Tropentag, September 16-18, 2026, hybrid conference

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

Enabling access to climate-smart irrigation technologies: Institutional feasibility of collective finance in mount Kenya

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Abstract

In Kenya, climate-smart irrigation technologies (CSIT) are widely promoted as key instruments for poverty reduction, climate change adaptation, and agricultural transformation, featuring prominently in national strategies such as Vision 2030, the Big4Agenda, the Agricultural Sector Transformation and Growth Strategy. In the northern region of Mount Kenya, stakeholders increasingly promote rooftop rainwater harvesting, drip irrigation, and solar-powered irrigation systems (SPIS) as part of a Water–Energy–Food Nexus approach to enhance water-use efficiency, off-grid energy access, and food security. Despite this strong policy emphasis, uptake among smallholder farmers remains limited, largely due to financial constraints and restricted access to formal credit.

Barriers such as lack of collateral, high transaction costs, income uncertainty, and information asymmetries continue to hinder engagement with conventional financial services. In this context, Agricultural Group Guarantee Loans (AGGLs) are emerging in many african countires as an alternative mechanisms that leverage collective guarantees and shared responsibility to facilitate access to credit. However, their effectiveness depends not only on financial design but also on underlying social and institutional conditions.

This study assesses the institutional feasibility of AGGL-type financing arrangements for CSIT adoption among smallholder farmers in the Timau catchment (Upper Ewaso Ng'iro Basin). It conceptualises AGGLs as collective financial mechanisms operating under shared risk, whose viability depends on factors such as trust among participants, group homogeneity, coordination capacity, prior experience with collective organisations, and perceptions of investment risk. Drawing on institutional economics and collective action theory, the study examines how these conditions shape farmers' willingness to participate in group-based financing.

Empirical data are collected through a structured household survey of 150 farmers, stratified across 32 Community Water Projects to capture variation in organisational and irrigation contexts. By shifting the focus from financial availability to institutional viability, this study contributes to debates on rural finance and irrigation development, offering insights into the conditions under which group-based lending can support scalable access to climate-smart irrigation technologies.

Keywords: Agricultural group guarantee loans, climate-smart irrigation, collective action, farmers organisations, rural finance, solar powered irrigation systems

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