

The Umlindi newsletter: Disseminating information on the management of natural resources for agricultural production in South Africa

**United nations/Austria Symposium on
Space for climate action: Space applications & Technologies for sustainable earth
Graz, Austria, 12-14 September 2023**



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Outline

- Introduction
- South Africa's climate change monitoring efforts: ARC's contribution
- Projects using space technologies
- Success factors & limitations

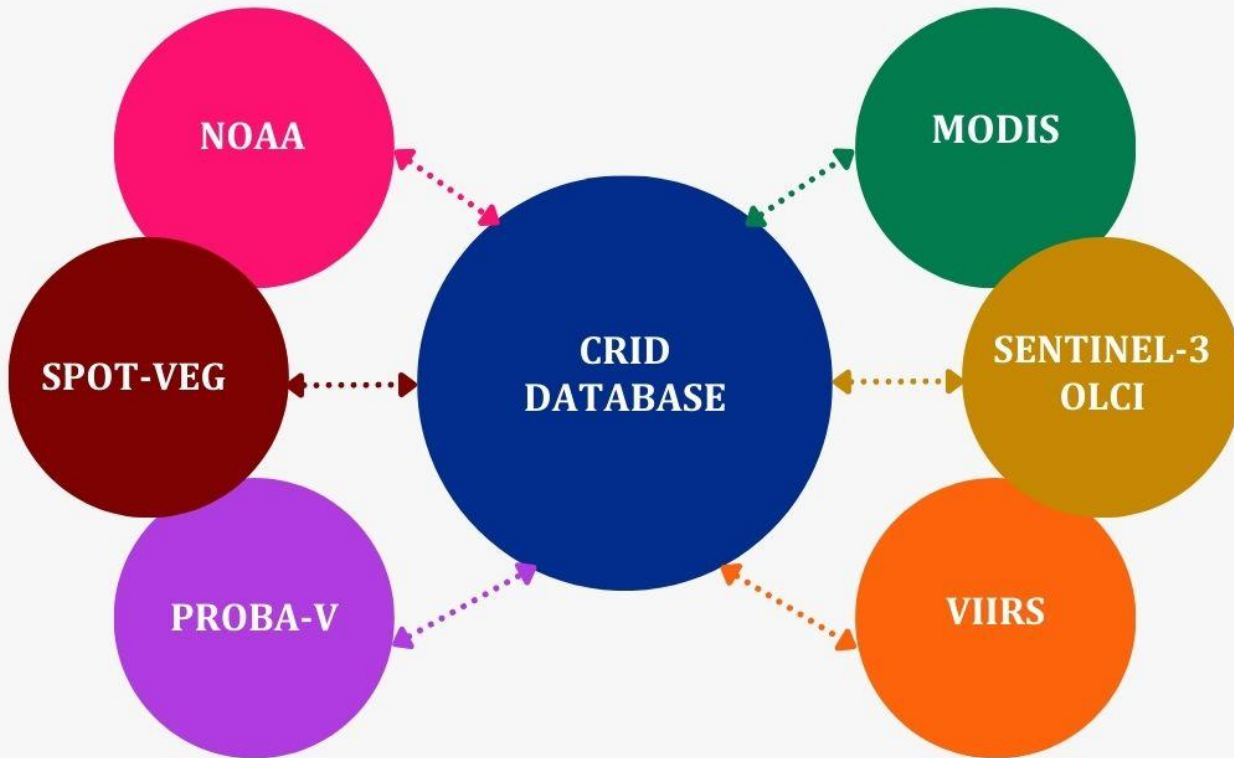
Introduction

- Agricultural Research Council (ARC)
 - Agricultural Research Act 86 of 1990
 - Undertake research
 - Promote development and technology transfer
 - Disseminate information
 - The ARC information dissemination mandate
 - development of the natural resource monitoring system

