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Smallholder Farms System Reliability Assessment via Panel Data in Ghana,

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Abstract

Smallholder farms in Ghana face challenges related to energy access that impact their productivity and reliability of operations. A mixed methods approach is employed, combining quantitative analysis through panel data regression models with qualitative insights from interviews and observations. Panel data analysis reveals that the average reliability score of smallholder farms in Ghana was 75%, indicating moderate system performance across different years. The study concludes that while there are significant variations, overall farm systems show improvement over time with interventions aimed at improving energy access and management. Policy recommendations include increasing investment in renewable energy solutions for smallholder farms and enhancing training programmes to improve operational efficiency. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, African, Spatial, Econometrics, Qualitative, Hybrid, Integration*

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