



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



An early warning and crop damage estimation system for crop, using satellite observations

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Agbiz Grain Mini Symposium
TRIPLE BOTTOM LINE: People, Profit, Planet
10th August 2016,
Centurion Country Club

Crop Watch for South Africa in Perspective

- Joint Project between SANSA and Airbus DS
Funded by the UK Space Agency
- The output being a **Crop Stress/Condition service**

Areas of Interest

Two areas located in the Free State

Bothaville AOI

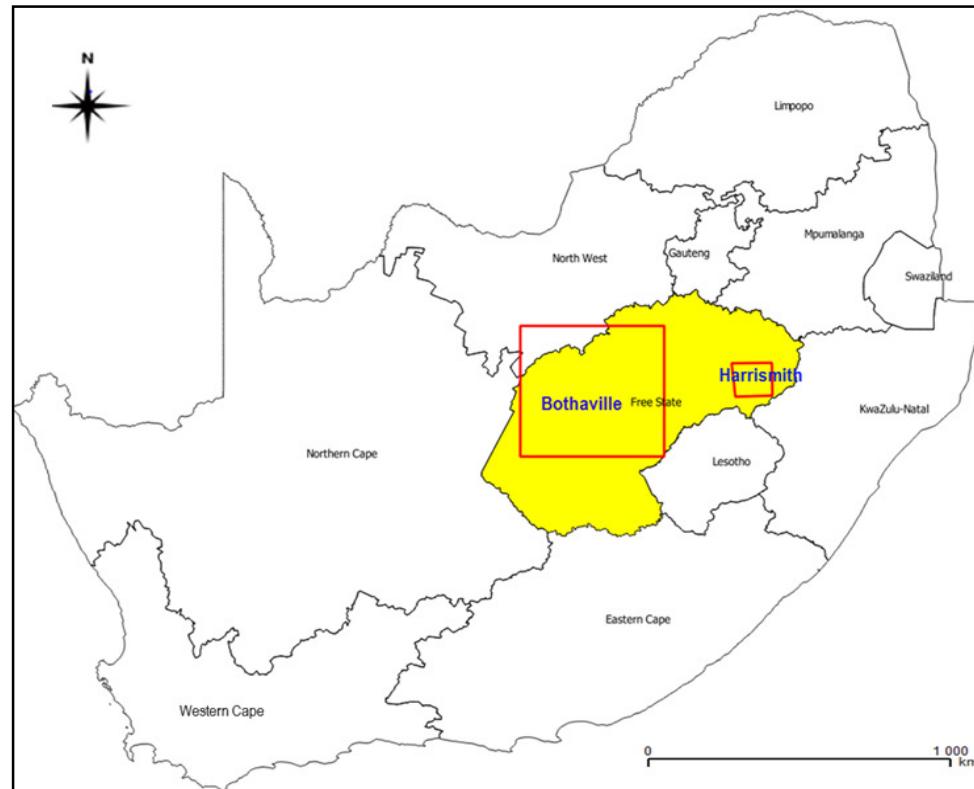
Area of approx. of 64,031 km²

Harrismith AOI

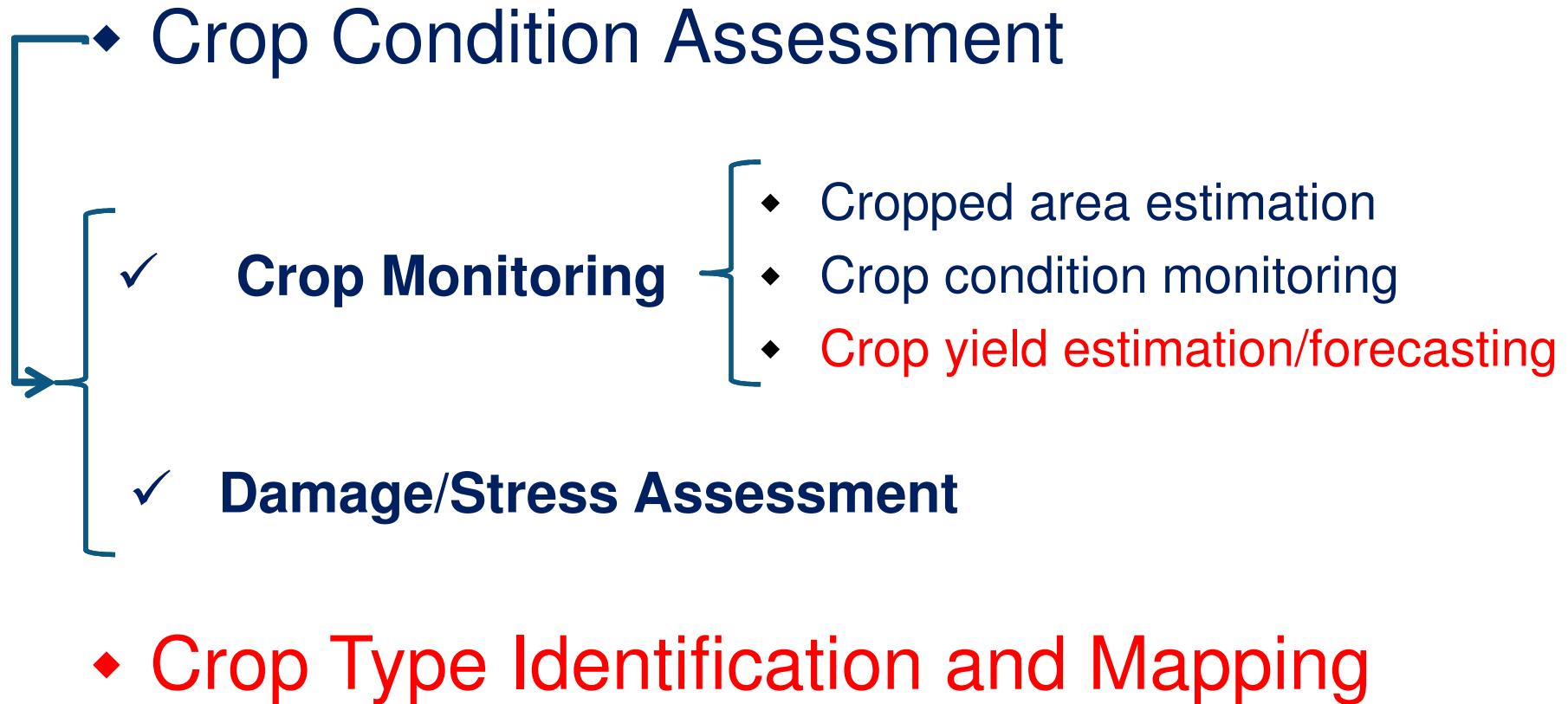
Area of approx. 4,358 km²

Pilot Project

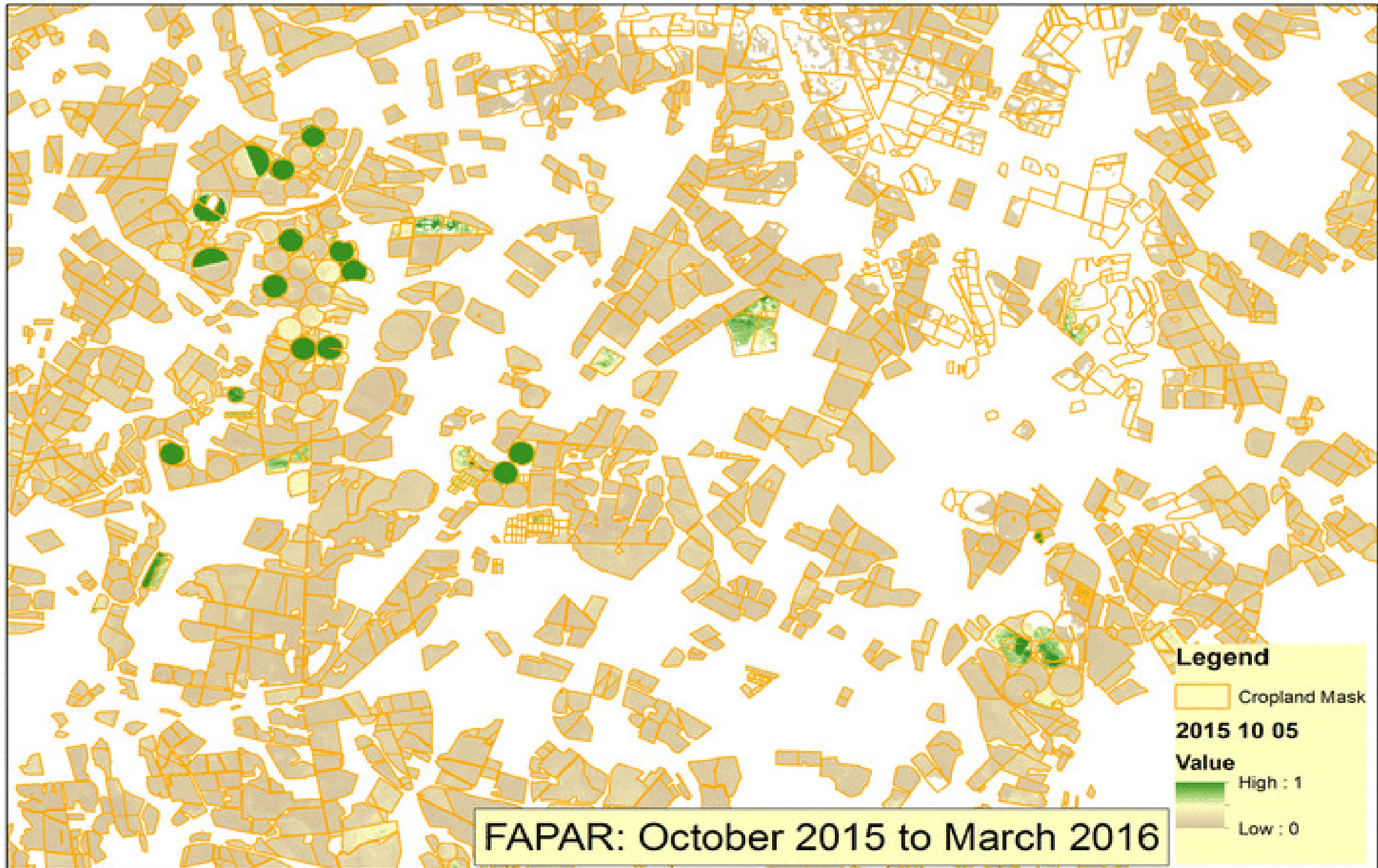
- Project Duration – 9 Months
- Start – September 2015
- Finish – May 2016



