TACTIC: DroughT impACt on the vegeTation of South African semIarid mosaiC landscapes.

Implications on grass-crop-lands primary production.

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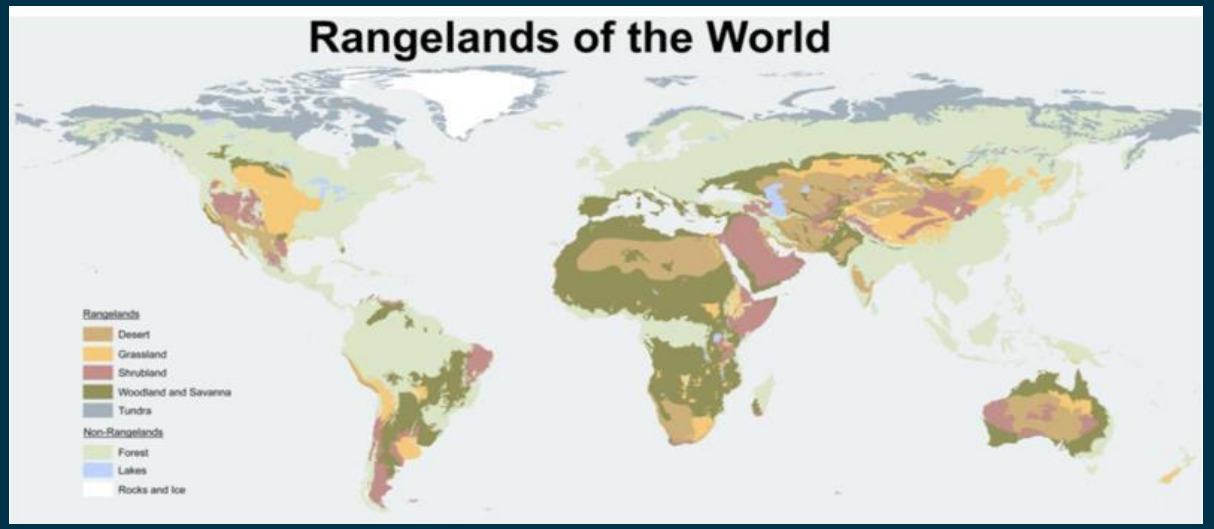
Scientific Background and Objectives

Semiarid **rangelands** are one of Africa's most complex and variable biomes. They are a **mosaic of land uses**, where extensive **livestock** is the main economic activity, and agriculture, soil for livelihood, or conservational uses are also crucial. They are highly controlled by the availability of water.

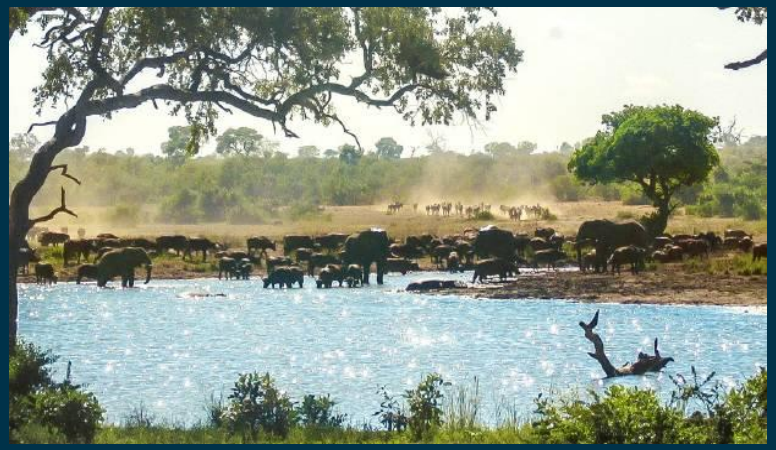
From A. Andreu. Savanna Tiger Guide.



