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# Technical efficiency with the adoption of climate-smart agricultural practices: Case of northern Togo

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**Abstract**

Agriculture plays a vital role in the livelihoods of smallholder farmers. However, its dependence on increasingly unpredictable rainfall patterns has made it highly vulnerable to the effects of climate change. Climate-smart agriculture (CSA) has been heralded as a sustainable approach to increasing agricultural productivity while adapting to and mitigating climate change; however, the adoption of CSA practices is context and site-specific. Farmers have relied on their indigenous CSA practices, while government extension agents and non-governmental organisations (NGOs) are playing a vital role in promoting innovative CSA practices to farmers. There is a need to examine the efficiency of farm production with farmers' indigenous CSA practices, and innovative CSA practices promoted through intervention projects. Our study closes this gap by employing a cross-sectional study to compare the technical efficiency in farm production with the adoption of CSA practices from farmers' traditional knowledge and CSA practices from intervention projects. Additionally, it examines the drivers of farmers' adopted CSA practices. Through multistage sampling, we selected over 500 farm households in the Kozah prefecture of Togo and used a survey to collect primary data. The data were collected between January and March 2023. The stochastic frontier approach will be used to estimate technical efficiency in farmers' production, and the multivariate probit model will be employed to understand the drivers of the adopted CSA practices. Findings from this study can provide information to guide policymakers in designing agricultural programmes and policies that can better address the constraints of low food productivity and high food insecurity plaguing the country.

**Keywords:** Climate smart agricultural practices, intervention projects, smallholder farmers, technical efficiency, traditional knowledge

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