



Methodological Assessment of Quasi-Experimental Designs in Municipal Water Systems Adoption, Nigeria

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Abstract

Municipal water systems in Nigeria have faced significant challenges in adoption due to various socio-economic factors. A mixed-method approach was employed, combining quantitative data analysis with qualitative interviews to assess perceptions and practices related to municipal water systems. Quasi-experimental designs were used to control for confounding variables and measure adoption rates accurately. The study identified a 15% increase in system adoption among communities that received targeted community engagement interventions compared to those without such initiatives, with confidence intervals indicating a margin of error of ± 3 percentage points. Quasi-experimental designs proved effective in measuring municipal water systems adoption rates. Community engagement was found to be a key driver of increased system uptake. Further research should explore the long-term sustainability of these interventions and consider scalability across different regions of Nigeria. Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_{i=1}^n \ell(y_i, f_{\theta}(\xi_i)) + \lambda \|\theta\|_2^2 \}$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, randomized controlled trial, qualitative assessment, spatio-temporal analysis, iterative process methodology*

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