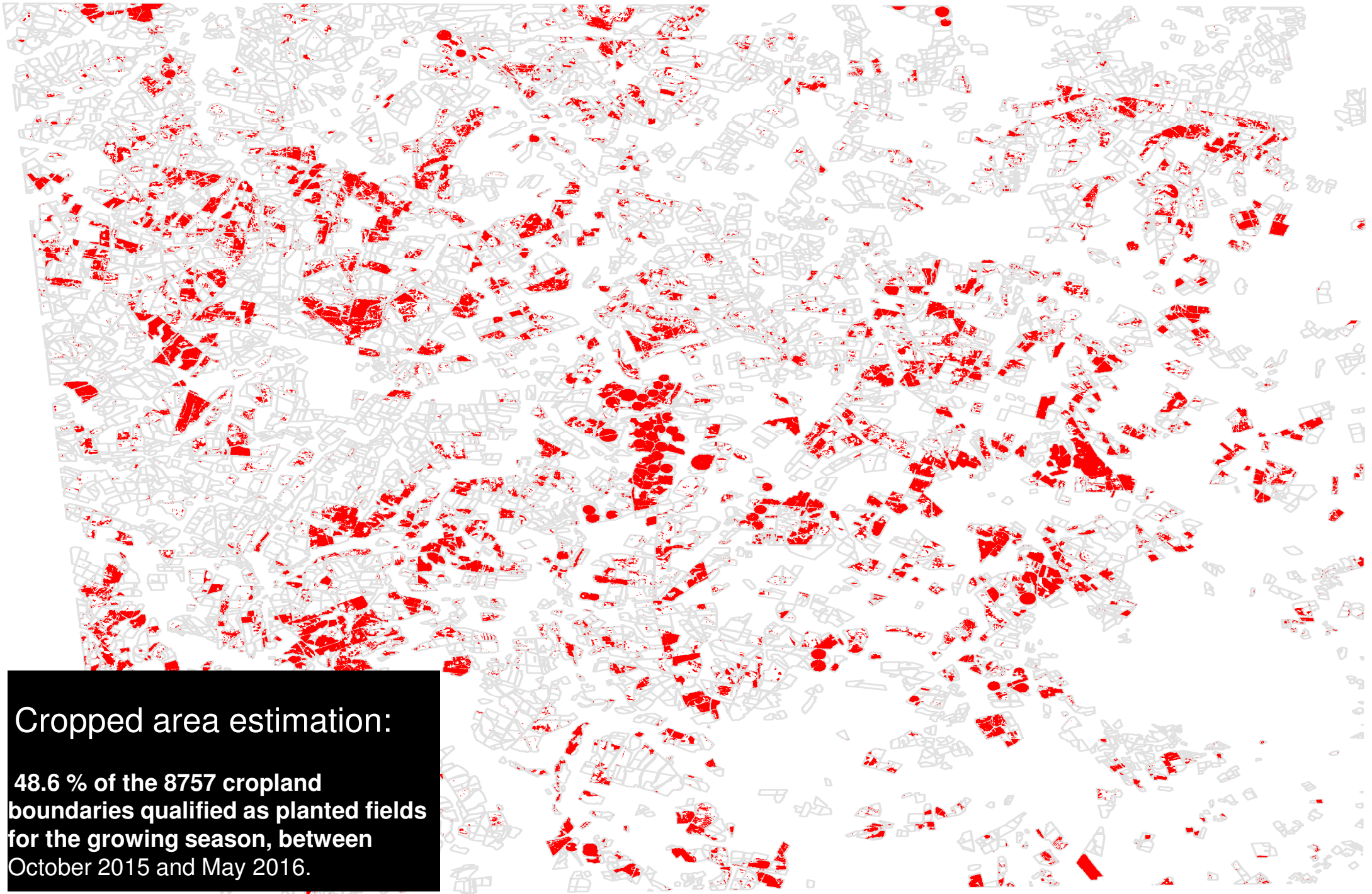
Possible Services



Field Crops Evolution Monitoring



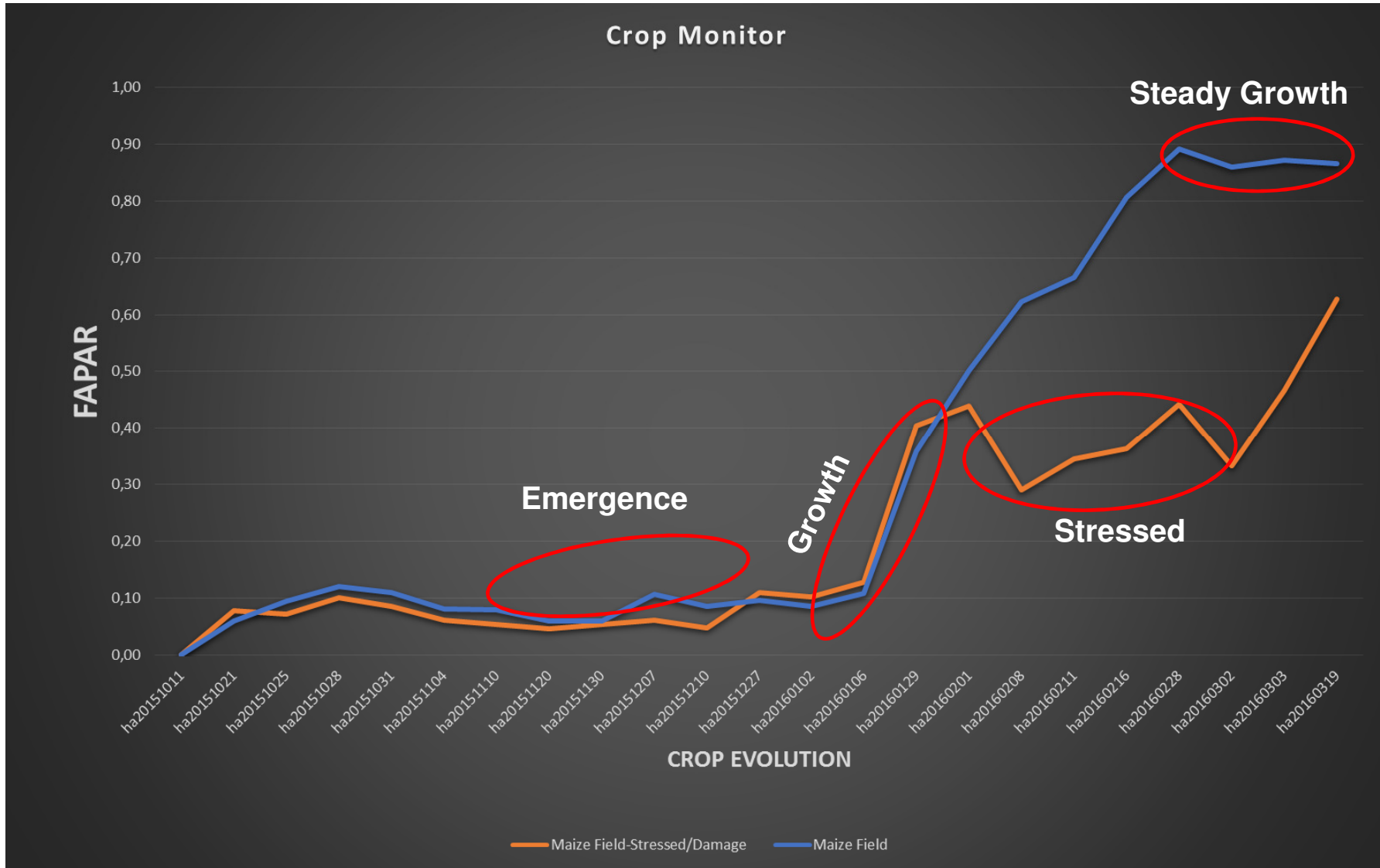
Calculating Fraction of Crop Arable Land in Harrismith area



