Methodological Evaluation of Smallholder Farms Systems in Uganda Using Panel Data for Adoption Rate Measurement

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Abstract

Smallholder farms in Uganda have faced challenges in adopting modern agricultural technologies due to various socio-economic factors. A scoping review was conducted, synthesizing existing literature on the use of panel data techniques such as fixed effects models and random effects models to estimate adoption rates among smallholder farmers. Fixed effects models were found to be more robust for capturing individual farm-specific characteristics influencing adoption decisions. Panel data analysis provided a nuanced understanding of factors affecting adoption, including access to credit and market linkages. Future studies should consider additional qualitative dimensions alongside quantitative data to enhance the interpretability of results. Smallholder farms, panel data, Uganda, fixed effects model, random effects model Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumi ell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

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