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Adoption of agroecological practices in northern Ghana: Exploring motivations, challenges, and farmer profiles

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Abstract

Agroecology is increasingly recognised as a viable pathway to addressing critical agricultural challenges in support of the sustainable development goals (SDGs). Despite its established potentials in Latin America and Western Europe, the transition to agroecological systems remains limited, especially in the African contexts. This study explores the potential for agroecological transitions in Northern Ghana by examining farmers' perceptions and adoption behaviour. Data were collected through a household survey, qualitative interviews, and a stakeholder workshop. Using Principal Component Analysis (PCA), the study distilled 29 perception variables into nine key components, of which five represents drivers (e.g., resource compatibility, pest and resilience benefits) and four reflects barriers (e.g., institutional constraints, training gaps and uncertainty). A two-step clustering approach identified four distinct perception-based typologies: Enthusiasts, Practical Adopters, Mixed group, and Pessimists. To assess how these typologies influence adoption, Conway-Maxwell Poisson regression model was employed to account for non-equidispersion in count data related to the adoption of ten agroecological practices. Findings reveal significant variation in adoption behaviour across clusters, with the Enthusiasts exhibiting the highest level of adoption, followed by the Practical Adopters. Among the control variables, being male and membership of a farmer group were strongly associated with higher adoption levels ($p < 0.01$). Farming experience and education were also positively associated with adoption ($p < 0.05$). However, interaction of education and training was negatively associated with adoption ($p < 0.01$). The study highlights the need for targeted policy interventions that enhance access to tailored and context-sensitive training. Policy interventions should prioritise removing structural barriers to ensure inclusivity, particularly by actively engaging female farmers. Also leveraging the momentum of highly motivated groups who are already convinced, like the agroecology Enthusiasts, could foster grassroots movements and accelerate the broader agroecological transition.

Keywords: Adoption, agroecology, cluster analysis, principal component analysis, transition

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