LARGE-SCALE EXPLOITATION OF SATELLITE DATA IN SUPPORT OF INTERNATIONAL DEVELOPMENT

→ FOOD SECURITY: Early warning, monitoring and understanding the causes of natural hazards and associated agricultural risks with satellite Earth Observation

Traditionally agricultural monitoring systems rely heavily on in-situ measurements and agricultural statistics, while standardization of methodologies and coordination of data acquisition between and within countries are missing. Recent EO missions such as ESA's Sentinels, offer the opportunity to establish an effective, semi real-time and large-scale agricultural monitoring system which supports government agencies and international organisations to collaborate and coordinate their response.

EO services provide valuable information on crop biophysical, soil and climate characteristics, but also on the occurrence, duration and intensity of natural disasters such as heat stress, droughts, and floods that strongly influence production figures.

Large-scale EO observations of meteorological and growth conditions allow the continuous monitoring of crop production trends and changes. Crop production can be expressed as water productivity ("crop per drop") that not only indicates where production has obtained its full potential and where not, but that also reveals distinct patterns of change as upcoming risks or prosperity. Also, satellite data can be used to determine the onset and development of the rainy season and the status of crops and rangelands across countries and to generate situation bulletins. The service could include a webportal or email service that provides alerts when production figures are lower as usual or other anomalies are detected.

Combining the different EO data products such as water productivity and meteorological data helps in the assessment of climate risk, rainfall and drought impact, and consequently possible effects of plant water stress and water deficits on crop growth at the regional level. Traditional cropping patterns and farming methods may need to be adapted in the future to accommodate changes in rainfall patterns and increasing extreme and erratic weather events caused by climate change. A better understanding of the spatial variations and the scope for improvement can help to plan for agricultural production systems which are more resilient to climate change influences.

DESCRIPTION

This service provides timely information on predicted and actual crop production figures at various scales. It is an operational service with regular updates on crop and vegetation performance and production conditions (weather)

USE

- Assessment of agricultural production and risks
- Assess market situation
- Early warning to act upon food scarcity
- Determine impact of natural hazards on food production

INPUT PRODUCTS

- Cropping area
- Crop type
- Crop production
- Biomass production
- Water productivity
- Irrigated area
- Precipitation
- Weather data

SPATIAL RESOLUTION AND COVERAGE

Regional scale for daily semi real-time services and long-term time series with spatial resolution of 250m, local (10-30m) scale

BENEFITS

Improve decision and action making to better target and monitor the distribution of aid.

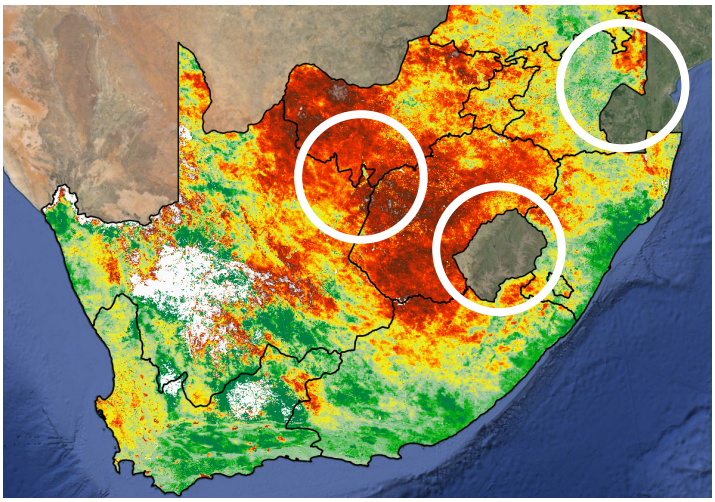
DELIVERY FORMAT

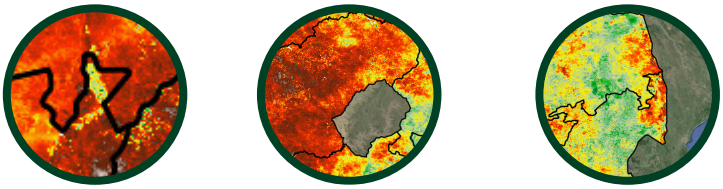
Depending on user needs, e.g.:

- Vector and raster formats
- Through a web portal
- Statistics in tables and/or graphs

FREQUENCY

- Up to near real-time (daily, weekly, monthly)





Vaalhaarts -20% | Free State -50% | Kruger Park -37%

Percentage of Actual Biomass Production lost over the period Aug 2015 to Jan 2016 when compared to the same period during the 2014-2015 agricultural season.

For more information, please contact:

ESA Technical Officer - Anna Burzykowska (Anna.Burzykowska@esa.int) | **Project Lead -** Remco Dost (Remco.Dost@eleaf.com) | eo4sd.esa.int/agriculture