



Methodological Assessment of Regional Monitoring Networks in Nigeria: Multilevel Regression Analysis for Risk Reduction Evaluation

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Abstract

This study evaluates the effectiveness of regional monitoring networks in Nigeria for environmental risk reduction. A multilevel regression model was applied using data from Nigeria's regional environmental monitoring networks. The model accounts for hierarchical structures within the data to ensure accurate assessment of risk factors at various geographical scales. The analysis revealed a significant reduction in environmental risks associated with industrial activities, indicating that proper monitoring can lead to effective mitigation strategies. This study provides evidence supporting the effectiveness of multilevel regression models for evaluating regional environmental risk reduction measures. The findings suggest that enhancing network infrastructure could further improve risk management. Based on this analysis, recommendations include upgrading monitoring equipment and expanding coverage areas to ensure comprehensive data collection across diverse geographical regions. The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Nigerian, Multilevel, Regression, Spatial, GIS, Evaluation, Modelling*

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