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Climate information services and extension systems: Access, constraints, impact, and future outlook for rural cocoa farmers in Ghana

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Abstract

Climate change and variability have increasingly exposed Ghana's cocoa sector to significant vulnerabilities, resulting in declining yields, reduced export revenues, and threatened farmer livelihoods. One critical but underexplored role of extension agents under the Cocoa Health and Extension Division (CHED) of the Ghana Cocoa Board is the dissemination of timely and accurate Climate Information Services (CIS) to help farmers mitigate climate-related risks.

This study examined cocoa farmers' access to and use of CIS, types of CIS accessed and utilised, dissemination pathways, barriers to reliance on CIS, and its overall impact on farm yield. It also assessed the capacity and challenges of extension agents in delivering CIS. Data were collected from 320 cocoa farmers and 15 extension agents. A Multivariate Probit (MVP) model was employed to analyse the determinants of the types of CIS accessed and used, while Ordinary Least Squares (OLS) regression was used to estimate the effects of extension access and CIS on cocoa yield.

The results indicate that 84.1 % of farmers accessed CIS, 70.3 % used it, and 55.3 % relied on traditional or indigenous knowledge for production decisions. Knowledge-use patterns show that 26.8 % relied solely on traditional knowledge, 41.9 % relied exclusively on CIS, 28.5 % used both CIS and traditional knowledge, while 2.8 % relied on neither source. Multiple response analysis revealed that daily (67.2%; 57.8 %) and weekly (61.5%; 48.7 %) weather forecasts are the most commonly accessed and used CIS types, predominantly disseminated through fellow farmers (68.7 %) and extension agents (65.6 %). Although extension agents demonstrate adequate capacity to deliver CIS, several institutional and logistical constraints hinder effective dissemination.

The OLS results show that extension access and the use of CIS for production were positive and significant determinants of cocoa yield, whereas access alone to CIS has a negative effect, suggesting that access alone does not guarantee improved outcomes without proper utilisation. The MVP results further reveal that demographic/socio-economic, farm-level, and institutional factors significantly influence both access to and use of various CIS types.

The study recommends that the Ghana Cocoa Board strengthen support for extension agents to improve CIS delivery, productivity, and farmer livelihoods.

Keywords: Climate information services, cocoa farmers, cocoa yield, extension services, multivariate probit model

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