

Methodological Evaluation and Panel-Data Estimation of Machinery Fleet Performance for Yield Improvement in Ghana (2000–2026)

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ABSTRACT

Background: The performance of industrial machinery fleets is a critical determinant of productivity in developing economies, yet systematic, longitudinal analyses of their operational efficiency and impact on yield are scarce. Existing evaluations often lack robust methodological frameworks suitable for the specific contextual challenges.

Purpose and objectives: This study aims to methodologically evaluate machinery fleet systems and quantify their causal effect on yield improvement. The primary objective is to develop and apply a panel-data estimation model to isolate the performance contribution of fleet management from other production factors.

Keywords: *Panel-data estimation, Machinery fleet management, Operational efficiency, Yield improvement, Sub-Saharan Africa, Developing economies, Longitudinal analysis*

Article Highlights

- Panel-data model isolates fleet management's causal effect on yield.
- Preventative maintenance adherence is the most significant performance driver.
- Framework controls for unobserved heterogeneity across sectors and time.
- Provides credible estimates for industrial policy in developing economies.

Core Methodology

Two-way fixed effects model applied to a balanced panel dataset from multiple industrial sectors, using cluster-robust standard errors for inference.

This study offers a robust framework for quantifying machinery fleet contributions to productivity.



ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.



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