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Impact of Climate-smart Technologies Adoption on Yield and Economic Return of Farming Household in Benin: A Case Study of Drought Tolerant Maize (DTM) Varieties

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Abstract

Climate change is a major threat to agricultural production and food security in West Africa, especially in Benin, and climate-smart agriculture through the diffusion some climate-smart technologies like Drought Tolerant Maize (DTM) varieties packages is essential to cope with the potential impacts. This study examines the effectiveness of the funded extension research- development programme using mixed methods approach based on both qualitative (focus group discussions (FGDs) and in-depth Interviews (IDIs) with various key stakeholders) and quantitative techniques. Country-wide cross-sectional data at farm level of about 518 maize farming households from 48 villages in Benin are used to assess the productivity and the economic performances impact of DTM varieties adoption. The evaluation focuses on whether adopters have increased their productivity and farm economic return. We used endogenous switching regression (ESR) model with two instrumentals variables to control self-selection bias due to unobserved characteristics, such as the farmer's socioeconomics or institutional characteristics, that may affect both adoption and targeted outcome variables (productivity and farm economic return). We used respectively net margin, return on labour, return on capital, cost-benefit ratio and return on investment as farm economic return outcome indicators while maize quantity harvested as a productivity outcome indicator. Perception of the pocket of drought, awareness on the existence of DTM varieties, organisation membership, livestock ownership, access to credit, size of maize growing are the mains drivers of adoption. We have estimated the Average Treatment Effect (ATE) and the results have indicated that adoption of DTM varieties adoption significantly improved respectively net margin about 1.78%, return on labour about 7.01%, return on Capital about 128.72%, cost-benefit ratio about 73.57% and Return on investment about 53.35%. Besides, we found no significant impact of Drought tolerant maize varieties adoption on yield. This study argues that the adoption of DTM varieties can help to earn a profit.

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