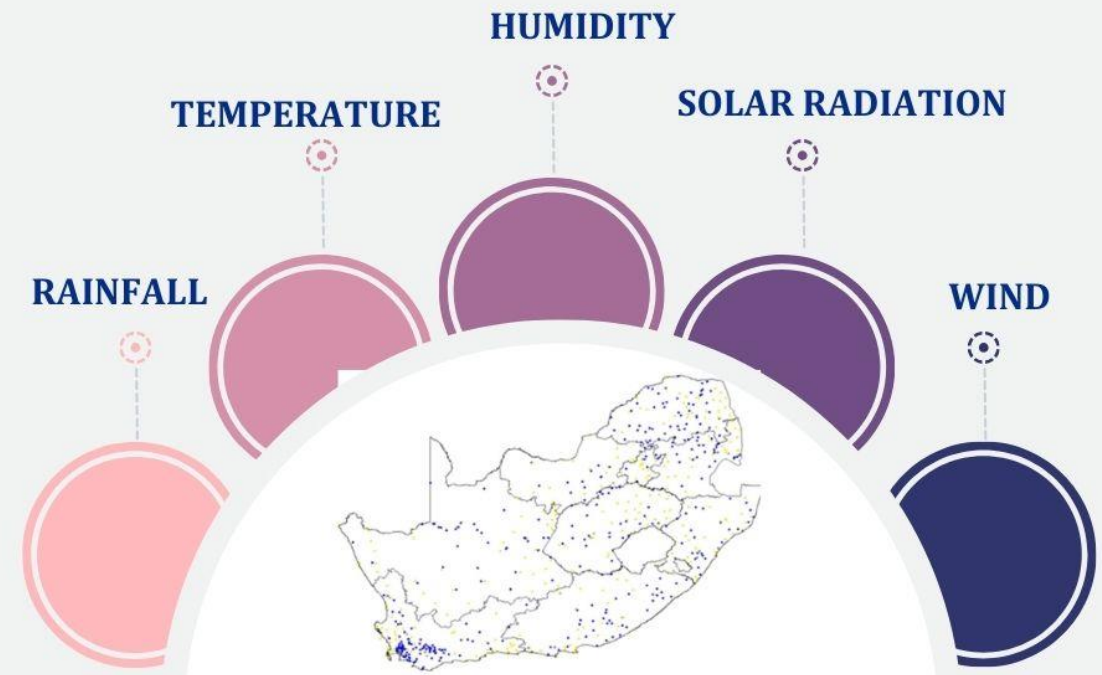
South Africa's climate change monitoring efforts: ARC's contribution

- ARC Maintains:

Coarse Resolution Image Database



Weather stations



Projects using space technologies

The Umlindi (a Zulu word for “the watchman”)

- remote sensing data
- *in-situ* weather station data
- disseminated on a monthly basis
 - <https://www.arc.agric.za/arc-iscw/Newsletter%20Library/Forms/AllItems.aspx>
 - Subscription (email)
- +/-400 readers

ARC • LNR
Excellence in Research and Development

UMLINDI

The Watchman

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Image of the Month

Drought risk concerns persist in the Eastern Cape

Following extreme drought conditions over the Eastern Cape during the latter months of 2019, welcome rains were observed during January to April 2020. This is somewhat normal as the greater part of the province is situated in the mid- to late-summer rainfall region. However, only short-term relief was experienced as these rains were not enough to rehabilitate from the previous drought period. Mild drought conditions became apparent in the area in May and, as depicted in the 3-month Standardized Precipitation Index (SPI) map ending in August 2020, these have since intensified, implying a risk of severe widespread impending drought. Currently, dam water levels in the province remain low and common agricultural practices such as cattle and sheep production are most likely to be negatively affected should these conditions persist. When considering the all-year rainfall region which is situated in the southern belt of the province, the mildly wet conditions that were observed are an indication of above-normal rainfall that was experienced during the month of August. Other areas of concern include adjacent parts of the southern Free State and Karoo during this period, raising drought risk concerns for agricultural activities in these areas.

