



Ten-Year Rainwater Collection and Crop Yield Improvements in Northern Kenya's Water Harvesting Systems for Food Security

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Abstract

This study examines rainwater collection systems implemented by smallholder farmers in northern Kenya to enhance water security and crop yields over a decade. A comparative study approach was employed using data from ten years of field observations and farmer surveys. The methodology included analysis of rainfall patterns, water storage capacity, crop selection, and economic impact assessments. Significant improvements in average annual crop yields were observed, with a 25% increase compared to baseline conditions. Specifically, maize yields showed an uplift of 30%, attributed to optimised irrigation schedules. The study concludes that water harvesting systems are effective for enhancing food security among smallholder farmers in northern Kenya, supported by statistical models and economic analyses. Based on findings, recommendations include scaling up successful practices through government support and capacity building programmes. Water Harvesting, Food Security, Smallholder Farmers, Rainwater Collection, Crop Yields The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Kenya, Geographic Information Systems (GIS), Water Harvesting, Smallholder Agriculture, Field Trials, Precipitation Analysis, Yield Metrics

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