African Land Degradation Studies (Environmental/Earth Science)

Methodological Evaluation of Municipal Water Systems in Uganda: A Randomized Field Trial

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Published: 22 October 2012 | **Received:** 13 August 2012 | **Accepted:** 17 September 2012

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DOI: 10.5281/zenodo.18950644

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Abstract

The current municipal water systems in Uganda face challenges such as inadequate infrastructure, poor maintenance, and insufficient funding, leading to inefficiencies and environmental degradation. A comprehensive search strategy was employed across multiple databases including PubMed, Web of Science, and Google Scholar. Studies were selected based on predefined inclusion criteria, focusing on randomized field trials conducted between and . The analysis identified a significant trend towards the use of statistical models such as logistic regression to evaluate system performance, particularly in regions with high population density and limited resources. This review highlights the critical need for robust methodological frameworks to ensure sustainable municipal water systems in Uganda. The findings suggest that incorporating advanced statistical techniques can significantly improve the accuracy and reliability of performance evaluations. Public health authorities should prioritise the adoption of validated statistical models, such as logistic regression with a confidence interval of ±5%, to enhance decision-making processes for municipal water system improvements. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic* *Terms:* *African* *Sub-Saharan*

Methodological Terms:
Randomization
Evaluation
Sampling
Qualitative Research
Quantitative Research

Theoretical Concepts:
Sustainability
Infrastructure Development
Policy Analysis

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