



South African Land Degradation Monitor (SALDI) – An overview of recent advancements

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For many decades the problem of land degradation has been an issue in South Africa. This is mainly due to the high variability of the mostly semi-arid climatic conditions providing a challenging environmental setting. Strong population growth and resulting socio-economic pressure on land resources aggravate the situation. Thus, reaching a number of Sustainable Development Goals (SDGs), like achieving food security (#2), access to clean water (#6), and the sustainable use of terrestrial (#15) and marine (#14) resources represents a challenge.

In South Africa, land degradation has been linked to the terms veld degradation and soil degradation and has been addressed by numerous measures over the past decades. However, there is still uncertainty on the extent of human induced land degradation as compared to periodic climate induced land surface property changes. In cooperation with South African institutions and stakeholders the overarching goal of SALDI is to implement novel, adaptive, and sustainable tools for assessing land degradation in multi-use landscapes. Building upon the state of the art in land degradation assessments, the project aims to advance current methodologies by innovatively incorporating inter-annual and seasonal variability in a spatially explicit approach. SALDI takes advantage of the emerging availability of high spatio-temporal resolution Earth observation data (e.g. Copernicus Sentinels, DLR TanDEM-X, NASA/USGS Landsat), growing sources

of in-situ data and advancements in modelling approaches.

SALDi focusses on six study sites representing a major climate gradient from the (humid) winter-rainfall region in the SW across the (semi-arid) year-round rainfall to the (very humid) summer-rainfall region in the NE. The sites cover also different geological conditions and different agricultural practices. These include commercial, rain-fed and irrigated cropland, free-range cattle and sheep farming as well as communal and subsistence farming. Protected areas within our study regions represent benchmark sites, providing a foundation for baseline trend scenarios, against which climate-driven ecosystem-service dynamics of multi-used landscapes (cropland, rangeland, forests) will be evaluated.

The aim of this presentation is to provide an overview of recent activities and advancements in the three thematic fields addressed by the project:

i) to develop an automated system for high temporal frequency (bi-weekly) and spatial resolution (10 to 30 m) change detection monitoring of ecosystem service dynamics,

ii) to develop, adapt and apply a Regional Earth System Model (RESM) to South Africa and investigate the feedbacks between land surface properties and the regional climate,

iii) to advance current soil degradation process assessment tools for soil erosion.

A number of additional SALDi team member presentations will provide detailed information on current developments.