



Assessing the biophysical and socio-economic potential of Sustainable Land Management and Water Harvesting Technologies for rainfed agriculture across semi-arid Africa.

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Stakeholders in recent EU projects identified soil erosion as the most frequent driver of land degradation in semi-arid environments. In a number of sites, historic land management and rainfall variability are recognised as contributing to the serious environmental impact. In order to consider the potential of sustainable land management and water harvesting techniques stakeholders and study sites from the projects selected and trialled both local technologies and promising technologies reported from other sites . The combined PESERA and DESMICE modelling approach considered the regional effects of the technologies in combating desertification both in environmental and socio-economical terms. Initial analysis was based on long term average climate data with the model run to equilibrium. Current analysis, primarily based on the WAHARA study sites considers rainfall variability more explicitly in time series mode.

The PESERA-DESMICE approach considers the difference between a baseline scenario and a (water harvesting) technology scenario, typically, in terms of productivity, financial viability and scope for reducing erosion risk.

A series of 50 year rainfall realisations are generated from observed data to capture a full range of the climatic variability. Each realisation provides a unique time-series of rainfall and through modelling can provide a simulated time-series of crop yield and erosion risk for both baseline conditions and technology scenarios. Subsequent realisations and model simulations add to an envelope of the potential crop yield and cost-benefit relations. The development of such envelopes helps express the agricultural and erosional risk associated with climate variability and the potential for conservation measures to absorb the risk, highlighting the probability of achieving a given crop yield or erosion limit. Information that can directly inform or influence the local adoption of conservation measures under the climatic variability in semi-arid areas