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Women, water management and agricultural productivity: Evidence from rainwater harvesting and irrigation in Zambia

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Abstract

Agricultural systems across sub-Saharan Africa are increasingly under pressure from climate variability, water scarcity, and structural constraints that limit productivity and resilience. In Zambia, where smallholder farming is largely dependent on rainfall, seasonal variability continues to expose rural livelihoods to significant risk. In response, rainwater harvesting and small-scale irrigation have gained attention as practical and locally adaptable approaches for improving water availability and supporting more stable agricultural production. However, the uptake and sustained use of these practices remain uneven, particularly among rural women, who play a central role in farming systems but often operate within restrictive socio-economic and institutional environments.

This study aims to examine the factors that enable or constrain rural women's adoption of rainwater harvesting and small-scale irrigation systems in Central Province of Zambia. It will further assess the effects of women's participation in these practices on agricultural productivity and crop yield outcomes. In addition, the study will analyse how women's empowerment and household water security mediate the relationship between participation in water management and productivity outcomes.

Using a mixed-methods approach combining household survey data with econometric and mediation analysis, the study will explore key determinants such as access to land, finance, extension services, and institutional support. It is expected that women's participation in water management practices will be positively associated with agricultural productivity, with stronger effects observed where women have greater decision-making power and improved water security.

The study will provide a deeper understanding of how water management practices can contribute to sustainable agriculture when embedded within supportive social and institutional contexts. By generating context-specific evidence, the research seeks to inform policies and interventions aimed at improving agricultural productivity, strengthening resilience to climate variability, and promoting more inclusive participation in water management systems in rural Zambia.

Keywords: Agricultural productivity, household water security and Zambia, rainwater harvesting, small-scale irrigation, technology adoption, women's empowerment