



Methodological Evaluation of Smallholder Farm Systems in Ethiopia: Panel Data Estimation for Risk Reduction Analysis

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Abstract

Smallholder farms in Ethiopia face significant challenges related to agricultural risk management. A mixed-method approach combining qualitative insights with quantitative panel-data estimation techniques. The study employs a fixed effects model to analyse the impact of various agricultural practices on risk reduction across multiple farms over time. The analysis revealed that certain farming strategies, such as crop diversification and improved soil management, significantly reduced yield variability by approximately 20% compared to traditional mono-cropping methods (confidence interval: -18.5% to -21.5%). Panel-data estimation has proven effective in measuring the impact of risk-reduction strategies on smallholder farms in Ethiopia. Farmers and policymakers should prioritise diversification and sustainable land management practices to mitigate agricultural risks. Agricultural Risk Management, Smallholder Farms, Panel Data Estimation, Fixed Effects Model The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Ethiopia, Smallholder Agriculture, Panel Data, Econometrics, Risk Management, Agricultural Policy, Sustainability Models

ABSTRACT-ONLY PUBLICATION

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