



# Methodological Evaluation of Water Treatment Facilities Adoption in Rwanda Using Difference-in-Differences: An Empirical Study

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## Abstract

The adoption of water treatment facilities in Rwanda has been inconsistent, leading to varying levels of access to clean water across different regions. This variability necessitates a methodological evaluation to understand factors influencing adoption rates. The DiD method was applied to analyse data from multiple regions where water treatment facilities were introduced at different times. A control group of regions without treatment facilities served as a reference point for comparing changes in adoption rates over time. A significant proportion (75% confidence interval: 60-85%) of regions showed an increase in the installation and use of water treatment facilities after their introduction, indicating that policy interventions and community engagement played crucial roles in this adoption pattern. The DiD model effectively highlighted the impact of external factors on the adoption of water treatment facilities, providing a robust framework for future policy development and implementation strategies in Rwanda. Based on the findings, targeted educational programmes and incentives should be implemented to enhance community acceptance and ensure equitable access to clean water resources. The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Rwanda, Water Treatment Facilities, Methodology, Adoption Rates, Difference-in-Differences, Geographic Analysis, Quantitative Methods*

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