From University of Idaho. Wikimedia Commons

Scientific Background and Objectives

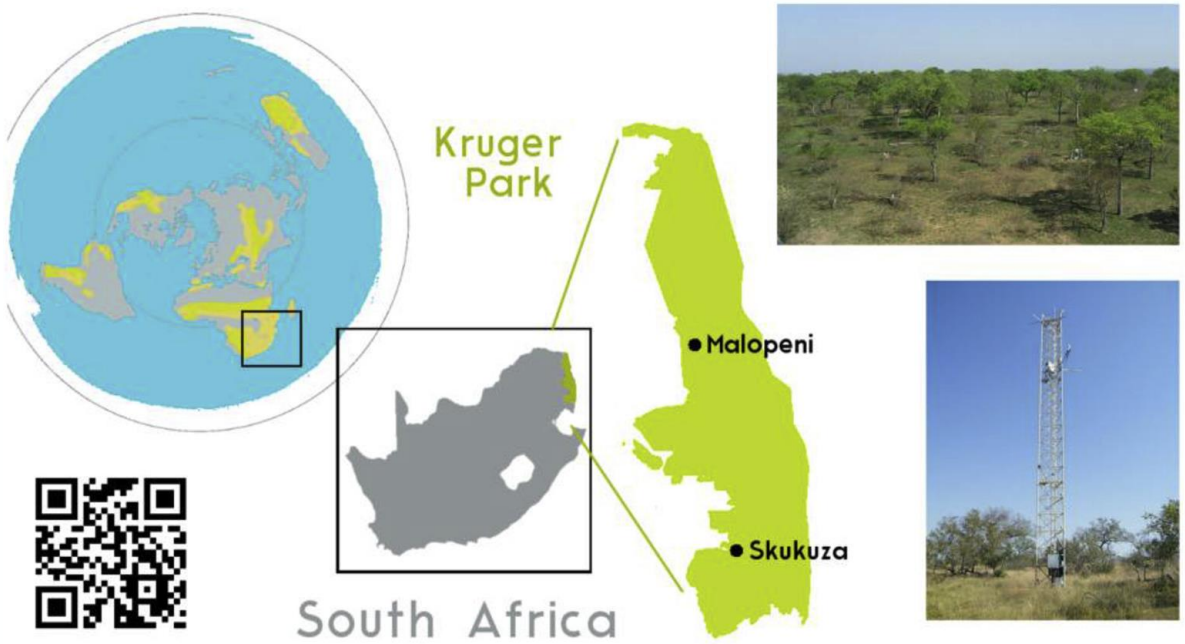
Problem: Although the vegetation is adapted to variable climatic conditions and dry periods, the increase in **drought intensity**, duration, and frequency, changes in agricultural practices, and other socioeconomic and environmental factors precipitate their degradation.



Objective: Mapping **water consumption** and **primary production** of **semiarid mosaic crop-rangelands** at the optimal spatiotemporal scales, setting up an open-source cloud framework to monitor these processes' interaction in the long term and analyze **system tipping points**.

Study Area

Our **pilot area** is located in the Limpopo region, with great agricultural importance but subject to periodic droughts, and home of the **Kruger National Park**.



Research Outline

Our **methodology** has been validated over our pilot area or in another semiarid savannas. The **working plan** encompass:

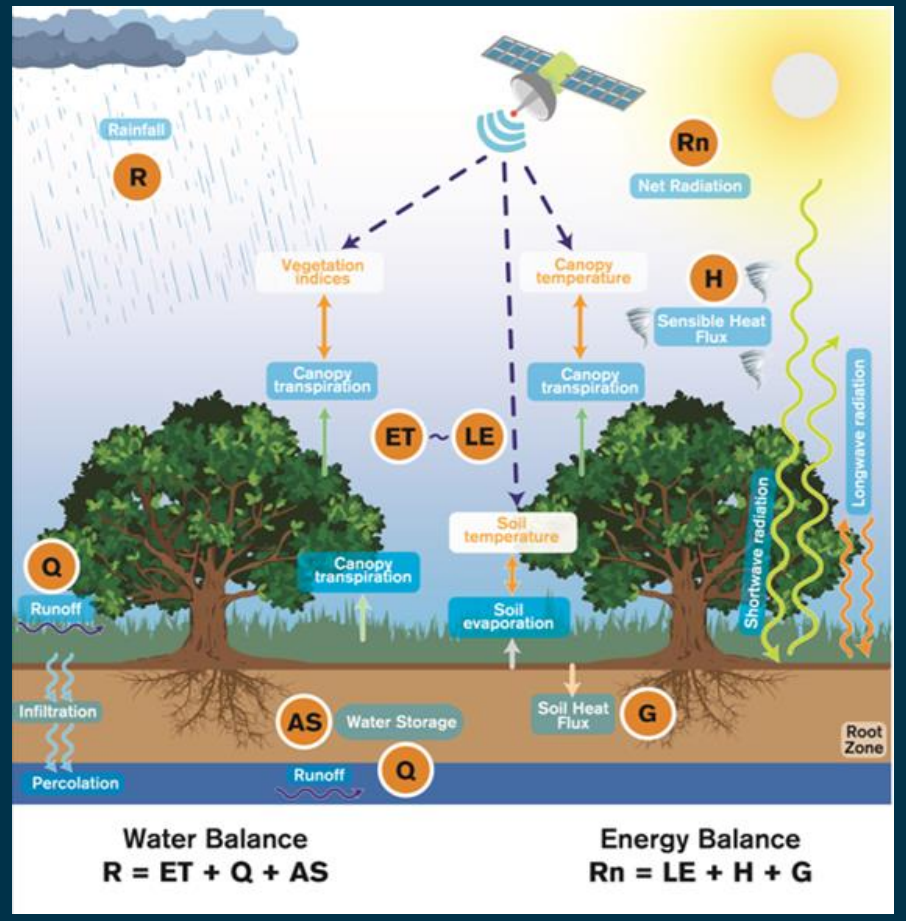
1. Assessing water consumption and vegetation water stress
   1. Adaptation of the Kc-FAO56 crop-coefficient method (Allen et al., 1998, Carpintero et al., 2020)
   2. Two Source Energy Balance model (Kustas and Norman, 1999) & STARFM (Gao et al., 2006)
   3. Ratio ET/ETo anomalies

2. Assessing biomass production (Light Use Efficiency model). (Monteith et al., 1997, Gomez-Giraldez et al., 2019)

3. Assessment of the drought impact on grass/crop production (Gonzalez-Dugo et al., 2021)

TSEB model

Kc-FAO56 approach



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