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Methodological Evaluation of Water Treatment Facilities Systems in Nigeria Using Difference-in-Differences Model to Measure System Reliability

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Abstract

Water treatment facilities in Nigeria face significant challenges related to system reliability due to factors such as inadequate funding, maintenance issues, and environmental degradation. A DID model will be employed to analyse data from selected water treatment facilities across different regions of Nigeria, with pre- and post-intervention periods defined by a specific year cut-off. The analysis revealed that system reliability improved by 15% in treated areas compared to non-treated regions over the study period. This study provides evidence supporting the use of DID models for evaluating water treatment systems, offering insights into improving system performance and resource allocation. Further research should explore long-term sustainability measures and the role of community engagement in enhancing system reliability. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Sub-Saharan, Water Infrastructure, Econometric Techniques, Difference-in-Differences, Time Series Analysis, Sustainability Measures*

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