African Condensed Matter Physics (Pure Science)

Reliability Assessment of Smallholder Farming Systems in Uganda through Randomized Field Trials

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Abstract

Smallholder farming systems in Uganda face challenges related to reliability due to varying environmental conditions and resource availability. A randomized field trial was conducted across different regions in Uganda, applying statistical models to assess system performance under varying environmental conditions. Randomization ensured fair comparison among farms. The analysis revealed that a specific irrigation strategy (X) increased crop yield by an average of 15% compared to traditional methods, with a confidence interval (CI) of [9%, 23%]. Randomized field trials provided insights into the reliability of smallholder farming systems in Uganda, highlighting effective strategies for increasing productivity. Implementing the identified irrigation strategy could enhance the sustainability and profitability of smallholder farms in Uganda. Smallholder farming, randomized field trial, resource allocation, system reliability, Ugandan agriculture The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, randomized trials, resource management, resilience assessment, agroecosystems, experimental design, sustainability metrics*

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