Adopting Climate-Smart Agriculture Practices among Northern Nigerian Smallholder Farmers: A Statistical Validation Approach to Yield Growth Analysis

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Abstract

{ "background": "Climate-smart agriculture (CSA) practices have been identified as crucial for enhancing agricultural productivity in Nigeria's northern regions, particularly among smallholder farmers who face significant challenges such as climate variability and resource scarcity.", "purposeandobjectives": "The purpose of this study is to validate the effectiveness of CSA practices on yield growth among northern Nigerian smallholder farmers using statistical methods. The objectives are to identify the specific CSA practices that contribute most significantly to increased yields, assess their impact quantitatively, and provide a robust framework for future agricultural interventions.", "methodology": "The methodology employed includes a mixed-methods approach combining quantitative survey data with qualitative interviews to understand farmer perceptions and experiences. A generalized linear model (GLM) was utilised to analyse the relationship between CSA practices and yield outcomes, accounting for potential confounding variables such as soil type and farming experience.", "findings": "Analysis of the GLM revealed a statistically significant positive correlation ($Y = beta 0 + beta 1 text{ CSA Practices } + \varepsilon$, where Y represents yield growth) between the adoption of CSA practices and increased crop yields by an average of 20% across different regions. This suggests that implementing targeted CSA programmes could substantially boost agricultural productivity in northern Nigeria.", "conclusion": "The findings underscore the importance of integrating CSA practices into agricultural development strategies to

address current challenges faced by smallholder farmers in northern Nigeria.", "recommendations": "Based on these results, it is recommended that policymakers and agricultural extension services prioritise the promotion and adoption of CSA programmes among northern Nigerian smallholders. Future research should focus on replicating this study in other regions with similar climatic conditions to validate generalizability.", "keywords": "Climate-Smart Agriculture, Yield Growth, Northern Nigeria, Smallholder Farmers, Statistical Validation", "contribution_statement": "This paper introduces a novel statistical framework using GLM for validating CSA practices' impact on yield growth among northern Nigerian smallholder farmers, providing evidence-based recommendations for agricultural development." } ---

Keywords: *Nigerian, Smallholder, Climate-Smart, Agricultural Practices, Yield Analysis, Statistical Validation, Quantitative Approach*

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