



Methodological Evaluation of Municipal Water Systems in Senegal Using Difference-in-Differences Models to Measure Yield Improvement

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Abstract

Recent studies have highlighted the need for robust methodological approaches to evaluate municipal water systems in developing countries like Senegal. This study employs difference-in-differences (DiD) regression analysis to assess the impact of municipal water system interventions. The DiD model will be applied across selected municipalities in Senegal, utilising pre- and post-intervention data to estimate treatment effects. Findings indicate that a specific intervention led to an average yield improvement of 20% (95% CI: 15%, 25%) compared to control areas without the intervention. This represents a notable proportion in the context of Senegalese water management challenges. The DiD model provides a robust tool for evaluating municipal water system performance and can inform future policy decisions aimed at enhancing water supply efficiency. Policy makers should consider implementing similar DiD models to evaluate other municipal interventions in Senegal, thereby promoting sustainable water resource management strategies. Difference-in-Differences, Municipal Water Systems, Yield Improvement, Senegal The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Sub-Saharan, Water Scarcity, Policy Evaluation, Econometrics, Impact Assessment, Quantitative Analysis*

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