African Atmospheric Sciences (Earth Science focus)

Climate-Friendly Rice Varieties in Southern Ghana: A Three-Year Impact Assessment for Smallholder Farmers

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Abstract

This study examines the adoption of climate-friendly rice varieties among smallholder farmers in southern Ghana, focusing on their impact over a three-year period. A mixed-method approach was employed, combining quantitative data from yield measurements and qualitative insights through interviews with farmers. A generalized linear model (GLM) was used for statistical analysis of yield data, accounting for potential confounding factors such as soil type and rainfall variability. Over three years, climate-friendly rice varieties demonstrated an average annual increase in yield by 15%, with significant reductions in water usage and carbon emissions compared to traditional varieties. Farmers reported a 70% satisfaction rate with the new varieties. The findings suggest that climate-friendly rice varieties are highly effective for smallholder farmers in southern Ghana, offering substantial benefits in terms of productivity and environmental sustainability. Policy makers should incentivize the adoption of these climate-friendly rice varieties through subsidies or extension services. Farmers should be provided with training on best practices to maximise yield and minimise adverse effects. The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, AgriculturalEcology, SustainableDevelopment, VarietalAdoption, ClimateResilience*

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