Sustainable agriculture for the future

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Use of Satellite Data in Agriculture

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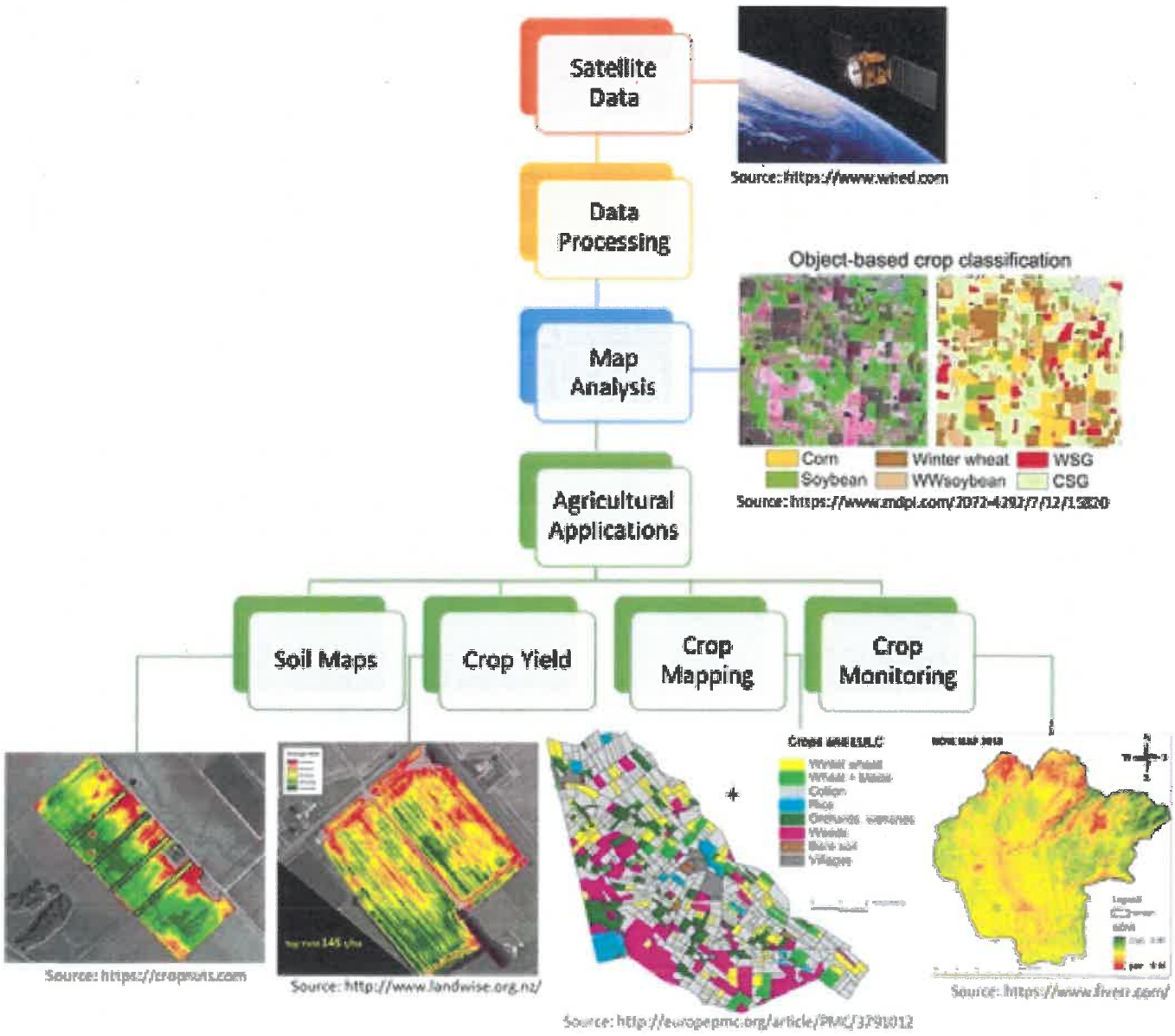
Satellites are termed an 'all-seeing eye in the sky'. They collect data from the Earth for different applications. The principle of satellite data collection is that different objects have distinct reflectance properties, and the reflected energy is captured by satellite sensors to produce images. Three terms are commonly used to describe satellite image resolution: spatial, spectral, and temporal. Spatial resolution



Van die nuwe Sensako-kultivars op die keuselys is:

- SST 8135 - 'n Kort tot medium groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal.
- SST 8154 - 'n Kort groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal, staanvermoë en graankwaliteit.
- SST 8175 - 'n Medium groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal en graad.
- SST 8156 – Hierdie hoëpotensiaal semi-dwergkultivar het 'n medium groeiperiode en is wyd aangepas is vir vroeë en middelseisoenaanplantings. Dit bied goeie uitloopweerstand asook matige weerstand teen stam- en geelroes. SST 8156 se pitvastheid is goed en die graangehalte is baie goed.
- SST 8177* - 'n Lang groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal en siekteverdraagsaamheid. Baie goed aangepas vir vroeë aanplantings.
- SST 8205* - 'n Medium groeiperiode besproeiingskultivar met uitmuntende opbrengspotensiaal.

Van die bekende Sensako-staatmakers wat steeds deel van die pakket moet uitmaak, is:

- SST 806 – Die semi-dwergkultivar is 'n medium groeiperiode besproeiingskultivar met uitstekende opbrengspotensiaal wat hitte kan hanteer.
- SST 895 - Hierdie kultivar wat onlangs vrygestel is, is aangepas vir middel en laat plantseisoen-aanplantings in die warmer- en koeler besproeilingsgebiede. Dit is 'n kort tot medium groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal.
- SST 884 - 'n Kort tot medium groeiperiode besproeiingskultivar met baie goeie opbrengspotensiaal. Wanneer die risiko groot is vir laat koue en ryp, is hierdie moontlik die ideale keuse omdat die plantdatums aangepas kan word.
- SST 843 – Hierdie kultivar is 'n dubbeldwerg met 'n kort groeiperiode en baie goeie opbrengspotensiaal wat ook weerstand bied teen geelroes.

Syngenta se Sensako-kultivars word ontwikkel binne die beginsels van vooruitgang deur navorsing en alle nuwe produkte word eers deeglik binne navorsings-, laboratorium- en veldtoestande getoets voordat dit in die mark geplaas word.

Vir meer inligting kontak Pieter Craven by 082 388 0299.

refers to the size of the smallest object that can be detected by the satellite sensor, e.g., 30 x 30 metres; spectral resolution is the specific wavelengths the satellite measures; and temporal resolution is the frequency of image collection or time it takes a satellite to revisit the same area, e.g., every 16 days. The data is processed/prepared for analysis by applying specialized algorithms to make it useable for research purposes. The Agricultural Research Council (ARC) generates data products derived from satellite imagery for agricultural purposes. Some of the products include maps for soil nutrients, crop yield, crop types and crop monitoring.

Soil nutrient monitoring

Soil maps are produced by collecting soil samples and analysing them in the ARC's analytical laboratories to determine the soil nutrient contents. The macronutrients (nitrogen, phosphorus, potassium, magnesium, and calcium) and soil physiochemistry (pH and resistivity) are determined during laboratory processing. The soil data is then related to the satellite data to generate field/regional-scale maps depending on the nutrient of interest. These maps can inform soil fertility management interventions and aid in developing variable fertilizer recommendations. This application therefore contributes towards sustainable agricultural productivity.

Crop yield estimation

Current developments regarding yield estimation are focused on smallholder maize farms. Maize samples are collected, and different parameters measured on these farms to determine crop yield. The yield data is then related to satellite data with the utility of specialized machine-learning algorithms to

An unmanned aerial vehicle (UAV) / drone with crop monitoring sensors flying over a maize field

generate yield maps. These maps are used for maize yield prediction and forecasting. This application provides an indication of the expected maize yield and aids in planning for maize shortages and surpluses to ensure sustainable maize production. Farmers can modify their crop production practices accordingly to improve their yields.

Crop mapping

The locations of different crops are captured and used as training data to relate them to satellite imagery for crop type mapping. This application is fundamental for determining the planted area of different crops, especially on smallholder farms. These farms are challenging to map with low spatial resolution satellite data because of their small sizes and fragmented distribution which makes them difficult to detect. Thus, freely available satellite data such as Sentinel-1 and Sentinel-2 with an improved spatial resolution are used at the ARC for crop mapping on a regional scale.

Crop monitoring

Vegetation indices such as the Normalized Difference Vegetation Index (NDVI) are an indicator of crop health status. For example, areas with healthy crops will have high NDVI values while areas with sparse or unhealthy crops will have low values. This can help in mitigating factors which are adverse to optimum crop development during the season. The use of unmanned aerial vehicle (UAV) data is currently being tested for estimating crop biophysical parameters on a field scale throughout the crop growing season.

For more information:

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