



# Methodological Foundations for Evaluating Regional Monitoring Networks in Ethiopia Using Difference-in-Differences Approach

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## Abstract

Regional monitoring networks in Ethiopia are crucial for environmental management but face challenges in data quality and consistency. The DiD approach will be applied to assess changes in environmental parameters across different regions before and after the implementation of new monitoring protocols. The analysis will account for potential confounders through robust statistical techniques. The developed methodological framework provides a robust tool for continuous evaluation and improvement of regional monitoring networks in Ethiopia. Policy makers should prioritise ongoing quality control measures to maintain the effectiveness of these systems. Model estimation used  $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_i (y_i - f(\theta(\xi)))^2 + \lambda \operatorname{Vert} \theta \operatorname{Vert} \}^2$ , with performance evaluated using out-of-sample error.

**Keywords:** Ethiopia, Geographic Information Systems (GIS), Spatial Analysis, Regional Monitoring Networks, DiD Model, Methodological Evaluation, Data Quality Assurance

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