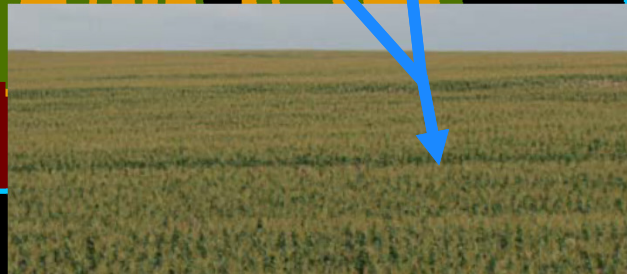
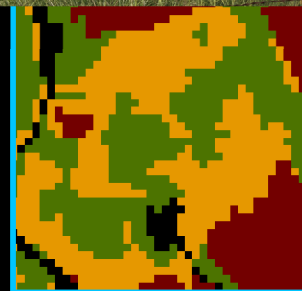
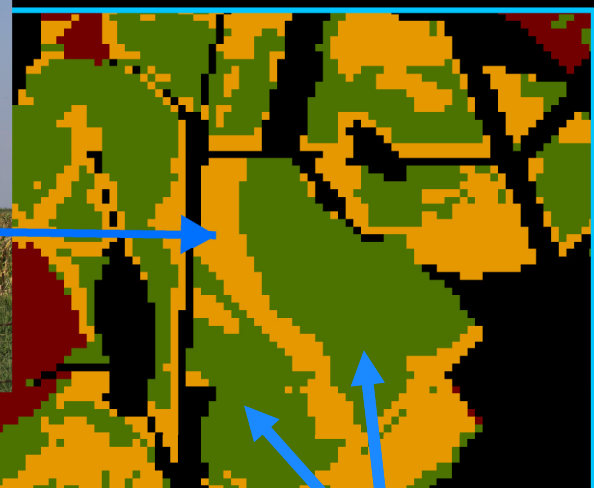
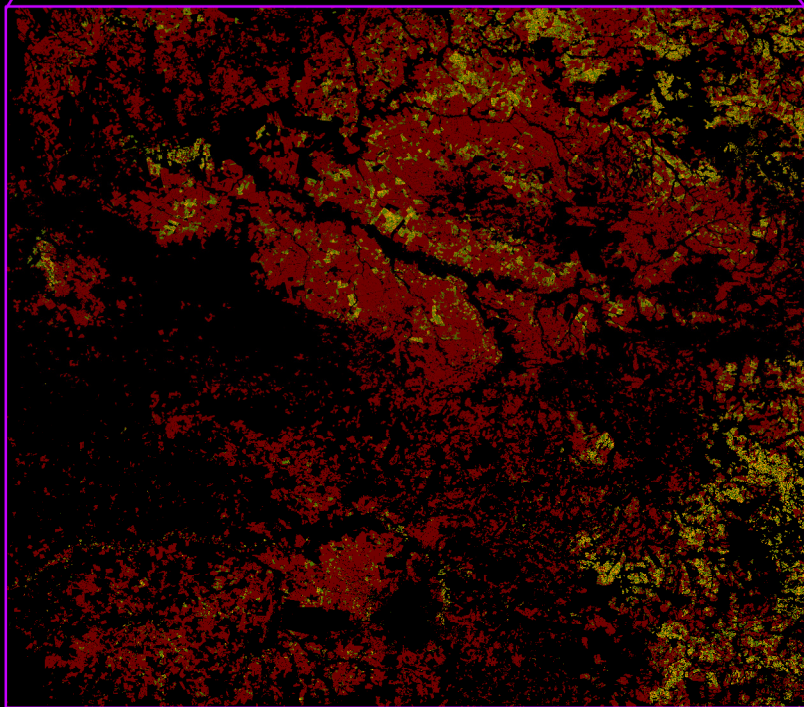
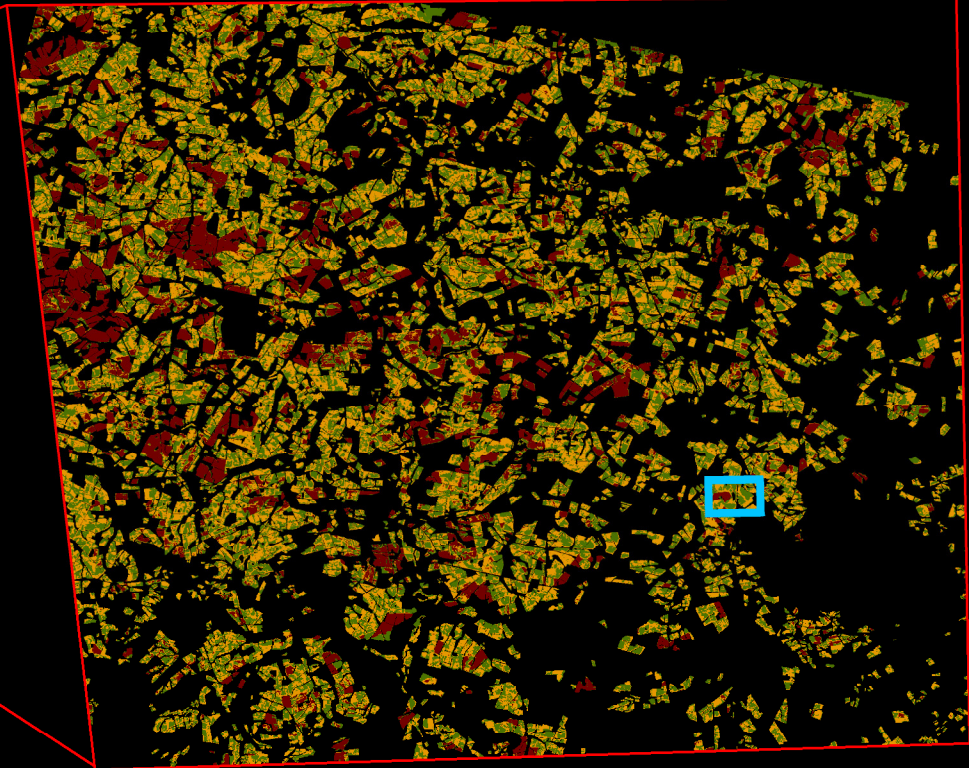
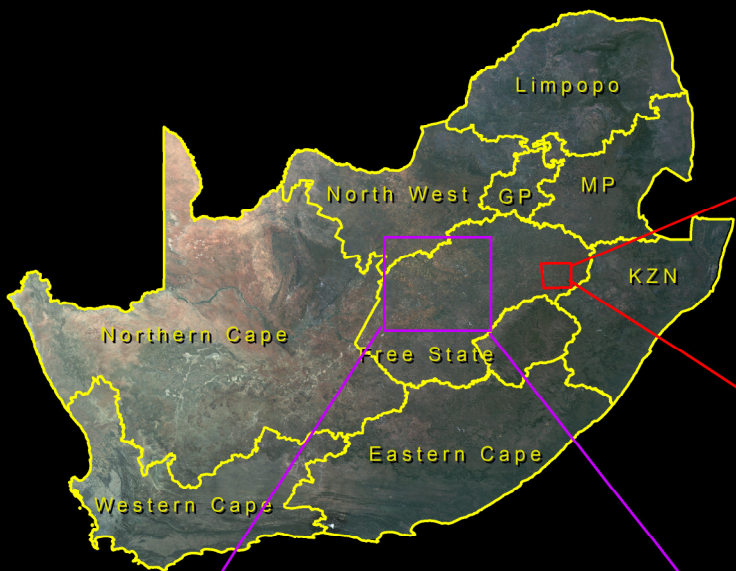
Cropped area estimation:






48.6 % of the 8757 cropland boundaries qualified as planted fields for the growing season, between October 2015 and May 2016.

