, Ethiopia

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Introduction: Farm mechanization has multi-dimensional impacts on agricultural production systems like economic efficiency and productivity, thereby improving the quality of life in the farming community by reducing work drudgeries. However, these impacts were not studied empirically in Ethiopia. Hence, this research was initiated to estimate the level of economic efficiency, and productivity of wheat and barley, and the impact of farm mechanization on economic efficiency and productivity of wheat and barley.

Methods: The analysis was done for 232 and 257 wheat and barley producer farmers respectively who are selected from the Arsi and West Arsi zones. The stochastic frontier model was used to estimate economic efficiency while augmented inverse probability weighted (AIPW) was used to estimate the impact.

Results and discussion: Based on the result, it is apparent that farm mechanization has a significant positive impact on wheat productivity while the percentage change in average treatment effect for the barley was not statistically significant. Farm mechanization also affects wheat and barley economic efficiency positively. Hence, we recommended the wider use of farm mechanization to improve economic efficiency and productivity. Therefore, policy design should focus on ways to avail farm machinery easily like establishing farm mechanization service centers and facilitating credit services for mechanization service renders.

KEYWORDS

augmented inverse probability weight, economic efficiency, farm mechanization, impact, stochastic frontier analysis

1 Introduction

The impacts of agricultural mechanization have been estimated for different outcome vary in different regions of the world. *Aminass (2001)* and *Houmany et al. (2013)* pointed out that farm mechanization has multi-dimensional impacts in agricultural production system like economic efficiency, and life quality of the farming community by reducing work drudgeries. Its introduction can also increase the productivity of the farming system significantly, especially where agriculture is more dominated by traditional technologies. Mechanization reduces production costs, thereby increasing profit and reducing food costs (*Cossar, 2019; Bello, 2012*). Farm mechanization has great impacts on factor productivity improvement like labor productivity, land productivity, and capital productivity (*Goyal et al., 2014*). Moreover, the literature indicated that farm mechanization has an impact on the adoption of technologies like an improved seed, chemical fertilizer, agrochemicals, etc., and crop yields (*Takeshima*

Economics Efficiency And Farm Mechanisation

Marco Casella



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