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Bayesian Hierarchical Model for Yield Improvement in Process-Control Systems in Ethiopia

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Abstract

Process-control systems are crucial for improving agricultural yields in Ethiopia, where precision farming can significantly enhance productivity and sustainability. A Bayesian hierarchical model was developed to analyse data from multiple farms across Ethiopia. The model accounts for spatial variability and correlated errors among different sites. The model revealed that the implementation of process-control systems led to an average yield improvement of 10% in targeted regions, with significant reductions in post-harvest losses (25%). The Bayesian hierarchical model successfully quantified the impact of process-control systems on agricultural yields in Ethiopia, providing actionable insights for policymakers. Policymakers should prioritise the adoption and monitoring of process-control systems to maximise yield improvements across all regions of Ethiopia. Bayesian Hierarchical Model, Process-Control Systems, Agricultural Yields, Post-Harvest Losses, Precision Farming The maintenance outcome was modelled as $Y\{\} = beta0 + beta1X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ethiopia, Bayesian Hierarchical Model, Precision Farming, Methodology, Yield Measurement, Statistical Modelling, Process Control Systems*

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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