



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

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Abstract

Water treatment facilities in Nigeria often face challenges related to yield, which affects their efficiency in providing safe drinking water. A randomized field trial was conducted across ten randomly selected communities in Nigeria, where participants were provided with both conventional and improved water treatment units (ITUs). Data collection included pre- and post-treatment yield measurements, user feedback surveys, and microbiological tests to ensure quality control. A mixed-methods approach combining quantitative yield data with qualitative insights from interviews was employed. The yield improvement through the use of ITUs ranged between 20% and 45%, with a significant increase in water safety indicators such as improved turbidity levels post-treatment compared to pre-treatment. User satisfaction scores also showed a marked improvement, indicating greater acceptance and reliability of the new treatment methods. The randomized field trial demonstrated that the use of ITUs can significantly enhance yield efficiency without compromising water quality or user acceptability. Based on these findings, it is recommended that public health authorities in Nigeria adopt this methodological approach for improving the performance of water treatment facilities. Additionally, further research should be conducted to explore the scalability and sustainability of such interventions. Water Treatment Facilities, Yield Improvement, Randomized Field Trial, Nigeria The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Aquatic Systems, Sampling, theoretical-framework, Randomized Controlled Trial, Water Quality Assessment, Hydrology, Public Health Engineering*

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