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PRECISION AGRICULTURE: POVERTY ANALYSIS OF ADOPTERS OF STRESS TOLERANT MAIZE IN NORTH-CENTRAL NIGERIA

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Abstract: The study examined poverty among adopters and non-adopters of STM technology in North-Central Nigeria using data collected via Mobile Device Data Collection and analyzed with the FGT Poverty Index, Propensity Score Matching, and Logit Regression. Results showed that while adoption of STM technology reduced poverty for both men and women, female farmers remained poorer overall. Key factors influencing adoption included education, access to credit, cooperative membership, and information availability. The study highlights the need for targeted support to female farmers, improved resource access, and stronger cooperative networks to achieve equitable poverty reduction.

• Introduction

Stress-Tolerant Maize (STM) techniques have emerged as a critical solution for mitigating climate-induced agricultural risks such as drought and low soil fertility. The Stress-Tolerant Maize for Africa (STMA) project has introduced varieties capable of increasing yields by 25–30% under adverse conditions while enhancing farmers' resilience to climate shocks [5]. These innovations provide smallholder farmers with stable yields, even in unpredictable climatic conditions, offering a pathway to reduce rural poverty.

• Material and method

The study was conducted in Kwara State, Nigeria, an agriculturally rich region known for maize production. A two-stage sampling method was used to select maize-farming households, and data were collected through structured questionnaires covering demographics, income, adoption of Precision Agriculture (PA), and resource access. Analysis employed the Foster-Greer-Thorbecke (FGT) Poverty Index, Propensity Score Matching (PSM), and Logit Regression to assess poverty levels, control selection bias, and identify factors influencing poverty among PA adopters.

• Results and discussions

The results show that male farmers (73.08%) are more likely to adopt Stress-Tolerant Maize (STM) than females (26.92%), largely due to better access to resources and information. Adoption of STM significantly reduced poverty among both genders, with male farmers recording a greater decline in poverty indicators. Key factors influencing poverty reduction include education, access to credit, information on STM, cooperative membership, and collaborative learning. However, persistent gender gaps highlight the need for targeted support to female farmers to ensure inclusive poverty alleviation through STM adoption.

• Conclusions

The study concludes that while Stress-Tolerant Maize (STM) adoption reduces poverty among farmers in North-Central Nigeria, gender disparities persist, with female farmers remaining more affected. Education, credit access, cooperative membership, and information availability significantly influence adoption and poverty outcomes. Strengthening support systems for women and improving access to productive resources are vital for achieving inclusive and sustainable poverty reduction.