



Case Study

CropWatch for South Africa

Project lead



Prepared by



CropWatch for South Africa

Overview

The agricultural sector is crucial to South Africa's socio-economic stability. The sector is sensitive to key issues including climate change, population growth, changes in consumer needs and shifts in the global economy and related markets. These factors are increasingly volatile, resulting in falling incentives to invest in agriculture and increasing uncertainty within the sector.

Monitoring crop coverage and health is therefore an important activity, but any solution needs to be cost effective. Using a satellite-based solution offers several key strengths, such as objectivity, wide area coverage and frequent data updates. Recent developments in the capabilities of satellite instruments support this approach, as they allow frequent, wide area observations to be made with improved spatial and spectral resolutions, enabling images of greater detail and better quality to be captured from space.

With funding from the UK Space Agency's International Partnerships in Space Programme (IPSP), Airbus Defence and Space has built on these strengths by developing a set of crop monitoring tools called CropWatch, in partnership with the South African National Space Agency (SANSA).



Partner

- South African National Space Agency

Challenge

The underlying challenges in the agricultural market are both economic and societal. In South Africa the sector contributes only 3% to national GDP, which is far below its capacity. Nevertheless, its potential impact on empowerment and poverty relief is substantial because it is one of the most employment-intensive sectors – agriculture is responsible for approximately 7% of formal employment.

Consequently, there is significant interest in improving monitoring capabilities in the agricultural sector, but there are significant challenges due to the wide areas over which crops are produced and the variabilities within the growing cycles for different crops. Successful monitoring requires reliable, wide area observations during growing seasons that are frequent enough to adequately observe different trends and potential anomalies. In addition, for such monitoring to be sustainable, it has to be cost effective.



Differentiating between 'stressed' maize (top) and a healthy crop (bottom) is possible at ground level, but hard to monitor over wide areas

Solution

In partnership with SANSA, Airbus has developed CropWatch with the aim of stimulating both economic and societal benefits in South Africa (and more widely across southern Africa). The main goal was to develop and demonstrate a set of crop stress assessment tools that use satellite data and agronomical information to optimise the monitoring of field crop areas in both irrigated and dry-land production systems in South Africa.

CropWatch project activities included three key steps:

- Acquisition of optical satellite images of two areas of interest in South Africa taken at frequent repeated intervals (using imagery provided by DMCii).
- Implementation of an automated production workflow to enable routine generation of a range of biophysical parameters – such as the moisture content of vegetation – from the satellite images.
- Development and implementation of an integrated model which combines the biophysical parameters (generated from satellite images) with complimentary, non-satellite datasets to enable crop stress to be modelled.

Throughout the project, partners engaged end-users from across the stakeholder community, from institutions to the commercial sector, to ensure the capabilities of the system were of real benefit and add value.

IPSP benefits

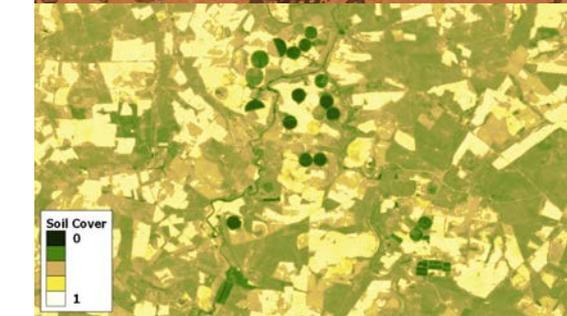
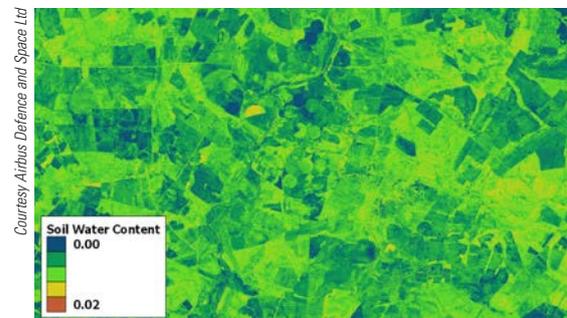
IPSP funding has enabled Airbus to develop an international partnership with SANSA and other South African stakeholders and provide support to SANSA in meeting its obligations to institutional stakeholders in policy making, policy monitoring and evidence gathering.

The results of the project should ultimately enhance the sustainability and resilience of the South African agri-business sector, and support improved food security and social stability in the country.

The funding has also enabled the partnership to build on existing Earth observation capabilities to develop commercially viable products and services, and to build on existing investments in industrial processing capabilities.



Crop stress maps



Satellites can measure a range of parameters for the same area

Outcomes & Future

The CropWatch project team has successfully developed and implemented an automated production workflow that can generate biophysical parameters from satellite data and use these in an integrated model that can generate crop condition maps and indicators.

The next step is to look at how to effectively distribute the CropWatch products, with customers likely to include government departments, agricultural businesses (such as banks and insurance companies) and financial institutions. The products are likely to be made available online, with a browser front-end and processing based in the UK and South Africa.



Airbus' IPSP INSIGHTS

Find the right international partner – not just one that is enthusiastic, but one with the means, capabilities and competence to contribute to the project.

Also identify and understand the right local context for the proposed service offering, how partners fit into that context and how you can best work together according to what you are trying to develop.

IPSP

The International Partnership Space Programme was a two year, £32 million pilot programme established and led by the UK Space Agency. The aim of the programme was to open opportunities for the UK space sector to share expertise in real-world satellite technology and services overseas and develop international partnerships for mutual benefit. The objectives for this programme were to show the benefits that UK satellite or space technology can provide above and beyond terrestrial solutions; these were provided in terms of societal or economic benefits, for countries that currently do not have these capabilities or wish to develop them further. The aims were for the UK to learn from partnerships with these countries and to establish the UK as the partner of choice with these countries once they are in a position to acquire or enhance their own space or satellite infrastructure.

UK Space Agency

The UK Space Agency is an executive agency of the Department for Business, Innovation and Skills (BIS) and lies at the heart of UK efforts to exploit and benefit from investment in space technologies and satellite applications. The Agency was created on 1 April 2011, and for the first time integrated UK civil space policy and the majority of programme funding from across Government, the Research Councils and Innovate UK (formerly known as the Technology Strategy Board).

To view profiles of IPSP partners and learn more about satellite applications in emerging markets visit: starhub.sa-catapult.co.uk