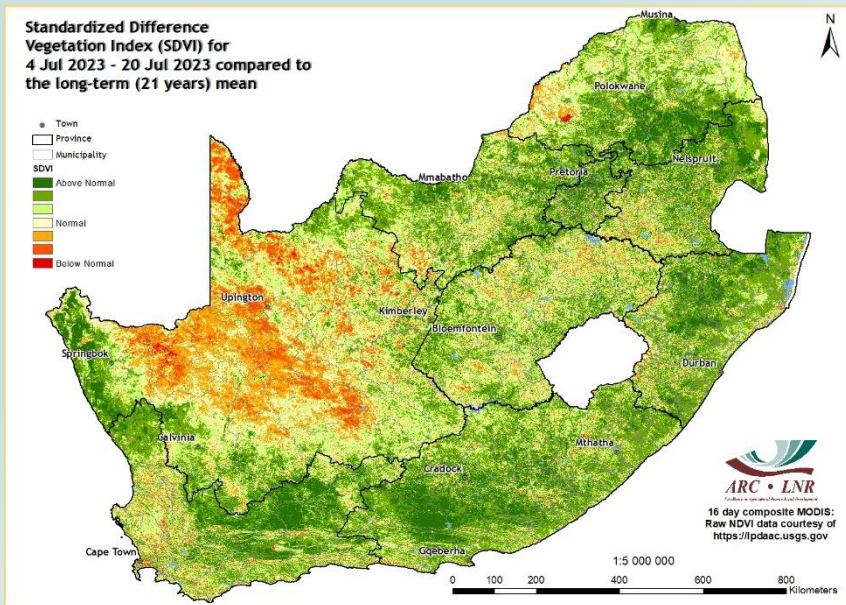
3-Month SPI category by 2020-08

- Extremely Wet
- Severely Wet
- Moderately Wet
- Mildly Wet
- Mild Drought
- Moderate Drought
- Severe Drought
- Extreme Drought

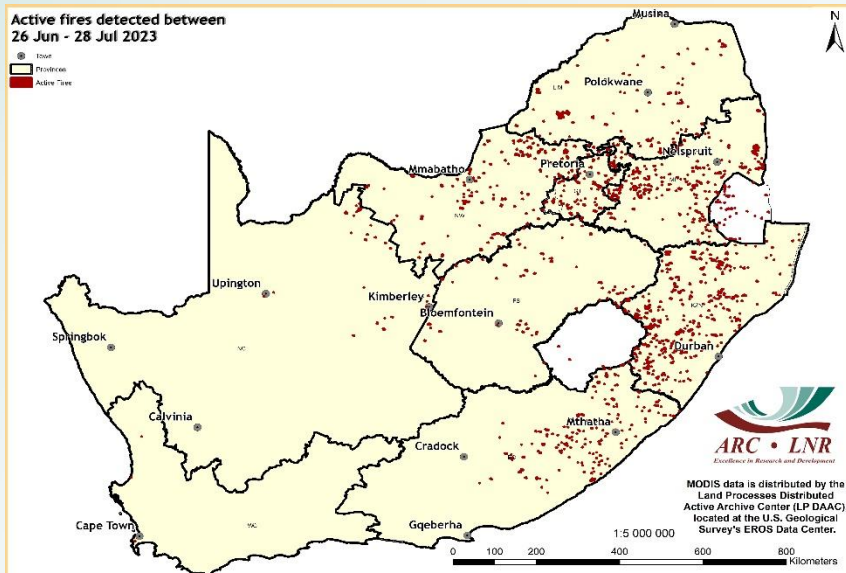
185th Edition

The Agricultural Research Council - Institute for Soil, Climate and Water (ARC-ISCW) collected the data, generated the products and compiled the information contained in this newsletter, as part of the Coarse Resolution Imagery Database (CRID) project that was funded by the Department of Agriculture and Department of Science and Technology at its inception and is currently funded by the Department of Agriculture, Land Reform and Rural Development.

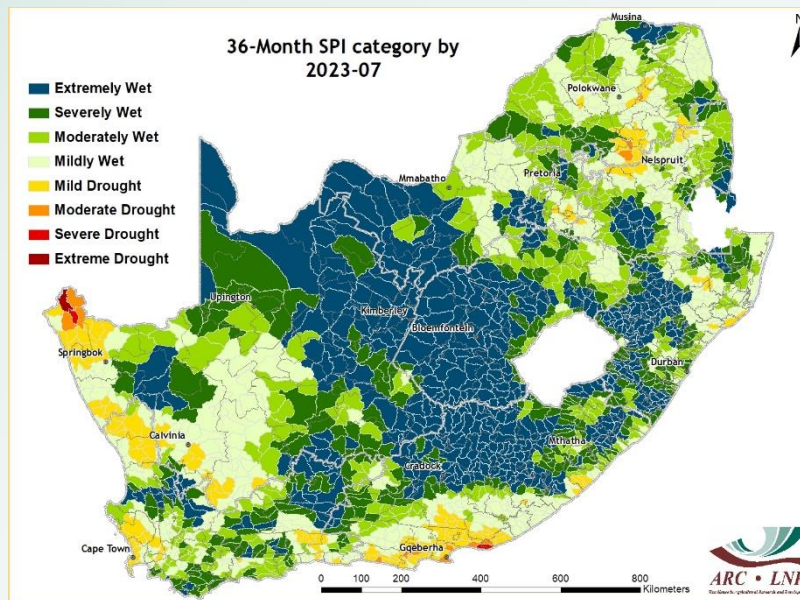
Projects using space technologies (Cont'd)



