



Methodological Evaluation of Municipal Water Systems in Kenya Using Quasi-Experimental Design to Assess System Reliability

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Abstract

Municipal water systems in Kenya face challenges such as reliability issues due to varying factors including infrastructure age, maintenance frequency, and operational efficiency. The review will employ systematic search strategies with inclusion criteria based on specific research designs, data types, and geographic focus (Kenya). Eligible studies will be assessed for methodological rigor, reliability of results, and applicability to municipal water systems. One study used a quasi-experimental design that incorporated time-series analysis and robust standard errors to measure system performance over two years, revealing significant improvements in reliability when regular maintenance was implemented. The review highlights the importance of consistent data collection methods and comprehensive evaluations for improving municipal water system reliability. Future research should focus on replicating these findings across other Kenyan municipalities. Policymakers are encouraged to adopt rigorous evaluation methodologies, which can inform evidence-based decision-making in municipal water systems management. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Kenya, Quasi-Experimental Design, Methodological Evaluation, Water Infrastructure, Reliability Analysis, System Performance, Data Quality Assessment

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