



Methodological Evaluation of Regional Monitoring Networks in South Africa Using Difference-in-Differences for Clinical Outcomes Assessment

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Abstract

The effectiveness of regional monitoring networks in South Africa for environmental restoration has been studied extensively, but methodological evaluations are scarce. A systematic review was conducted, including studies from various regions in South Africa. The data were analysed using a difference-in-differences (DID) regression model, accounting for potential confounders and uncertainties through robust standard errors. The analysis revealed that the DID model could effectively measure clinical outcomes with an estimated effect size of 0.25 (95% CI: 0.12-0.38), indicating a moderate positive impact of monitoring networks on restoration efforts. This meta-analysis provides evidence for the robustness and applicability of the DID model in evaluating regional monitoring networks' effectiveness in South Africa, offering valuable insights for future environmental research and policy-making. Policy makers should consider using the DID model to assess the impact of their monitoring efforts on environmental restoration projects. Funding agencies could also prioritise supporting studies that validate these methodologies. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, monitoring networks, spatial analysis, quasi-experimental design, systematic review, clinical outcomes, difference-in-differences*

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