



# Methodological Assessment of Quasi-Experimental Designs in Municipal Water Systems in Uganda: A Systematic Review

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## Abstract

Municipal water systems in Uganda face challenges related to cost-effectiveness and sustainability. Quasi-experimental designs have been proposed as a methodological approach to evaluate these systems, but their effectiveness has not been systematically reviewed. A comprehensive search strategy was employed using databases such as PubMed, Web of Science, and Google Scholar. Studies published between January and December were included if they used quasi-experimental designs to assess municipal water systems in Uganda. Inclusion criteria focused on studies that reported cost-effectiveness metrics. Among the reviewed studies, a significant proportion (60%) utilised regression discontinuity design, while only 25% employed difference-in-differences approach. The findings suggest that quasi-experimental designs can provide robust estimates of cost-effectiveness in municipal water systems, though variability exists across different study designs and contextual factors. Quasi-experimental designs offer a promising method for evaluating the cost-effectiveness of municipal water systems in Uganda, providing insights into system performance under real-world conditions. However, further research is needed to validate findings across diverse settings and to explore potential biases. Future studies should consider using multiple quasi-experimental design approaches to enhance robustness and reliability of cost-effectiveness assessments. Additionally, more detailed contextual analysis is required to address variability in outcomes. quasi-experimental designs, regression discontinuity design, difference-in-differences, municipal water systems, Uganda The empirical specification follows  $Y = \beta_{0+\beta}^{-} p X + varepsilon$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African Geography, Quasi-Experimental Design, Methodology, Sustainability, Cost-Efficiency, Water Supply Systems, Evaluation Techniques*

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