



Methodological Evaluation of Regional Monitoring Networks in Rwanda: A Difference-in-Differences Approach

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Abstract

Regional monitoring networks in Rwanda have been established to assess environmental impacts of anthropogenic activities such as agriculture and mining. A systematic review approach was employed to identify relevant studies. A DiD regression model will be used to analyse temporal trends in monitoring data from to , accounting for potential confounders with robust standard errors and a confidence interval of $\pm 2\%$. The DiD analysis revealed a statistically significant improvement ($p < 0.05$) in network reliability over the study period, indicating improved data consistency. This study provides evidence that the Rwandan regional monitoring networks have been strengthened through regular calibration exercises and technological upgrades. Further validation is recommended to ensure consistent performance across different seasons and regions. The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, geospatial analysis, spatial statistics, econometrics, regression discontinuity, causal inference, panel data*

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