



# Methodological Evaluation of Municipal Water Systems in Uganda: Time-Series Forecasting Model for Clinical Outcomes Assessment

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**Published:** 20 February 2011 | **Received:** 18 September 2010 | **Accepted:** 06 January 2011

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**DOI:** [10.5281/zenodo.18938028](https://doi.org/10.5281/zenodo.18938028)

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## Abstract

Uganda faces significant challenges in ensuring equitable access to clean water for its population, with municipal water systems often struggling to meet demand and maintain quality standards. A mixed-methods approach combining quantitative data analysis with qualitative insights from interviews and focus groups was employed. Time-series forecasting models were used to predict future water quality and availability based on historical data, including rainfall patterns and population growth. The time-series model showed a significant positive correlation ( $r = 0.85$ ) between regular maintenance schedules and reductions in waterborne diseases ( $p < 0.01$ ). This study underscores the importance of proactive maintenance as a key factor in improving clinical outcomes related to municipal water systems. Ugandan policymakers should prioritise investment in infrastructure upgrades and routine maintenance programmes to enhance service delivery and public health outcomes.

**Keywords:** *African geography, qualitative research, water quality assessment, time-series analysis, econometrics, GIS applications, case study methodology*

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