African Silviculture (Forestry)

Methodological Evaluation of Off-Grid Communities Systems in Ghana Using Difference-in-Differences Approach for Risk Reduction Analysis

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Abstract

Off-grid communities in Ghana face significant challenges related to energy access, which impacts their agricultural productivity and risk management strategies. A DiD approach will be used to assess the impact of off-grid energy solutions on agricultural productivity and risk reduction. The analysis will compare pre- and post-intervention outcomes for communities with and without access to off-grid energy systems. Initial findings suggest a moderate but statistically significant decrease in agricultural risks among communities with improved off-grid energy systems, indicating the potential of DiD models in measuring such impacts. The difference-in-differences model provides valuable insights into how off-grid energy systems can mitigate agricultural risks in Ghana. Further research is recommended to validate these findings and explore other risk factors. Policy makers should consider promoting off-grid energy solutions as a means of reducing agricultural risks, particularly among vulnerable communities. The empirical specification follows $Y = \vec{\beta}_{0+\beta}\, p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, off-grid communities, DiD model, agricultural productivity, risk management, econometric methods, spatial analysis*

ABSTRACT-ONLY PUBLICATION

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