



Methodological Evaluation of Water Treatment Systems in Uganda: A Randomized Field Trial on System Reliability

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Abstract

Water treatment systems have been implemented in Uganda to improve access to clean water, but their reliability remains a concern. A randomized field trial was conducted across different regions of Uganda. A Poisson regression model was used to analyse system failures over time, accounting for geographical variability. The analysis revealed an average failure rate of 15% per year with significant variations between highland and lowland areas ($p < 0.05$). Despite improvements in infrastructure, there is a need to address localized issues affecting system reliability. Targeted interventions should focus on enhancing maintenance practices in rural communities of lowland regions where failures were more frequent and severe. 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: *Geographic, Africa, FieldTrials, SystemReliability, Methodology, Epidemiology, PublicHealth, Hygiene*

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