African Horticulture Studies (Agri/Plant Science)

Bayesian Hierarchical Model for Assessing System Reliability in Tanzania's Regional Monitoring Networks Systems

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Abstract

Regional monitoring networks in Tanzania are crucial for assessing agricultural system reliability. However, current methodologies often lack a comprehensive statistical framework to evaluate these systems accurately. A Bayesian hierarchical model was developed to account for variability across different regions. The model incorporates prior knowledge about system components and uses likelihood functions to estimate parameters based on observed data. The model demonstrated a significant improvement in estimating the reliability of monitoring networks, with an average accuracy rate of 85% when compared to traditional methods. This study provides evidence that Bayesian hierarchical models can enhance the assessment of regional agricultural monitoring systems, offering improved reliability estimates and insights into system performance. The findings suggest that implementing these models in real-world applications could lead to more informed decision-making regarding resource allocation for monitoring networks. Regional Monitoring Networks, Agricultural Systems Reliability, Bayesian Hierarchical Model, System Performance The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Tanzania, Bayesian, Hierarchical, Reliability, Monitoring, Networks, Spatial*

ABSTRACT-ONLY PUBLICATION

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