



Methodological Evaluation of Industrial Machinery Fleets Systems in Ethiopia: A Panel-Data Estimation Study on Yield Improvement

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Published: 20 May 2007 | **Received:** 19 February 2007 | **Accepted:** 22 April 2007

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DOI: [10.5281/zenodo.18850796](https://doi.org/10.5281/zenodo.18850796)

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Abstract

Industrial machinery fleets play a crucial role in agricultural productivity in Ethiopia, where smallholder farmers often lack access to modern equipment. Panel-data estimation was employed to analyse the impact of machinery fleets on crop yields over time across different regions in Ethiopia. A significant proportion (35%) of smallholder farmers experienced a 10% increase in maize yield due to the deployment of advanced machinery, with robust standard errors indicating reliable results. The use of industrial machinery fleets has potential for enhancing agricultural productivity in Ethiopia, warranting further policy and investment support. Government policies should incentivize farmers to adopt modern machinery while providing training and maintenance services. Industrial machinery, fleet systems, panel data, yield improvement, smallholder agriculture The maintenance outcome was modelled as $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + v_t + \epsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African economies, econometrics, panel data, stochastic frontier analysis, productivity studies, smallholder farming, time-series analysis*

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