Bayesian Hierarchical Model Assessment of Process-Control Systems in Kenyan Agricultural Yield Improvement: A Comparative Study

Wambugu Mutai[1,2], **Odhiambo Omollo**[1,2]

[1] Technical University of Kenya

[2] Pwani University

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Correspondence: wmutai@hotmail.com

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Author notes

Wambugu Mutai is affiliated with Technical University of Kenya and focuses on Engineering research in Africa.

Odhiambo Omollo is affiliated with Pwani University and focuses on Engineering research in Africa.

Abstract

The study focuses on assessing process-control systems in Kenyan agricultural yield improvement through a Bayesian hierarchical model. A Bayesian hierarchical model is employed to analyse data from multiple fields, with uncertainty quantified via credible intervals. The analysis revealed that a specific control system increased crop yield by an average of 15% compared to traditional farming practices in the region. Bayesian hierarchical models provide robust insights into process-control systems' efficacy and can guide future agricultural policy and practice improvements. Policy-makers should consider implementing these enhanced control systems to improve agricultural productivity, particularly in regions with similar climatic conditions. The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, Bayesian hierarchical model, Process control systems, Statistical methods, Methodological evaluation, Yield assessment, Quantile regression*

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