In-field Crop Condition Monitoring

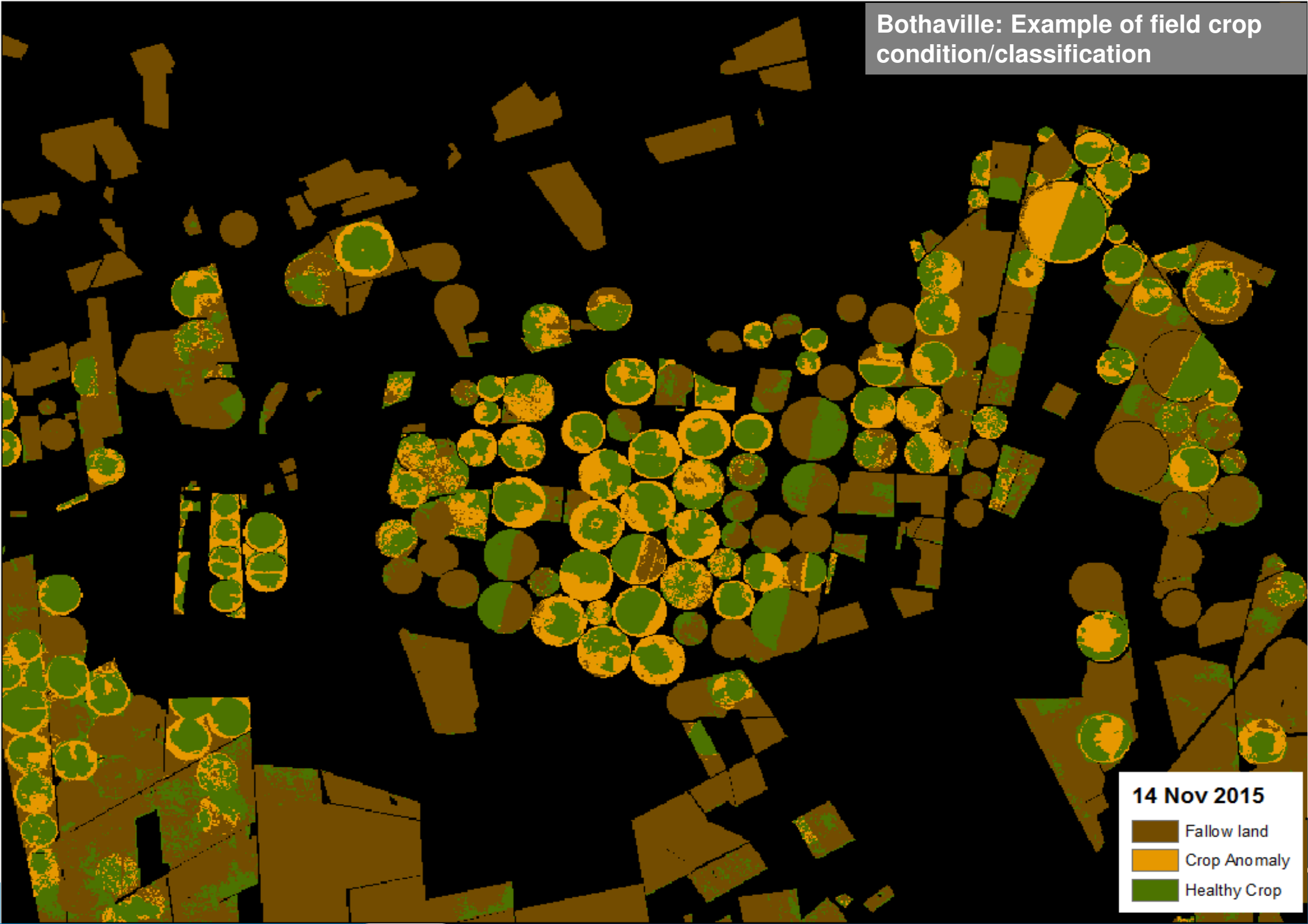


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-  Harrismith Site
-  Bothaville Site
-  Fallow land
-  Crop Anomaly
-  Heathy crop

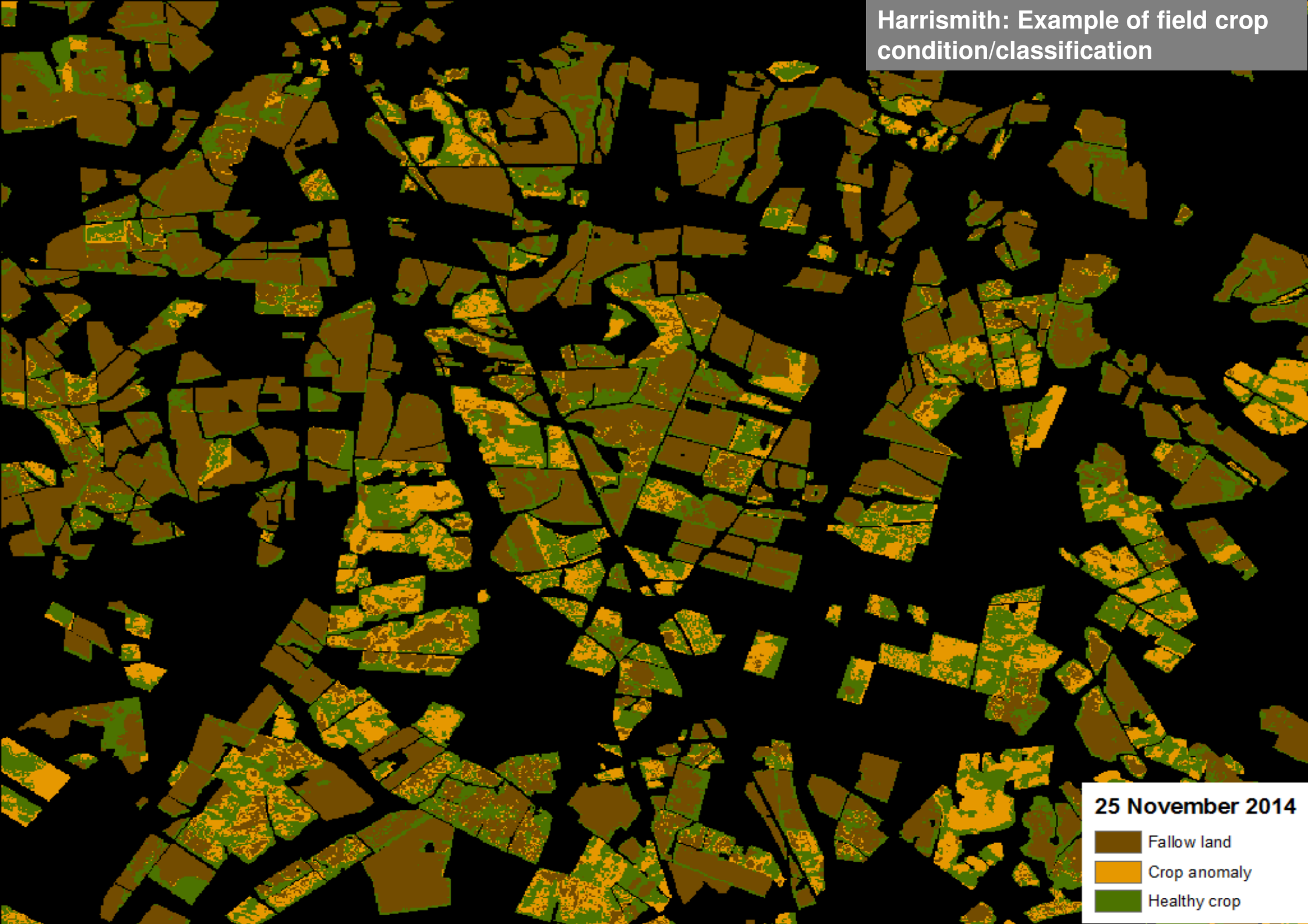
Bothaville: Example of field crop condition/classification



