

# NEAR REAL-TIME MONITORING OF WATER USE

combining earth observation and machine learning to drive economic growth

THE TEAM

MOTIVATION

The recent droughts that plagued South Africa (SA) demonstrated that water has become one of our most precious resources. Its impact on agricultural production was the main factor contributing to the poor economic growth of late, resulting in a technical recession.

PROBLEM

Irrigated agriculture is estimated to be using between 51% and 63% of SA's water resources and water is one of the biggest running costs of high-value crop production, as electricity is required to pump it.

**How can we increase agricultural production AND reduce water use (AND running costs)?**

SOLUTION

The solution is to monitor how much water is being used by a particular crop in a specific region so that producers can be advised about water-efficient and cost-effective alternatives. Having a record of crop water use will also allow for change analyses to monitor the effectiveness of water-saving measures such as drip irrigation. We have developed an earth observation technology whereby the amount of water used by agricultural crops can be quantified.

Knowing how much water specific crops consume will increase water use efficiencies as it will allow for more appropriate crop selection and improved farming practices.

The technology makes use of machine learning and freely available satellite imagery (Sentinel-2 and MODIS) to:

1. identify actively growing crops;
2. determine whether the crops are being irrigated (or not); and
3. quantify the water used by the crops.

TECHNOLOGY

This process is:

1. fully-automated;
2. capable of generating water use quantifications at a monthly interval;
3. scalable to the entire Africa.

Soon the system will also be capable to differentiate crop types.

The target customers are government agencies, water boards, insurance companies, agribusinesses, commodity traders, agronomists, and farmers (producers).

Government agencies responsible for water security need up-to-date data about how much water is used by agriculture to inform policy making.

Water boards need water use and availability data for allocation management.

MARKET

Insurance companies need information about crop status to assess risks

Water use quantifications are essential for agribusinesses as it affects production costs and yield estimations.

Knowing the area planted by a particular crop and whether it is irrigated (or not) is invaluable to commodity (future) traders.

Agronomists need to advise producers about irrigation scheduling and how much water specific crops need.

Producers are most concerned about maximizing yield and minimizing running (input) costs, including water and electricity use.