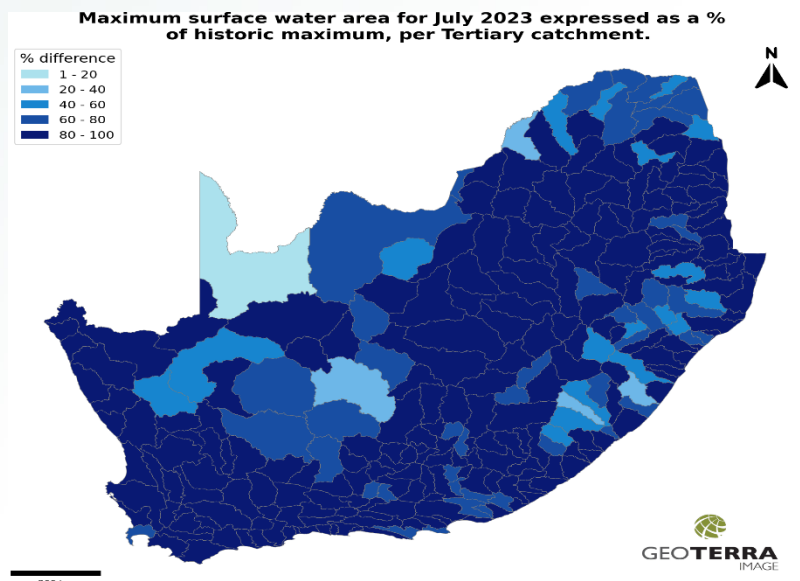
Vegetation condition



Fire activity



Precipitation



Surface water area

Content of Umlindi: Vegetation indices

- Normalized difference Vegetation Index (NDVI)
- Standardized Difference Vegetation Index (SDVI)
- Vegetation Condition Index (VCI)
- Percentage of Average Seasonal Greenness (PASG)

Rainfall

- Total rainfall
- Standardized Precipitation Index
- Percentage of long-term mean
- Rainfall deciles

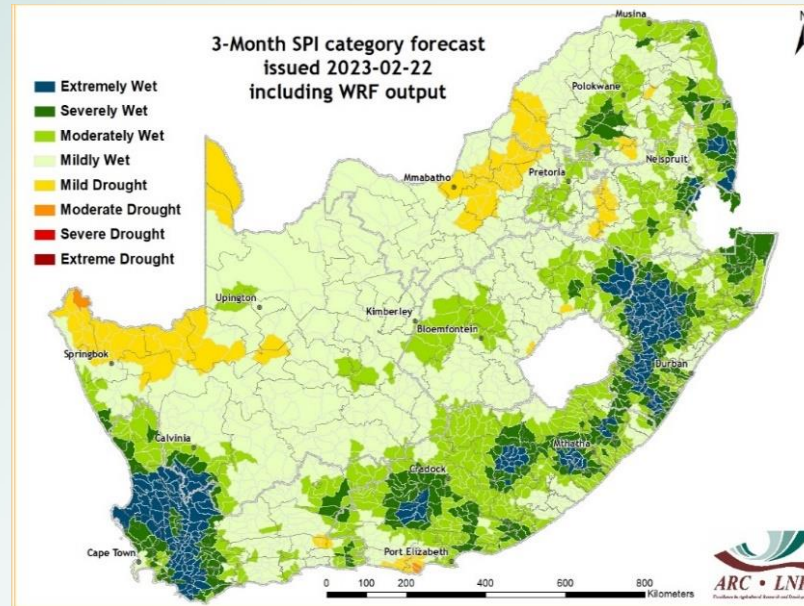
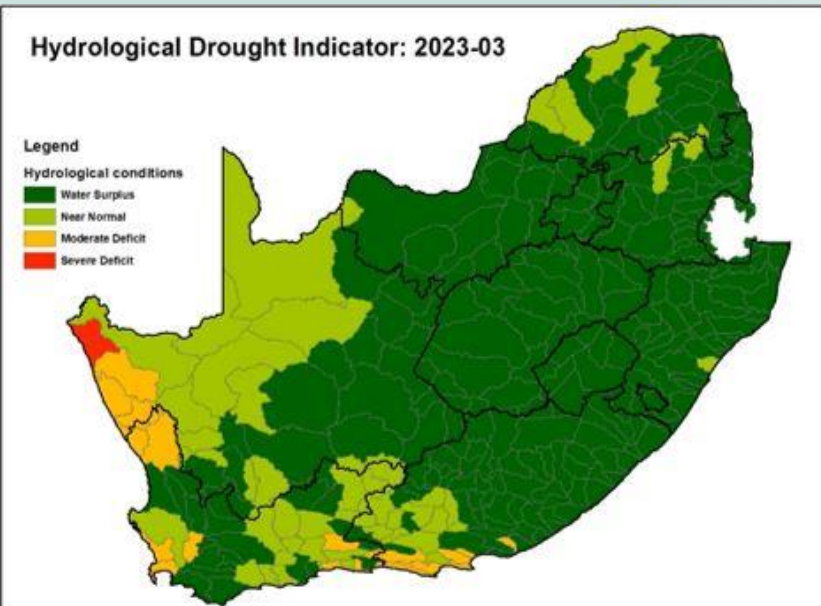
Surface water resources

