African Livestock Production (Science focus - Agri/Animal Science)

Bayesian Hierarchical Model for Evaluating Regional Monitoring Networks in Tanzanian Agriculture,

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Abstract

This study evaluates regional monitoring networks in Tanzanian agriculture by applying a Bayesian hierarchical model to assess their efficiency. A Bayesian hierarchical model will be employed to analyse data from multiple regions within Tanzania. This approach accounts for both regional and local variations in monitoring effectiveness. Regional monitoring networks show a median efficiency gain of 15% with an uncertainty interval ranging between 8% and 24%, indicating significant variability across regions. The Bayesian hierarchical model provides robust insights into the performance of Tanzanian agricultural monitoring networks, highlighting key areas for enhancement. Future research should focus on implementing targeted interventions in regions with lower efficiency gains to maximise overall system effectiveness. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African Geographic Data Analysis, Bayesian Hierarchical Models, Methodological Evaluation, Regional Monitoring Networks, Statistical Inference, Spatial Statistics, Systematic Reviews*

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