PROOF OF CONCEPT

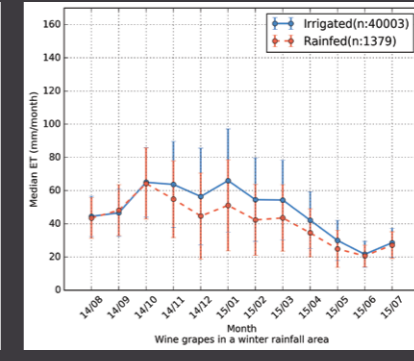
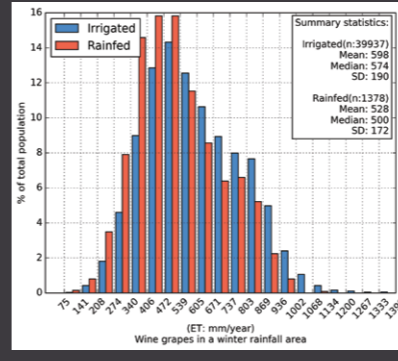
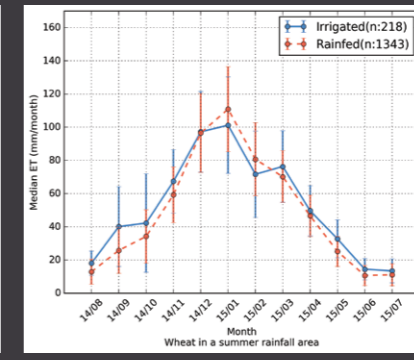
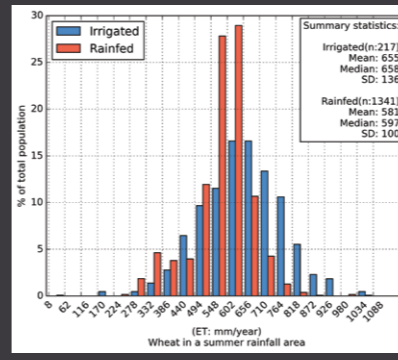
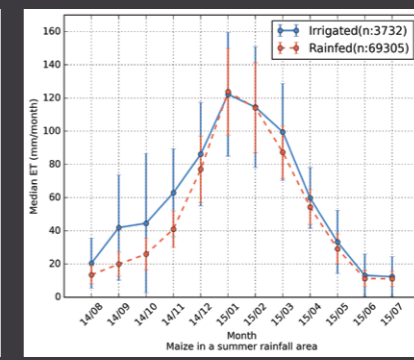
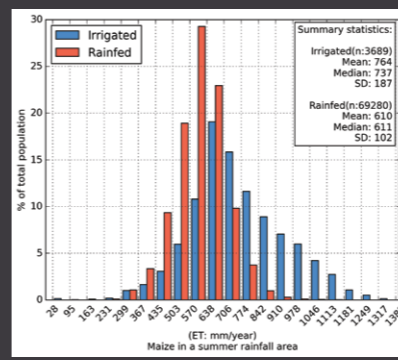
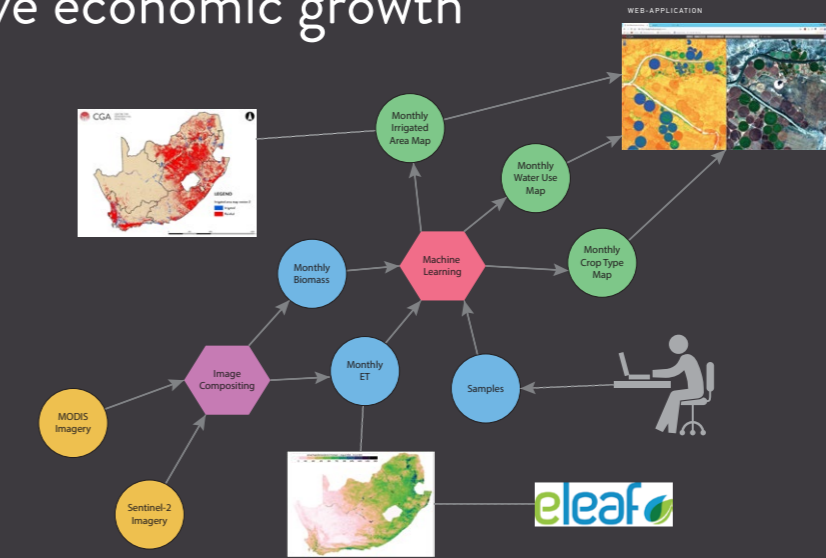
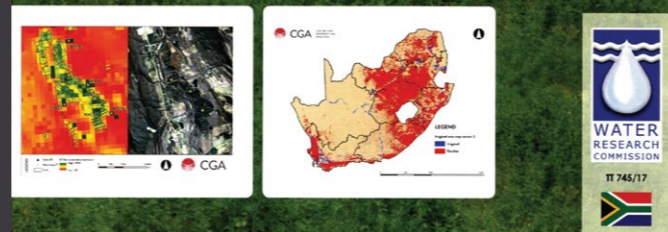
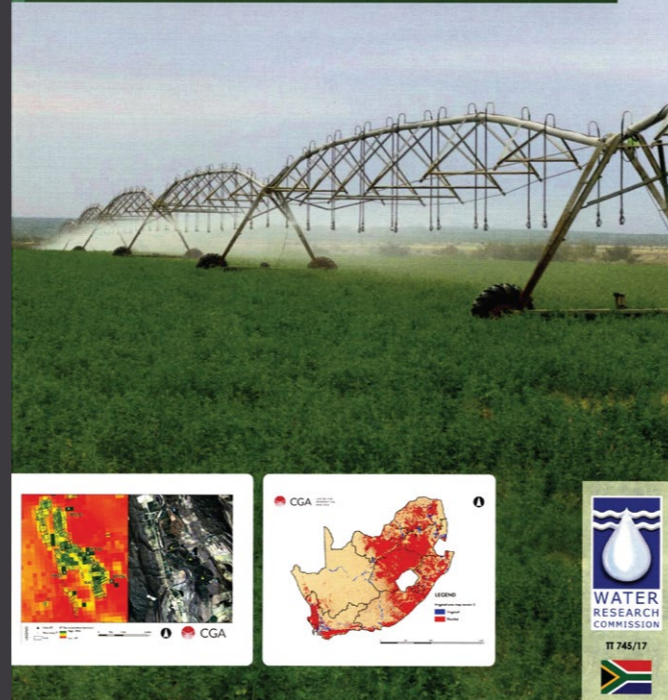
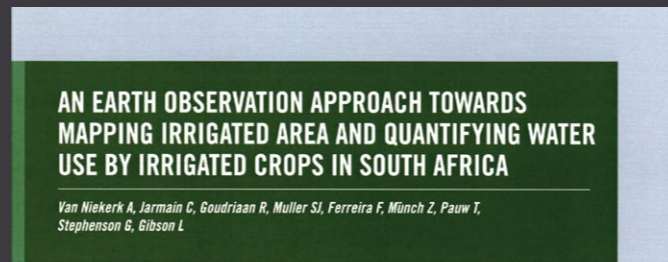
The technology was used to map all irrigated crops in South Africa and to quantify the water used by such crops in 2014/15. The map has an accuracy of more than 95% and the water use quantifications were in line with field-verified measurements. See published WRC report on the right for more info.

Funding is needed to operationalize the technology.

BUSINESS MODEL

Once operationalized, the information (maps and water use quantifications) will be made available through a web-application.

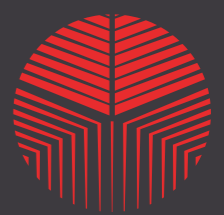
Access to the web-application will be on a subscription basis. Free trial subscriptions as well as expert plans will be available.



FUNDERS



PARTNERS



CGA  
CENTRE FOR GEOGRAPHICAL ANALYSIS



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