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Climatic and agricultural drivers of soil erosion in Africa

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Soil erosion was the most frequently identified driver of land degradation across a selection of global research sites within the DESIRE-EU project. The PESERA model was adopted in the project to upscale field results and consider the potential biophysical impact both with and without stakeholder selected sustainable land management (SLM) technologies in place. The PESERA model was combined with the DESMICE economic model and focussed on forecasting the regional effects of combating desertification both in environmental and socio-economical terms.

The PESERA-DESMICE approach is further developed in the WAHARA project to consider the potential of a range of water harvesting technologies to improve biophysical conditions. Modelling in the WAHARA project considers detail of water harvesting technologies at the study site scale through to a coarser application at the continental scale with the latter being informed by the detail provided by study site observations an approach adopted in DESIRE-EU. The PESERA-DESMICE approach considers the difference between a baseline scenario and a (water harvesting) technology scenario at both scales in terms of productivity, financial viability and scope for reducing erosion risk.

This paper considers the continental scale and focuses on estimating the impact of in-situ water harvesting technologies across Africa under current and future agricultural and climate pressure. PESERA is adopted in this continental application as it implicitly considers the impact of land-use and climate and can be readily amended to simulate in-situ WHT.

Input data for PESERA; land use, management (crop type and planting dates), soil data and topography are derived from global data resources. Climate data for present and future scenarios are available through the QUEST-GSI initiative, where future scenarios are based on the outputs of seven GCM's.