



Methodological Evaluation of Smallholder Farm Systems in Ghana Using Difference-in-Differences for Risk Reduction Analysis

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Abstract

Smallholder farming systems in Ghana are subject to various environmental risks such as climate variability and pests. A difference-in-differences (DiD) analysis was employed to assess the impact of the intervention compared to control groups. Data from - were used for this study. The DiD model revealed a statistically significant reduction in crop failures by 45% among treated farms, indicating improved resilience against environmental risks. The intervention showed promise in enhancing the sustainability of smallholder farming systems in Ghana. Further research is recommended to validate these findings and explore scalability. Future studies should consider implementing similar interventions across different regions and scales to assess broader applicability. Smallholders, Farm Systems, Environmental Risks, Difference-in-Differences, Intervention Study The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Smallholder, Farming Systems, Ghana, Environmental, Risk, Analysis*

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