14 Nov 2015

- Fallow land
- Crop Anomaly
- Healthy Crop

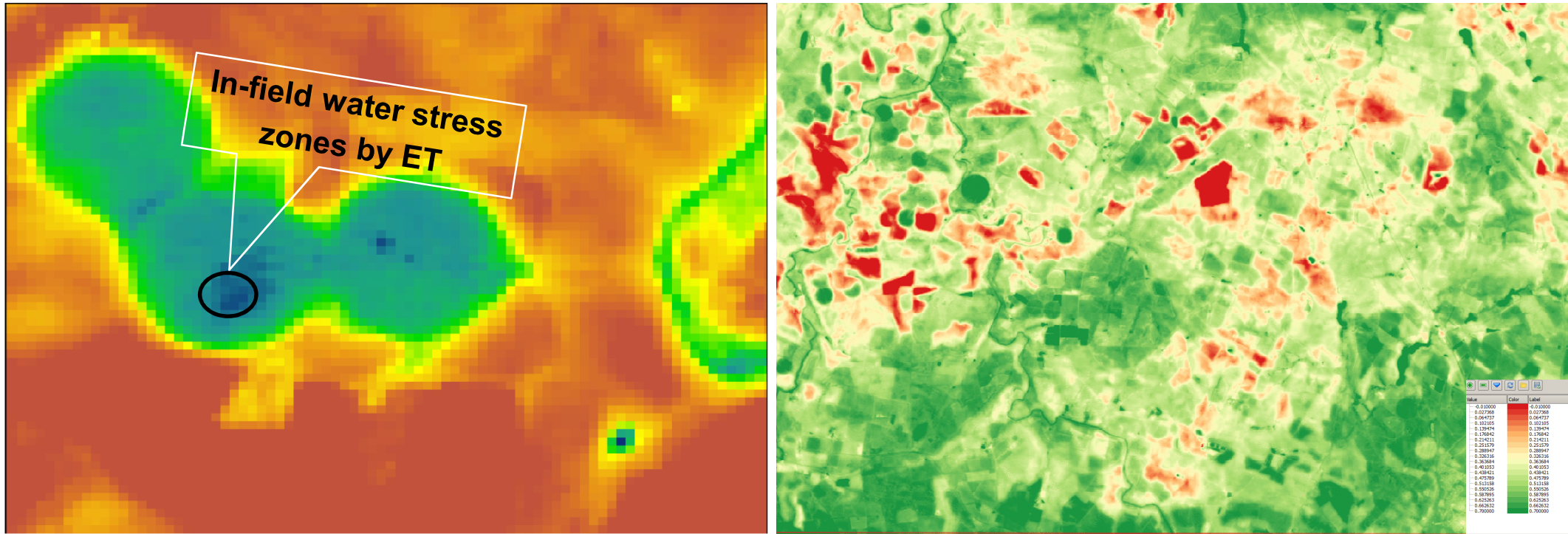
Harrismith: Example of field crop condition/classification



25 November 2014

-  Fallow land
-  Crop anomaly
-  Healthy crop

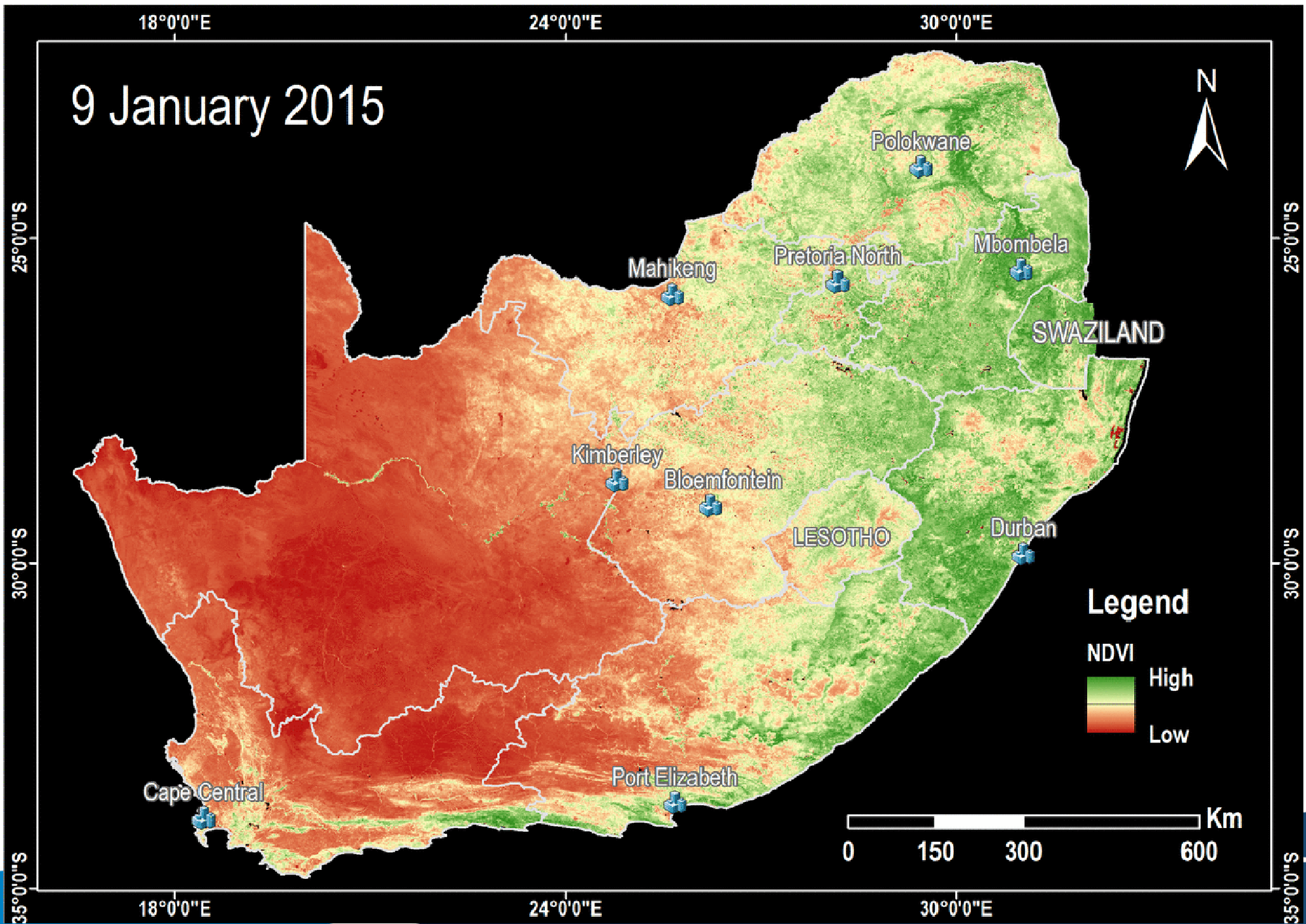
In-field crop anomaly detection by ET and LAI



