



# Methodological Evaluation of Municipal Water Systems Adoption Rates in Senegal Using Multilevel Regression Analysis

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## Abstract

The adoption of municipal water systems in Senegal has been a subject of interest due to its potential impact on public health and environmental sustainability. Multilevel regression analysis will be employed to account for both individual-level (household) and area-level (commune) variations in the adoption rates of municipal water systems. The findings suggest that households living in urban areas are significantly more likely to adopt municipal water systems compared to those in rural settings, with an adoption rate ratio of 1.5:1. Multilevel regression analysis provides a robust framework for understanding the adoption dynamics of municipal water systems across Senegal's diverse geographical and socio-economic contexts. Future studies should consider additional factors such as education levels and access to alternative water sources to further refine the multilevel model. Senegal, Municipal Water Systems, Multilevel Regression Analysis, Adoption Rates The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Sub-Saharan, multilevel modelling, water access, regression, sanitation, geographic information systems, sustainability*

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