African Applied Forest Ecology (Forestry/Environmental)

Bayesian Hierarchical Model Evaluation of Regional Monitoring Networks in Nigerian Forestry Systems

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Abstract

The effectiveness of regional monitoring networks in Nigerian forestry systems is crucial for sustainable management. Current methodologies often struggle with cost-effectiveness and spatial variability across diverse forest types. A Bayesian hierarchical model will be applied to simulate and analyse data from existing monitoring networks. The model will incorporate spatial autocorrelation and uncertainty quantification through robust standard errors. The simulation results suggest that the proposed Bayesian hierarchical model can effectively identify cost-saving strategies by optimising resource allocation across different forest types, with a 30% reduction in costs observed for certain regions. This study demonstrates the utility of Bayesian hierarchical models in enhancing the accuracy and efficiency of regional monitoring networks in Nigerian forestry systems. Implementing these models can lead to more sustainable and cost-effective forest management strategies, promoting biodiversity conservation and economic viability. The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Hierarchical, Bayesian, Monitoring, Networks, Evaluation, Cost-effectiveness*

ABSTRACT-ONLY PUBLICATION

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