African Social Geography (Geography/Social)

Methodological Evaluation of Municipal Water Systems in Nigeria: Randomized Field Trial for Yield Improvement,

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Abstract

Recent studies in Nigeria have highlighted issues with municipal water systems, particularly regarding their efficiency in delivering potable water to urban populations. The methodology involves the deployment of advanced sensors and data collection devices in randomly selected municipal water distribution networks across Nigeria's major cities. Statistical analysis will employ mixed-effects models to account for spatial variability and temporal trends. Initial findings suggest a significant increase in water yield efficiency by up to 20% in areas with optimised infrastructure, indicating the effectiveness of the randomized trial design. The study's results provide valuable insights into improving municipal water systems, contributing to more sustainable and equitable urban development in Nigeria. Based on these findings, recommendations include prioritising infrastructure upgrades in underperforming areas and implementing regular system maintenance schedules. The empirical specification follows $Y = \vec{\beta}_{0+\beta} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographical Indicators of Sub-Saharan Africa, Methodological Evaluation, Randomized Controlled Trials, Water Yield Measurement, Sustainable Infrastructure Development, Quantitative Research Methods, Geographic Information Systems*

ABSTRACT-ONLY PUBLICATION

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