



Process-Control Systems Impact Assessment in Tanzanian Agriculture: A Difference-in-Differences Approach

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Abstract

Agriculture in Tanzania faces challenges such as low productivity and climate variability. Process-control systems (PCS), when implemented correctly, can enhance efficiency and yield, although their impact varies across different settings. A DID approach was employed to assess the impact of PCS implementation. The study compared treated and untreated farms over time, accounting for potential confounders such as climate variability and farmer practices. The analysis indicated that PCS led to an average yield increase of around 15% in treated farms relative to untreated ones, with significant variation observed across different regions and crop types. While the results suggest substantial potential for yield improvement through PCS implementation, further research is needed to understand regional-specific adaptations and scalability. Future studies should explore how to tailor PCS design to local conditions and assess their long-term sustainability in Tanzanian agricultural settings. Agriculture, Tanzania, Process-Control Systems, Difference-in-Differences, Yield Improvement The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \text{varepsilon}_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Tanzania, African agriculture, econometrics, yield gap analysis, process-control systems, randomized controlled trials, intervention evaluation

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