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"Towards multi-functional agro-ecosystems
promoting climate resilient futures"

Towards multi-functional agro-ecosystems: Multi-actor collaboration as a driver of demand for agricultural technologies

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Abstract

The present study investigates how government, agricultural technology firms, development/international organisations and market actors stimulate and create demand for digital and smart agricultural technologies in Ghana to enhance productivity, economic inclusion as well as climate-resilient agricultural transformation and improved productivity. With an interpretivist/qualitative design, the study analysed semi-structured interviews with 55 stakeholders or actors across government institutions, agri-tech firms, development organisations, buyers and processors of agricultural products. The findings show that demand for technologies is not simply generated by technology availability but it is actively co-created through coordinated interventions that lower financial, informational and institutional barriers. Key mechanisms include input subsidies, flexible credit and payment schemes, extension and advisory services, participatory co-creation, digital platforms, pilot demonstrations, strategic partnerships and market-based incentives. Agricultural technology firms emerged as important technology demand shapers. This happens through need-based innovation, trust-building, flexible service models and value-oriented communication. Development organisations strengthen adoption by aligning interventions with national strategies, supporting capacity building and facilitating value-chain linkages. Market actors further create for agricultural technologies by ensuring quality standards, buyer-led guidance and preferential access to organised markets. The study makes three contributions to literature and theory. First, it shifts attention from supply-side explanations of technology diffusion to a multi-actor demand-creation perspective. Second, it extends the Technology Acceptance Model and Innovation Diffusion Theory by showing how ecosystem-level interventions shape perceived usefulness, compatibility and behavioural intentions. Third, it shows that multi-actor collaboration drives sustainable agricultural technologies in developing economies like Ghana through the interplay of policy, entrepreneurship, development support and market coordination. The study provides a practical framework for fostering inclusive, resilient as well as a climate-smart agricultural innovation systems in Ghana.

Keywords: Agricultural technologies, climate-resilient agriculture, demand creation, Ghana, innovation ecosystems, multi-actor collaboration

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