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Methodological Evaluation of Municipal Water Systems Adoption in Kenya Using Difference-in-Differences Analysis

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Abstract

Municipal water systems are essential infrastructure in many African countries, including Kenya. Despite their importance, adoption rates have varied widely across different regions and communities. A Difference-in-Differences analysis was employed, utilising data from government records and surveys conducted across selected districts in Kenya. The DiD model accounts for pre-existing differences between treatment and control groups over time. The DiD results indicate a significant increase in water system adoption rates by 25% in the intervention areas compared to non-intervention regions, with substantial variation observed among urban versus rural settings. This study provides robust evidence supporting the effectiveness of targeted interventions in promoting municipal water systems adoption. The findings highlight the need for tailored strategies addressing regional disparities. Future research should explore the long-term sustainability and impact of implemented water system improvements, while policymakers could leverage these insights to design more effective national programmes. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2,$ with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, African, Networks, Governance, Social-Ecological, Systems, Econometrics, DID*

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