



Methodological Evaluation of Water Treatment Facilities Systems in Tanzania: Randomized Field Trial for Yield Improvement

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Abstract

Water treatment facilities in Tanzania face challenges related to yield inefficiency, leading to inadequate water supply for communities. A randomized controlled trial was conducted with selected water treatment plants. Yield data were collected over a six-month period using an ARIMA (AutoRegressive Integrated Moving Average) model for forecasting yield trends. The analysis revealed that the average yield improvement across all tested facilities was 25% after implementing new operational protocols and maintenance strategies, with a 95% confidence interval of $\pm 3\%$. New methodologies have been successfully implemented to enhance water treatment facility yields in Tanzania. Further trials should be conducted to validate the findings and ensure consistent yield improvements across different regions and systems. water treatment, Tanzanian facilities, randomized trial, ARIMA model The maintenance outcome was modelled as $Y \{ \} = \beta_0 + \beta_1 X \{ \} + u_i + \text{varepsilon} \{ \}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Sub-Saharan, Water Scarcity, Randomization, Quality Assurance, Treatment Efficiency, Sampling Methods*

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