



# Methodological Evaluation of Multilevel Regression Analysis in Assessing Water Treatment Facility Adoption Rates in Uganda

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## Abstract

Water treatment facilities play a crucial role in improving water quality and public health outcomes in Uganda. However, adoption rates have been inconsistent across different regions. A multilevel logistic regression model was employed to analyse data from a survey conducted in three districts, incorporating both individual and district-level variables. The multilevel model revealed that infrastructure availability (20% increase) and community education programmes (15% increase) were significant predictors of adoption rates. Multilevel regression analysis provided a robust framework for understanding the complex factors affecting water treatment facility adoption in Uganda. Future studies should consider longitudinal data to better track changes over time and incorporate additional socioeconomic variables. The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Geographic, Multilevel, Regression, Hierarchical, Quantitative, Analysis, Evaluation, PublicHealth*

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