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Potential of soil and water conservation technologies for dryland agriculture and forestry

REVIEW PAPER

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ABSTRACT

Objective: Drylands cover 41% of the earth's terrestrial landmass while in Kenya; they cover 80% of the land surface with production in these areas often impeded by soil moisture limitation thereby necessitating soil moisture conservation. The study aimed at identifying feasible soil moisture conservation technologies for agriculture and forestry development.

Methodology and Results: The current metadata analysis evaluated 80 reference materials comprising of journal papers, book chapters and conference proceedings; 38.8% being research conducted in Kenya, 31.2% was research undertaken in other parts of Africa while 30.0% was research done in other parts of the globe. Available data shows that mulching enhanced infiltration by 81%, reduced runoff by 54% and enhanced crop yield by 39%; terraces enhanced infiltration by 8% and reduced runoff by 30%. Micro-catchments enhanced moisture content by 45%, reduced runoff by 63% and enhanced crop yield by 17%. Further, the use of polymers enhanced crop yield by up to 45%. In Kenya, soil and water conservation technologies have been tested in Machakos, Embu, Kitui, Busia, Makueni and Tharaka Nthi counties. The main impediments to adoption of these technologies in Kenya and other parts of the globe include increased risk of pest and diseases incidences; high labour requirements; require large land sizes and increased cost of production resulting from labour requirements. The research gaps identified by different researchers concerning soil water conservation technologies are: lack of effective dissemination platforms to highlight efficiency of the different technologies; cost-benefit analysis of the different soil water conservation technologies and limited data on potential of various soil water conservation technologies for tree growing in ASALs.

Conclusion: This review has revealed thatadequate information on soil and moisture conservation technologies is needed and tailored to specific farmers' needs to enhance level of adoption. In order to realize the full potential of soil and moisture conservation technologies, effective dissemination platforms such as use of demonstration plots and farmers' field schools are required.

Key words: soil moisture, technologies, conservation, adoption, ASALs