Actual ET calculated from Landsat-8 data acquired over center-pivots irrigated corn field near Harrismith. Image date: 25-09-2015

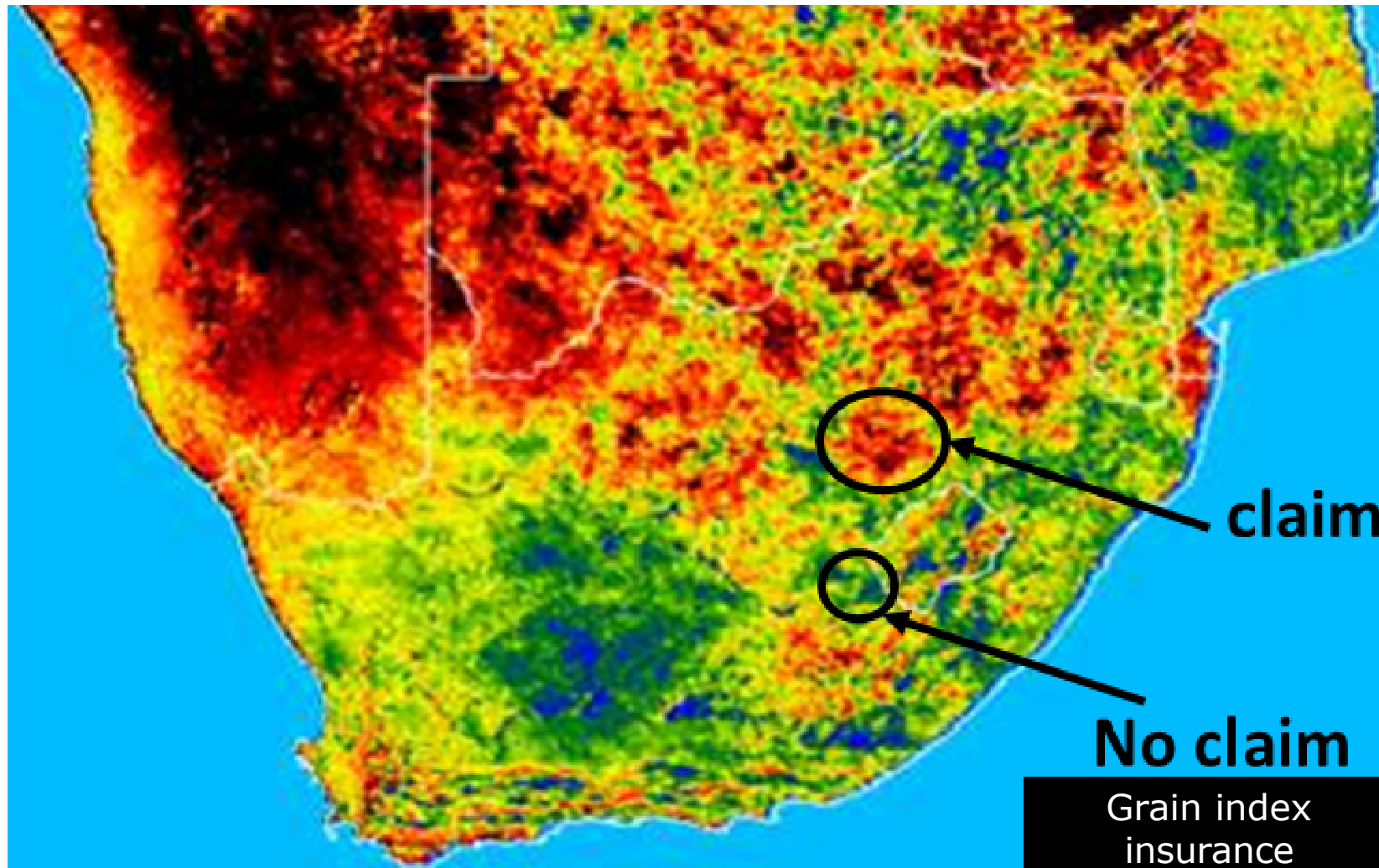
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Long-term time Series of Satellite-derived Observations

