# Precision agriculture and imagery

There is more to modern agriculture than production alone. It must also reduce the environmental impact, protect rural areas and ensure their durability. In the context of agri-environmental measures, the monitoring of agricultural parcels requires the use of specific management tools. Although information can be collected through systematic observations on the ground coupled with laboratory analyses, this remains a costly and laborious approach, due in particular to the variability between parcels and even within the same parcel. Hyperspectral remote sensing provides a detailed analysis that offers promising new perspectives for what is known as precision farming, namely the provision of the right amount at the right place at the right time.

## GRASS

**Observing grassland**

Grassland is a significant component of the regional and national agricultural landscape. Although remote sensing has been used for some time already to monitor agricultural land, until now its spatial resolution has been too weak to envisage ecological studies or monitoring of semi-natural grasslands. The GRASS project looked at how data obtained by the CASI and SWIR sensors could be used to provide a continuous spatial and temporal monitoring of grassland characteristics in the Belgian Lorraine region. It identified relations between the physico-chemical parameters of grassland and various spectral components such as the reflectance curve R(λ), spectral indexes and the first derivative of R (λ) to characterise, for example, the slope in the "red edge" zone (inflexion point on the borders of the red and near infrared distinctive for a sharp increase in plant reflectance), making it possible to distinguish between different types of grassland (pastures, hay fields, etc.). Information is also provided on the quality of the plant cover (energy values, etc.) that is a factor in estimating potential grass production, which is crucial to farmers.

Coordinator

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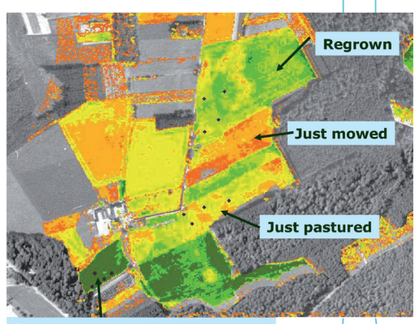


## HYNIM

**A fertilizer deficiency or surplus**

An unfortunately common problem today is that fertilizers not used by plants drain away from the soil with the risk of polluting underground or surface water and ultimately the sea. Beaches invaded by seaweed are the sad testimony to this pollution. On the other hand, nitrogen deficiency can limit yields and compromise soil fertility in the long term. Due to the high flexibility in the choice of spectral bands offered by the HyMap sensor, hyperspectral imagery can be a major aid in detecting the parcels or inter-parcel zones that are being inadequately fertilized. Five spectral bands in the green, red and near infrared were selected and proved pertinent, with several combinations of these bands being tested for their ability to provide information on nitrogen content. Encouraging results have thus been obtained in drawing up agri-environmental indicators wherewith to detect maize parcels showing abnormal reflectance that could be attributed to an excess or deficiency of nitrogen fertilizer.

Coordinator

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