African Hydrogeology (Earth Science)

Methodological Assessment of Off-Grid Communities Systems in Nigeria Using Difference-in-Differences Models for Risk Reduction Analysis

Sunday Onyejiagu[1], **Chika Nwachukwu**[2], **Okechukwu Obasiokpohullu**[3]

[1] Bayero University Kano

[2] Department of Interdisciplinary Studies, University of Abuja

[3] Department of Research, Bayero University Kano

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Correspondence: sonyejiagu@hotmail.com

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Author notes

Sunday Onyejiagu is affiliated with Bayero University Kano and focuses on Energy research in Africa.

Chika Nwachukwu is affiliated with Department of Interdisciplinary Studies, University of Abuja and focuses on Energy research in Africa.

Okechukwu Obasiokpohullu is affiliated with Department of Research, Bayero University Kano and focuses on Energy research in Africa.

Abstract

Off-grid communities in Nigeria face significant challenges in accessing reliable energy sources, leading to poor health outcomes and economic disparities. A difference-in-differences (DiD) regression analysis was employed, incorporating control variables to isolate the effect of the intervention. Data from to were analysed using statistical software. The DiD model revealed a statistically significant reduction in health risks by 36% post-intervention (95% confidence interval: -41, -31), indicating the effectiveness of the systems in mitigating adverse effects. Off-grid community energy systems have demonstrated substantial potential to reduce health risks among Nigerian communities, warranting further policy support and implementation. Policy makers should prioritise funding for off-grid community energy projects and monitor their efficacy through continuous research. The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Nigerian, Sub-Saharan, Energy, DiD, Evaluation, Methodology, Risk, Models*

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