African Forest Ecology (Environmental Science)

Methodological Assessment of Regional Monitoring Networks in Ethiopia Using Quasi-Experimental Design

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Abstract

Regional monitoring networks are crucial for tracking ecological changes in Ethiopia's diverse forest ecosystems. A quasi-experimental design was employed to assess the performance of regional monitoring networks in measuring environmental indicators across different regions of Ethiopia. Data from five years of continuous monitoring were analysed using multiple regression analysis for trend detection and uncertainty quantification with robust standard errors. There was a significant positive correlation ($p < 0.05$) between the number of monitored sites and the accuracy of forest cover estimates, highlighting the importance of network expansion in improving data reliability. The quasi-experimental design provided valuable insights into the operational efficiency of regional monitoring networks, enabling targeted improvements for future environmental management strategies. Expand monitoring networks to include previously undersampled regions and implement adaptive management practices based on feedback from monitoring results. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Ethiopia, Quasi-experimental design, Monitoring networks, Forest ecosystems, Methodology, Evaluation, Spatial analysis*

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