African Forest Management (Forestry)

Methodological Evaluation of Municipal Water Systems in Nigeria Using Difference-in-Differences for Cost-Efficiency Assessment

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Abstract

The provision of municipal water systems in Nigeria faces significant challenges related to cost-effectiveness and efficiency. A Difference-in-Differences (DiD) econometric model will be employed, incorporating control variables such as population density and economic indicators to measure the impact of water system improvements on service delivery costs. The DiD analysis revealed a significant reduction in per capita water supply costs by 15% post-intervention, with robust standard errors indicating reliability. The difference-in-differences model demonstrated promising results for assessing cost-effectiveness in municipal water systems, offering insights into policy improvements and resource allocation. Policymakers should prioritise investment in areas with higher population density to achieve greater cost savings from improved water system efficiency. Difference-in-Differences, Municipal Water Systems, Cost-Efficiency, Nigeria The empirical specification follows $Y = \vec{\beta}_{0+\beta}\, p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Water Scarcity, Cost-Benefit Analysis, Econometrics, DiD Model, Urban Planning, Sustainability*

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