African Environmental Contamination (Environmental Science)

Off-grid Communities Systems in Ghana: Methodological Evaluation and Clinical Outcome Analysis Using Difference-in-Differences Models

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Abstract

Off-grid communities in Ghana have adopted various systems to provide reliable electricity without reliance on national grids. A difference-in-differences model was applied to assess the impact of different off-grid energy solutions on health outcomes in Ghanaian communities. The analysis revealed a significant improvement ($p < 0.01$) in infant mortality rates among children exposed to improved lighting systems compared to those using traditional kerosene lamps. This study provides robust evidence supporting the effectiveness of certain off-grid energy solutions on health outcomes in Ghanaian communities, particularly in reducing neonatal deaths. Further research should explore scalability and long-term sustainability of these interventions across different socio-economic groups in Ghana. Difference-in-Differences Model, Off-Grid Energy Systems, Clinical Outcomes, Infant Mortality, Ghana The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, geospatial analysis, econometric models, randomized controlled trials, intervention effectiveness, community health metrics, disparity measures*

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