



Methodological Evaluation of Water Treatment Facilities in Senegal: A Randomized Field Trial for Cost-Effectiveness Assessment

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Abstract

Water treatment facilities in Senegal are crucial for ensuring safe drinking water, but their effectiveness varies widely. A randomized field trial was conducted across multiple regions in Senegal. Water quality parameters were monitored, and economic data on operation costs were collected from both treated and untreated sources. In one region, the chlorination system reduced bacterial contamination by 70% compared to unchlorinated water sources at a cost-effectiveness ratio of 15 per household served. The study demonstrated that randomized trials can effectively assess the performance $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: African geography, randomized trials, methodological evaluation, water resource management, cost-benefit analysis, sustainable development, statistical sampling

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