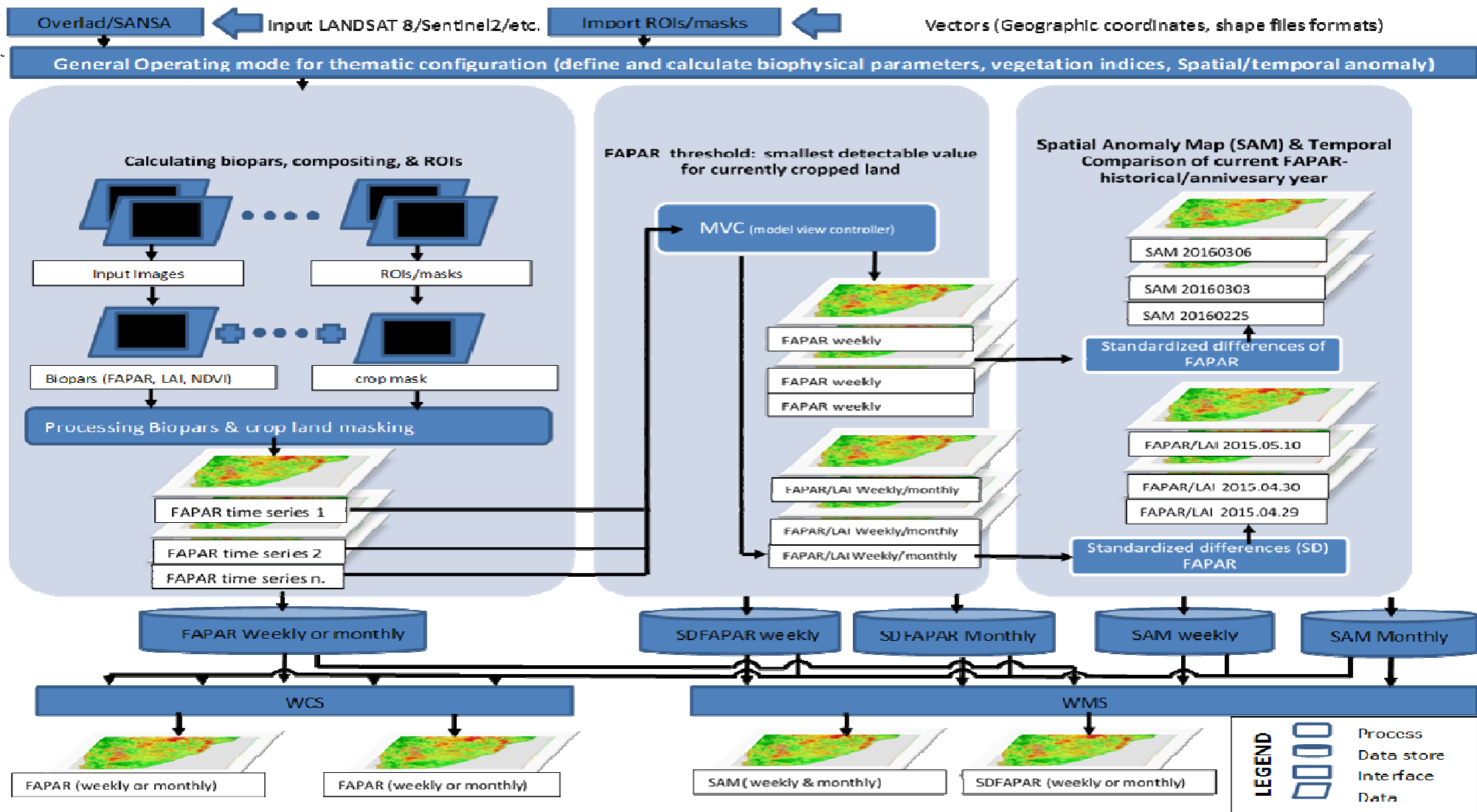


Risk management for Micro insurance

Growing Season ET relative to Long-Term Average



Visualisation: Web Mapping Service Architecture



Application Layer

GeoIntel Web Portal

Crop Evolution Applications

Other Vegetation visualization Applications

End-user Interface: SANSA Web Mapping Services

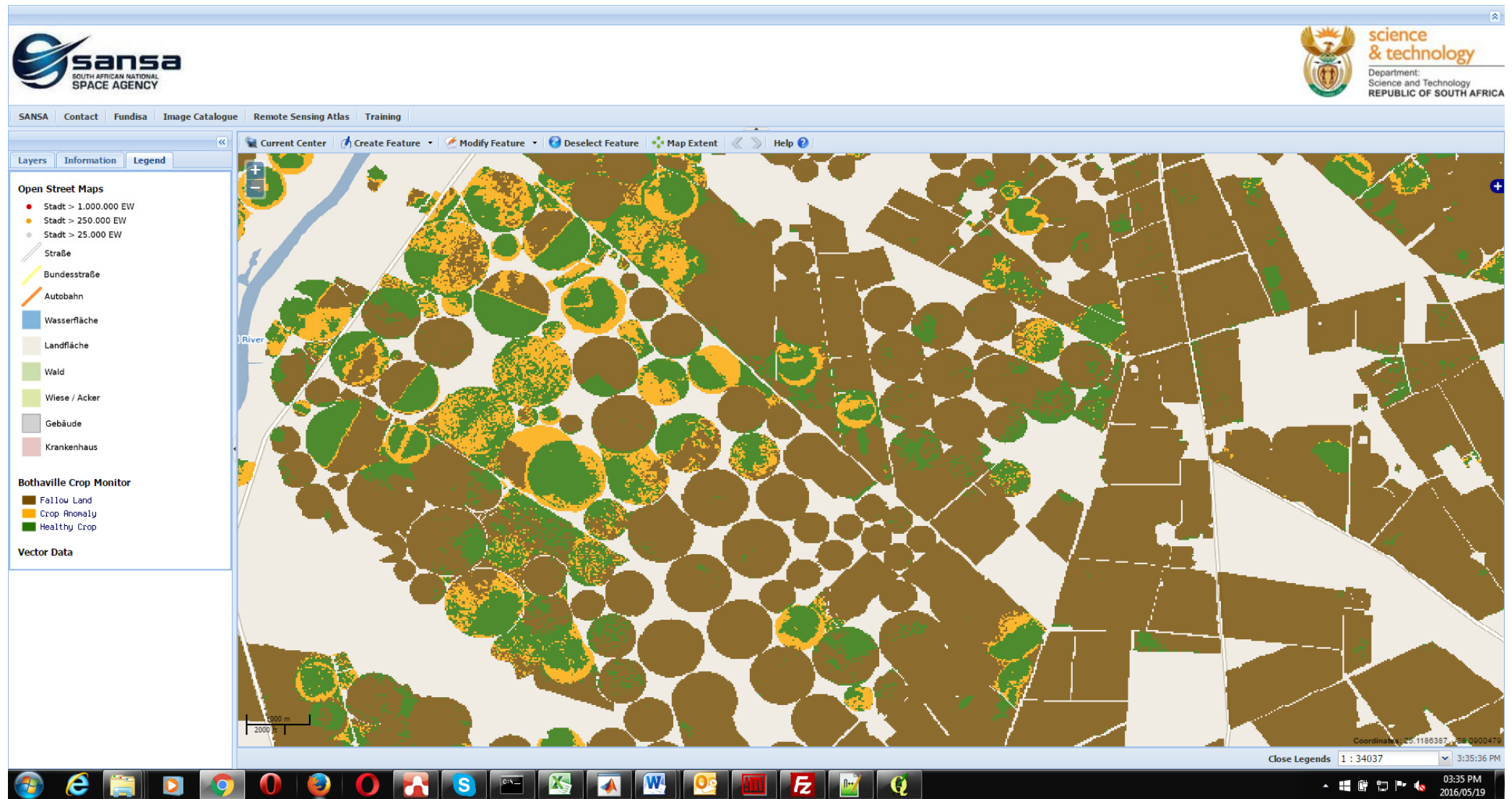
The screenshot displays the SANSA Web Mapping Services interface. The browser address bar shows the URL `products.sansa.org.za/mapApp/index.html`. The interface includes a header with the SANSA logo and the Department of Science & Technology logo. A navigation menu contains links for SANSA, Contact, Fundisa, Image Catalogue, Remote Sensing Atlas, and Training. The main map area shows a map of South Africa with a vegetation classes overlay. A legend window titled "2015 Vegetation Classes" is open, showing the following categories:

- No Vegetation (Brown)
- Sparse Vegetation (Yellow)
- Medium Density Vegetation (Light Green)
- Dense Vegetation (Dark Green)

The map also shows a scale bar (100 km / 100 mi) and a status bar at the bottom right indicating "No Coordinates - Beyond Map Extent" and "Close Legends 1 : 7000000 4:41:08 PM".

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End-user Interface: Visualizing Crop Anomalies



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Summary of Possible Applications

End-User	Application
Farmers and cooperatives	Farm level information to optimise productivity
National and provincial departments	Information for compliance monitoring to determine problem areas, disaster management and food security imperatives
Crop insurance companies Satellite-based Index based insurance / micro-insurance	Determine appropriate premiums, verify damage and quantify scope, extent, and magnitude of claims
Financial/lending stock exchange/trading institutions	Crop outlook and risk insurance information