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Rainwater Harvesting for Mitigating Crop Yield Risk in Hydrologically Less Favoured Area of Northern Tanzania

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Abstract Rainwater harvesting has the potential of mitigating rainfall-related crop yield risk in hydrologically less favoured dryland tropics of sub-Saharan Africa. The vast dryland tropics are deprived of perennial waters 'blue water' for conventional irrigated agriculture. Instead, rainwater harvesting that uses 'green water' as direct rain through in-field management and runoff farming remains to be a promising option. However, empirical knowledge on the efficacy of rainwater harvesting in mitigating risks associated with crop yield and economic returns is widely lacking. This paper presents an analysis of economics of rainwater harvesting by poor farmers in Tanzania. A questionnaire was used to survey 200 households in the end of 2004 to collate data on the performance of the maize enterprise over 6 years (1998–2003). The data were mainly based on recollection as respondent farmers never kept detailed records. Statistical analysis of the magnitude and stability of yield and economic returns was comparatively executed for rainfed and two rainwater harvesting systems (in-situ and external catchment) in above and below-average seasons as experienced by farmers. Results indicate that external catchment based rainwater harvesting assured significantly higher and stable yields and economic returns compared to in-situ and rainfed systems, particularly during below-average seasons. Conclusively, an external catchment based rainwater harvesting has eminent potential of mitigating rainfall-related crop production risks in the dryland tropics. Critical policy action points would be increased investment to link runoff harvesting with storage mini-dams for community schemes and technology-upgrading to improve farm-level water use efficiency.
KeyWords Rainwater harvesting, Crop yield risk, Hydrologically less favoured