



Methodological Evaluation of Quasi-Experimental Cost-Effectiveness in Water Treatment Facilities in Uganda

Mukakwasire Sserunkuwa^{1,2}, Kabingo Mugenyi², Owino Mukasa^{3,4}

¹ Department of Civil Engineering, Makerere University, Kampala

² Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit

³ Makerere University, Kampala

⁴ Department of Mechanical Engineering, Uganda National Council for Science and Technology (UNCST)

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Correspondence: msserunkuwa@outlook.com

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Author notes

Mukakwasire Sserunkuwa is affiliated with Department of Civil Engineering, Makerere University, Kampala and focuses on Engineering research in Africa.

Kabingo Mugenyi is affiliated with Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit and focuses on Engineering research in Africa.

Owino Mukasa is affiliated with Makerere University, Kampala and focuses on Engineering research in Africa.

Abstract

Water scarcity is a significant challenge in Uganda, necessitating effective water treatment solutions. A mixed-method approach combining quantitative analysis and qualitative insights was employed to assess the performance of various water treatment systems in Uganda, focusing on operational costs, efficiency, and environmental impact. The study revealed a significant reduction (30%) in operational costs for a specific type of membrane filtration system compared to traditional sand filtration methods, with a confidence interval of $\pm 5\%$ around this estimate. Quasi-experimental design provided robust evidence supporting the cost-effectiveness and efficiency gains of membrane filtration systems over conventional methods. Ugandan policymakers are encouraged to adopt these findings for the development and implementation of sustainable water treatment infrastructure, particularly in rural areas where access to clean water is limited. Quasi-experimental design, Water treatment facilities, Cost-effectiveness, Uganda, Membrane filtration. 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: *Sub-Saharan, cost-effectiveness, quasi-experimental, randomized controlled trials, econometric, impact evaluation, water resources management*

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