African Mining Engineering

Methodological Evaluation of Process-Control Systems in Ugandan Agriculture: Panel Data Estimation for Yield Improvement

Tumwebaze Ruberu[1,2], **Kizza Mutebi**[3], **Embaneyi Okothuko**[2,4]

[1] Department of Civil Engineering, Mbarara University of Science and Technology

[2] Makerere University Business School (MUBS)

[3] Department of Mechanical Engineering, Makerere University Business School (MUBS)

[4] Kyambogo University, Kampala

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Correspondence: truberu@gmail.com

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Author notes

Tumwebaze Ruberu is affiliated with Department of Civil Engineering, Mbarara University of Science and Technology and focuses on Engineering research in Africa.

Kizza Mutebi is affiliated with Department of Mechanical Engineering, Makerere University Business School (MUBS) and focuses on Engineering research in Africa.

Embaneyi Okothuko is affiliated with Kyambogo University, Kampala and focuses on Engineering research in Africa.

Abstract

This study addresses a current research gap in Engineering concerning Methodological evaluation of process-control systems systems in Uganda: panel-data estimation for measuring yield improvement in Uganda. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of process-control systems systems in Uganda: panel-data estimation for measuring yield improvement, Uganda, Africa, Engineering, original research This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Uganda, Agricultural Engineering, Panel Data, Econometrics, Process Control Systems, Yield Analysis, Time Series Analysis*

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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