



Bayesian Hierarchical Model Evaluation for Yield Improvement in Tanzanian Smallholder Farm Systems,

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Abstract

This study aims to evaluate yield improvement in Tanzanian smallholder farm systems through a Bayesian hierarchical model. A Bayesian hierarchical model was employed to analyse data collected from Tanzanian smallholder farms. This model accounts for both farm-level and field-level variability in yield measurements. The analysis revealed significant variation in yield across different fields within the same farm, indicating that site-specific interventions could lead to improved yields. The Bayesian hierarchical model provided a robust framework for assessing yield improvement by accounting for spatial heterogeneity. Further research should focus on implementing targeted interventions based on field-level data to maximise yield improvements in smallholder farming systems. Bayesian Hierarchical Model, Yield Improvement, Smallholder Farming, Tanzania The empirical specification follows $Y = \beta_{0+\beta}^{\vec{p}} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Tanzania, Bayesian Hierarchical Model, Smallholder Farms, Yield Measurement, Methodology, Statistical Analysis, Econometrics*

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