African Development Geography
(Geography/Development/Social)

Cost-Effectiveness Evaluation of Smallholder Farm Systems in Nigeria Using Panel Data Analysis

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Abstract

Smallholder farms in Nigeria face significant challenges in cost-effectiveness due to resource constraints and market volatility. A mixed-method approach combining econometric modelling with qualitative field observations was employed. Panel data from 50 randomly selected farms over three years were analysed to estimate cost-effectiveness ratios and determine the impact of different inputs such as fertilizer and irrigation technology. The panel regression analysis revealed that a balanced use of fertilizer (150 kg per hectare) and improved irrigation systems resulted in an average increase of 20% in crop yield compared to traditional farming methods. This study provides robust evidence for the cost-effectiveness of targeted agricultural interventions, particularly when combined with appropriate technology application. Policy makers should prioritise funding for research and extension services that promote the adoption of cost-effective farm management practices among smallholder farmers in Nigeria. Smallholder farms, Cost-effectiveness, Panel data analysis, Agricultural productivity, Nigeria The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic* *Terms:* *Nigerian*

Methodological		*Terms:*
Panel	*Data*	*Analysis*
Theoretical		*Terms:*
Resource		*Allocation*
Methodological		*Terms:*
Econometric		*Modelling*
Conceptual	*Framework*	*Terms:*
Smallholder	*Farm*	*Systems*
Theoretical		*Concepts:*
Market Volatility		

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