PRECISION FARMING: MANAGEMENT OF GRASSLANDS

Optimised grassland management requires accurate knowledge of grassland availability and growth. The use of remote sensing can provide an operational solution.

The challenge

Grazed grass is the cheapest feed in a ration of livestock systems. Good grassland management, amongst other things, requires knowledge of the amount of grass available.

The objective of this study is to provide users (agricultural organisations, farmers) with information on the quantity of grass available per agricultural plot, at a weekly rate. The full development of the operational service will be effective in the short term. It will be based on easy access to data for users

This will help to reduce managerial observations on the ground and increase the accuracy of pasture management based on biomass parcel data.

The space based solution

The current space-based method relies on the ability of remote sensing data to estimate grassland biomass. It must take into account the wide variability of conditions encountered in grassland management that depend on operator's needs, grassland type, soil and climate conditions. Under these circumstances, high spatial and temporal resolution of remote sensing data are required. Sentinel missions make it possible to satisfy these new requirements, in contrast to previous missions, which are more limited in terms of spatial and spectral resolution and revisit frequency.

The Sentinel missions make it possible to consider new perspectives in precision farming by providing accurate and regular monitoring of grassland biomass on a regional scale.

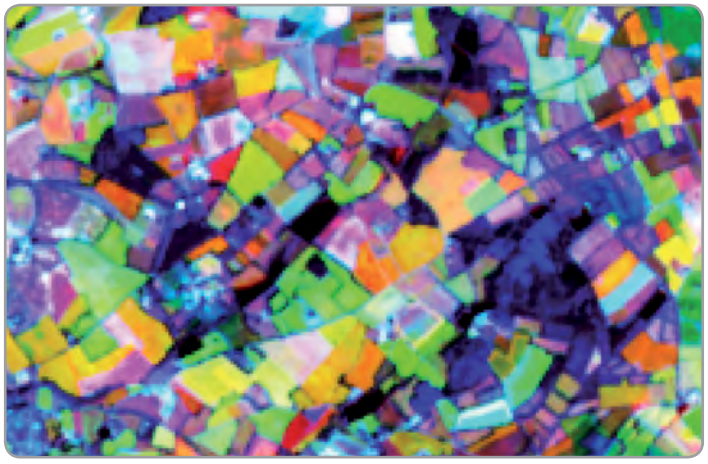
This procedure will be extended into a space-based operational solution.

The time between the acquisition of Sentinel images and the availability of data is brief and compatible with the users' needs. These data are available in near-real time and can be immediately exploited as they are pre-processed in geometry and corrected for atmospheric effects. The estimate of grassland biomass then becomes available at the scale of an agricultural field within a timeframe suitable for agricultural activity.

If clouds are present in some areas, several devices can be used to ensure continuity of information such as the use of a grass development model, multispectral drone image acquisition and ground measurements of grass height.

Benefits to Citizens

Remotely sensed grassland biomass data can optimise agricultural practices on grasslands and improve agronomic performance and yields. Easy access to spatialised data by farmers and managers allows for a measurable diagnosis of grassland conditions and provides access to plant growth assessment and on-farm yield



Variability of grassland management methods using a temporal coloured composition, Sentinel-2 images acquired at three dates along the growth season (Region Pays de Loire, France).
Credit: Contains modified Copernicus Sentinel data [2017]

Thematic Area: AGRICULTURE, FOOD, FORESTRY AND FISHERIES

Region of Application: PAYS DE LA LOIRE

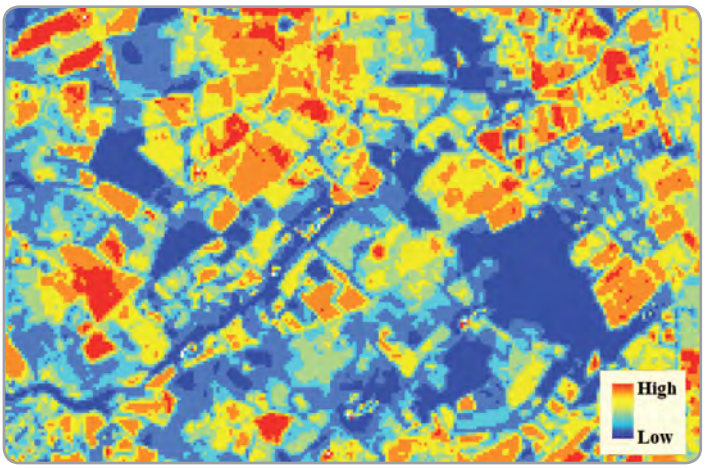
Sentinel mission used: S2

Copernicus Service used: –

Usage Maturity Level: 3

simulation. The methods that are available today to assess grass supply are based on in situ measurements, which take time and are not very accurate. The remote sensing method will provide access to relevant information at low human and logistical costs. Finally, the access to this management support tool allows farmers to be involved and comforted in the implementation of their daily practices with the assurance of a management consistent with the state of the vegetation.

At national level, this decision-support and diagnostic tool makes it possible to quantify the evolution of grass production on a large scale in various soil and climate contexts, such as in relation to a particular climatic event.



Remotely sensed grassland biomass over a set of agricultural parcels (Region Pays de Loire, France) (Source Agrocampus-Ouest).
Credit: Contains modified Copernicus Sentinel data [2017]

"This service will significantly change the way grasslands are managed."

Marc Fougere
French Chamber of Agriculture, Department of Loire-Atlantique

Outlook to the future

The main challenge for the future is to increase the robustness of the methodology by ensuring the continuity of the digital service offered to farmers and managers on a weekly basis. The cloudiness constraint will be analysed using Sentinel-2 time series data, Sentinel-1 radar images and vegetation development models.

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ABOUT COPERNICUS4REGIONS

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The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains.
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