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Methodological Evaluation of Smallholder Farms Systems in Uganda using Bayesian Hierarchical Models for Cost-Effectiveness Assessment

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Abstract

Smallholder farms in Uganda face significant economic challenges, necessitating systematic evaluations to enhance their cost-effectiveness. The review employed rigorous search strategies across academic databases and grey literature, employing Bayesian hierarchical models to analyse empirical data from case studies and surveys conducted by researchers in the field. A key finding was that integrating Bayesian hierarchical models significantly improved the precision of cost-effectiveness measurements for smallholder farms compared to traditional statistical methods. Bayesian hierarchical models offer a robust framework for assessing the economic viability of smallholder farm systems, providing insights into resource allocation and management strategies. Future research should focus on replicating this model across different regions in Uganda and incorporating additional variables such as climate change impacts. Smallholder farms, Bayesian hierarchical models, cost-effectiveness, Uganda, agricultural economics Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African geography, smallholder farming systems, Bayesian hierarchical models, cost-effectiveness analysis, econometrics, simulation methods, geographic information systems*

ABSTRACT-ONLY PUBLICATION

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