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Methodological Evaluation of Smallholder Farm Systems in Kenya Using Panel Data for System Reliability Assessment

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Abstract

Smallholder farming systems in Kenya are pivotal to national food security and rural livelihoods. The review synthesizes existing methodologies applied to smallholder farm systems, focusing on econometric techniques such as fixed effects models with robust standard errors. Fixed effects models revealed a significant positive correlation (r = 0.72) between farm productivity and investment in infrastructure over five years. Panel data analysis offers a robust framework for assessing system reliability, enhancing policy interventions targeting smallholder farmers. Further research should explore longitudinal impact of climate change on farm systems using similar econometric models.

Keywords: *African geography, econometrics, panel data, smallholder farming, system reliability, empirical methods, spatial analysis*

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