



# Rainwater Harvesting Systems in Ethiopian Valleys: Comparative Analysis of Water and Financial Savings Metrics

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## Abstract

Rainwater harvesting systems are increasingly being implemented in arid regions to mitigate water scarcity issues. In Ethiopia, maize producers face significant challenges due to erratic rainfall patterns and limited access to clean water for irrigation. The research employs a comparative design, analysing data from multiple sites where similar technology has been deployed. Statistical models will be used to estimate water savings and financial benefits with associated uncertainties. Initial results suggest that rainwater harvesting systems in one valley reduced maize yield by about 15% compared to conventional irrigation methods, but also resulted in a significant decrease of 30% in water usage per hectare. Financially, the system saved producers an average of 200 per hectare annually. *The findings indicate that while there is a trade-off between yield and resource efficiency*  $Y_{it} = \beta_0 + \beta_1 X_{it} + \epsilon_{it}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** African Geography, Water Harvesting, Financial Management, Irrigation Efficiency, Econometrics, Sustainable Development, Geographic Information Systems

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