



# Methodological Evaluation of Water Treatment Facilities in Uganda Using Panel Data for Cost-Effectiveness Analysis

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## Abstract

Water treatment facilities in Uganda face challenges related to cost-effectiveness and efficiency. The study employs a fixed effects regression model to analyse costs and benefits associated with different water treatment methods across various regions in Uganda. Panel data revealed significant variations in operational costs among facilities, indicating the need for targeted interventions to optimise resource utilization. The findings suggest that cost-effectiveness can be improved through better management practices and standardised facility maintenance protocols. Implementing a comprehensive monitoring system and promoting best management practices could enhance the sustainability of water treatment systems in Uganda. Water Treatment, Panel Data Analysis, Cost-Effectiveness, Fixed Effects Model, Uganda The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *African geography, panel data, econometrics, cost-benefit analysis, water resources management, fixed effects model, stochastic frontier analysis*

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