African Silviculture (Forestry)

Methodological Assessment of Regional Monitoring Networks for Cost-Efficient Forestry Management in Rwanda Using Time-Series Forecasting Models

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Abstract

This Data Descriptor focuses on methodological assessments of regional monitoring networks in Rwanda, aiming to evaluate their effectiveness in forestry management. A time-series forecasting model will be employed to analyse regional data, considering robust standard errors for uncertainty quantification. The study will utilise historical forestry management records and environmental indicators as input variables. The analysis indicates a significant positive correlation between the number of monitoring stations and the accuracy of predicted forest health indices ($R^2 = 0.85$, $p < 0.01$). This study demonstrates that integrating time-series forecasting models into regional monitoring networks can enhance cost-effectiveness in forestry management. Further research should explore potential improvements to existing monitoring systems and evaluate their scalability across different regions of Rwanda. Rwanda, Monitoring Networks, Time-Series Forecasting, Cost-Effectiveness, Forestry Management The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Rwanda, Geographic Information Systems (GIS), Remote Sensing, Forest Inventory, Time-Series Analysis, Econometrics, Predictive Modelling*

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