- Long-term maximum surface water area
- maximum surface water area current vs previous month

Fire Activity

- monthly active fire
- Yearly Cumulative fires

Projects using space technologies (Cont'd)



Funded projects

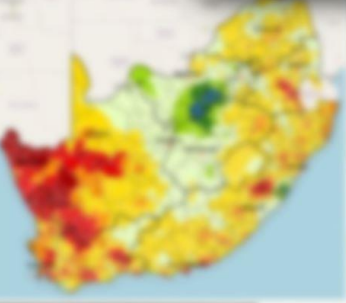
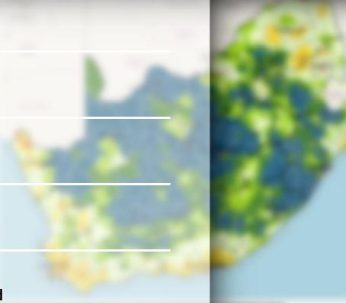
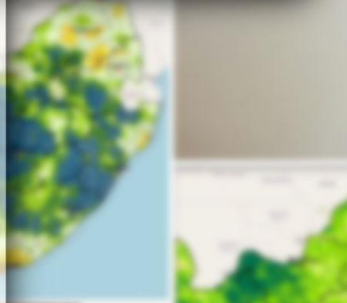
- Disaster-related data products and services for NDMC

ARC AGRICULTURAL DROUGHT EARLY WARNING SYSTEM

Stay informed about the latest drought trends across South Africa:

- Recent rainfall distribution
- Short- and long-term drought intensity
- Impacts on grain crops
- Impacts on grazing
- Automated drought alerts for user-defined locations of interest

From data to information - converting the latest weather- and remote sensing observations to real-time drought information


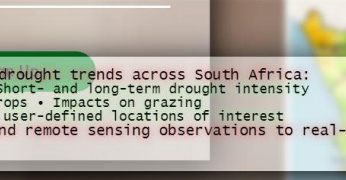
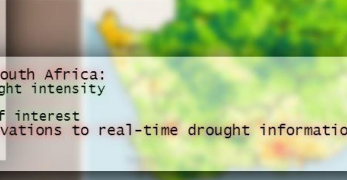
Full name

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From data to information - converting the latest weather- and remote sensing observations to real-time drought information

Success factors & limitations

- **Success factors**

- Informed

- Government officials
- policy makers
- Farmers
- Private organizations

- **Gaps**

- Back reporting
- forecasting future conditions
- incorporating information on other natural disasters (floods, heat waves, pest infestations, soil moisture & etc.)
- Limited infrastructure

Success factors & limitations (Cont'd)

- **ARC's Feedback Mechanisms in place**
 - Local seminars
 - Crop Estimate's committee meetings
 - Farmers Forums
- **Future Needs**
 - Funding
 - Near-real time forecasting
 - National web-based system
 - Incorporate other satellite datasets
 - Spatial resolution
 - Temporal resolution
 - Incorporate other indices
 - Collaboration
 - Soil Moisture

Thank you



CERTIFIED EXCELLENCE IN EMPLOYER CONDITIONS