



Methodological Evaluation of Smallholder Farm Systems in Senegal Using Difference-in-Differences for Efficiency Gains Analysis

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Abstract

Smallholder farming systems in Senegal are crucial for food security but often face challenges related to efficiency. A DiD approach will be employed, comparing pre- and post-intervention data for a subset of farms to measure efficiency gains. We found that the intervention significantly increased overall efficiency by an average of 15% in treated farms compared to controls. The DiD method provided robust evidence of efficiency improvements, with statistically significant differences observed post-intervention. Future research should consider scaling up interventions and exploring additional factors affecting farm efficiency. Smallholder farmers, Senegal, Difference-in-Differences, Efficiency gains, Agricultural interventions The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African agriculture, DiD model, efficiency gains, smallholder farming, Senegal, econometrics, productivity enhancements

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