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Cost-Effectiveness Assessment of Water Treatment Facilities in Ghana Through Panel Data Analysis

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Abstract

Water treatment facilities in Ghana are critical for ensuring safe drinking water access, but their cost-effectiveness varies across different regions and over time. Panel data from 10 regions in Ghana were analysed with a fixed effects model to estimate costs, benefits, and associated uncertainties. Robust standard errors were used for inference. The analysis revealed significant variations in treatment facility cost-effectiveness across regions, with some facilities showing marginal returns despite high initial investment. Panel data analysis provided insights into the regional variability of water treatment facility costs and benefits, highlighting the need for targeted interventions to optimise resource allocation. Investment decisions should consider regional specificities and potential cost savings through improved maintenance strategies or alternative technologies in less efficient regions. Water Treatment Facilities, Ghana, Panel Data Analysis, Cost-Effectiveness, Fixed Effects Model The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, panel data, econometric, treatment efficacy, resource allocation, sustainability, geographic variation*

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This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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