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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

Tamrat Gebiso<sup>1\*</sup>, Mengistu Ketema<sup>2</sup>, Arega Shumetie<sup>2</sup> and  
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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

**SJ Ball**



## **Economics Efficiency And Farm Mechanisation:**

**Economic Efficiency and Farm Mechanisation** P. Narasimha Rao, 2003 Modernisation Of Agriculture Is A Worldwide Trend Modernisation And Technological Inputs Are Highly Interrelated Among Technological Innovations The Mechanization Is Perhaps The Most Critical One Unfortunately The History Of Agricultural Policy In Many Developing Countries Including India Is Replete With Controversies When It Come To Mechanization Mechanization Was Dubbed As Anti Labour Anti Employment Anti Poor And Hence Needs To Be Discouraged At Any Cost Over The Years The Scare Among Policy Makers About Mechanization Has Receded In Its Intensity But The Phobia Has Not Disappeared Many Economists Have Also Contributed To The Predicament Of Policy Makers In This Regard Part Of It Was Ideological And Visibly Anti Big Farmer Oriented In This Perspective Mechanization Was Identified With Large Farms And Big Farmers The Present Study About The Impact Of Mechanization Is Able To Pinpoint With A Great Deal Of Accuracy The Desirable Consequences And Welcome Features Of Mechanization It Is Able To Explore The Effects Of Mechanization On Farm Income Employment Productivity And Economic Efficiency In Crop Production The Arguments That Have Been Made In The Present Study Regarding The Social Costs And Benefits Of The Existing Pattern Of Mechanization Leads To The Conclusion That Net Social Benefits Are Positive Analysis Of Data From The Present Study Indicates That The Existing Pattern Of Mechanization Does Not Add To Unemployment In The Region Where The Thrust Is To Expand Agricultural Output Because Machines Are Used In Response To Worthwhile Techno Economic Considerations And High Cost Of Draught Power As Machines Help To Save Resources Hitherto Allotted To Maintain Draught Animals They Enable An Increase In Output By Raising Crop Intensity And Yield Per Acre Their Use May Be Socially More Beneficial In The Context Of Shortages And High Prices Of Agricultural Commodities The Increase In The Scale Of Operation The Rise In The Crop Intensity And Yield Per Acre Made Possible By Mechanization Can Lead To A Net Increase In Farm Employment Being In An Age Of Technology We Simply Cannot Ignore This Beneficial Fallout From Mechanization Although The Empirical Work Is Confined To Andhra Pradesh In Its Analytical Framework Methodology And Discussion Of Relevant Issues It Has Much Wider Application It Is A Major Contribution To The Research And Would Be Useful To Economists Agricultural Scientists And Policy Makers

**Farm mechanization in India:**

**Economic issues, perspective and opportunities** Ranjith Kumar P.S, Prasanna Kumar P.S ,Prem Jose Vazhacharickal, Mechanization is a process of replacing biological sources of energy involving animal and human labour to mechanized sources of energy Farm mechanization indicates the use of machines for conducting agricultural operations replacing the traditional methods which involve human and animal labour In the period 2004 05 to 2011 12 robust growth in the secondary and tertiary sectors led to significant job creation in agriculture sector Tractors and power tillers have been driving the farm mechanization in India Tractor sales have grown at a CAGR of 9.0 % in Financial Year FY 05 15 to around 5.5 lakh tractors in FY15 around 2.3 lakh in FY2005 whereas sales of power tillers have grown at a CAGR of 10.6% in FY2005 to 2015 to 48 000

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**Agricultural Policies in Developing Countries** Frank Ellis, 1992-01-30 This book is designed for undergraduate and graduate students taking courses related to agricultural policy agricultural economics or rural development in developing countries

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*Human-Centered Agriculture* P. K. Nag, L. P. Gite, 2020-08-31 This book explores the interplay of farm mechanization human factors and climatic and other environmental uncertainty in agriculture using an ergonomics based approach to discuss solutions to the traditionally acknowledged vulnerability of the sector It converges contemporary research documentation case studies and international standards on

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