

TACTIC: Drought Impact on the vegetation of South African semiarid mosaic landscapes.

Implications on grass-crop-lands primary production.



A. Andreu
 T. Dube
 H. Nieto
 A. Ramoelo
 C. Shoko
 MJ Muñoz-Gomez
 MP. Gonzalez-Dugo
 MJ. Polo-Gomez
 D. Mazvimavi

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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

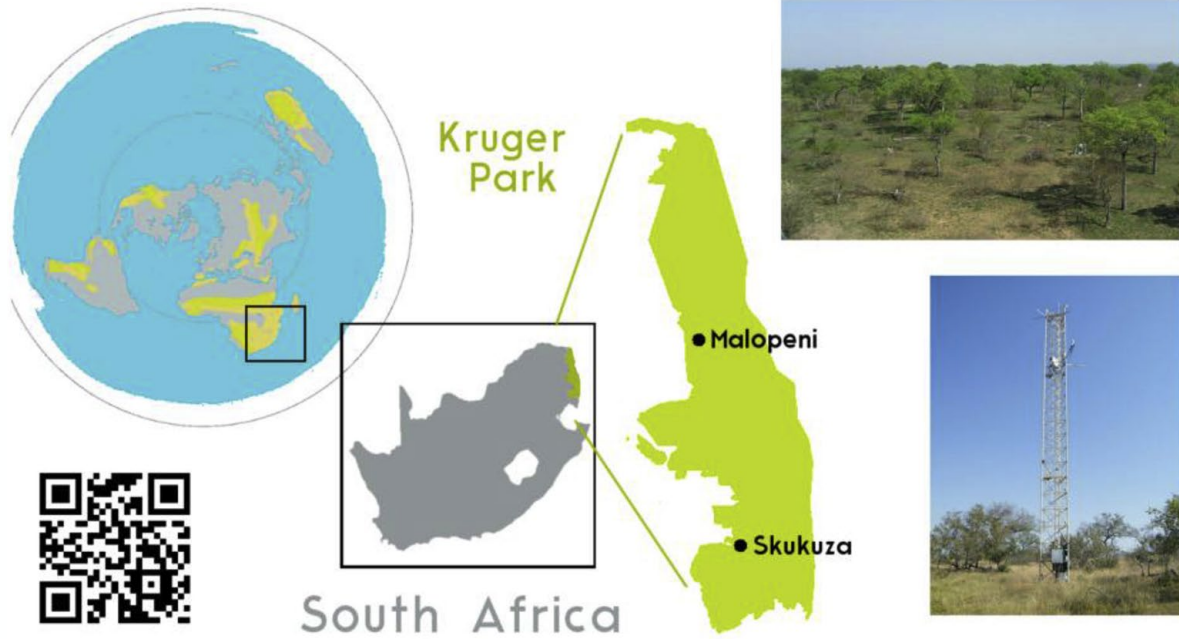
Problem: Although the vegetation is adapted to variable climatic conditions and dry periods, the increase in **drought intensity**, duration, and frequency, changes in agricultural practices, and other socioeconomic and environmental factors precipitate their degradation.



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

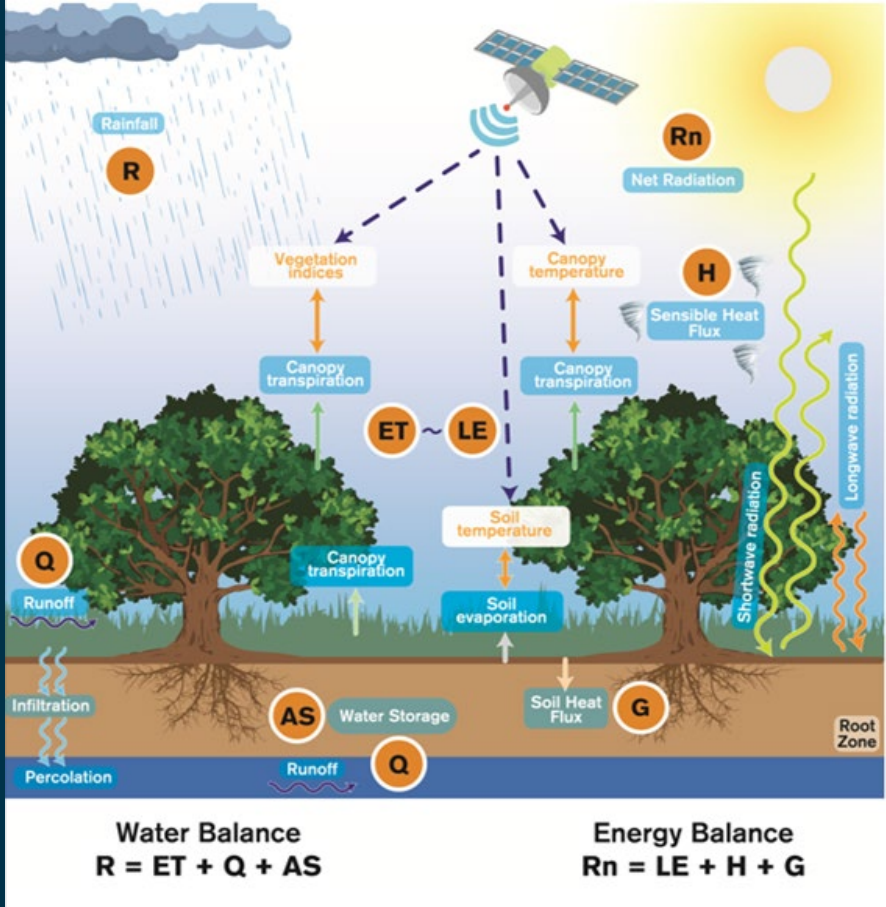
Our **methodology** has been validated over our pilot area or in another semiarid savannas. The **working plan** encompasses:

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) & STAREM (Cao et al., 2006)
 3. Ratio EI/ET₀ anomalies

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

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

TSEB model



Kc- FAO56 approach



Project Team

1 UNIVERSIDAD DE CÓRDOBA

2 UNIVERSITY of the WESTERN CAPE

3 CSIC CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

4 UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

5 UNIVERSITEIT VAN PRETORIA UNIVERSITY OF PRETORIA YUNIBESITHI YA PRETORIA

6 IFAPA Instituto de Investigación y Formación Agraria y Pesquera



A. Andreu ¹
ana.andreu@uco.es



T. Dube ²
tidube@uwc.ac.za



H. Nieto ³
hector.nieto@ica.csic.es



C. Shoko ⁴
Cletah.Shoko@wits.ac.za



D. Mazvimavi ²
dmazvimavi@uwc.ac.za



A. Ramoelo ⁵
abel.ramoelo@up.ac.za



MJ Muñoz ⁶
maria.munoz.gomez@juntadeandalucia.es



MP. Gonzalez-Dugo ⁶
mariap.gonzalez.d@juntadeandalucia.es



MJ. Polo ¹
mipolo@uco.es