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Methodological Evaluation of Smallholder Farming Systems in Nigeria Through Randomized Field Trials

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Abstract

Smallholder farming systems in Nigeria face significant challenges related to productivity and sustainability. A randomized controlled trial was conducted across five smallholder farms in different geographical regions of Nigeria. Data were collected using a standardised protocol including soil analysis, crop yields, water usage, and farmer feedback surveys to assess the impact of interventions aimed at enhancing productivity and sustainability. Randomized field trials demonstrated an average increase in maize yield by 20% compared to non-randomized plots over two growing seasons. Resource management practices showed a significant reduction in water usage by 15% without compromising crop yields. The randomized field trial design provided robust evidence of the effectiveness of targeted interventions on smallholder farms, contributing to more sustainable agricultural practices in Nigeria. Further research should explore scaling up successful interventions and integrating them into existing farming systems for broader impact. Smallholder farming, randomized trials, yield improvement, resource management The empirical specification follows $Y = \beta_{\vec{0+\beta}}\, p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agroecology, randomized controlled trial, smallholder farming, yield assessment, soil health, participatory rural appraisal, precision agriculture*

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