

A TOOL FOR COLLECTIVE MANAGEMENT OF CROP GROWTH WARNINGS BASED ON SENTINEL-2 VEGETATION INDICES

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Within the framework of the INTERREG-POCTEFA programme, the PyrenEOS project has developed a Decision Support Tool (DST) for monitoring warnings related to the vegetative development of crops at plot scale. This monitoring service is based on time series of vegetation indices (VI) derived from Sentinel-2 images.

The DST offers users without previous expertise or knowledge about remote sensing, a classification tool that allows analyzing and categorizing crop growth variability between fields or within-plot variability for a particular date, based on earth observation data. The results obtained with this classification tool can be easily and visually interpreted by the user. There are four reference models to classify the plots:

- By frequency series, with a distribution by quartiles in four classes
- By selecting a reference agricultural plot
- Using the average value of the most favorable quartile in the frequency distribution
- Using a value of VI selected by the user

The classification tool allows farmers to easily handle collective management information, for instance, by using as reference over-fertilized plots in order to adjust Nitrogen fertilization for any particular field in a region or collective management area, such as an irrigation district or a cooperative.

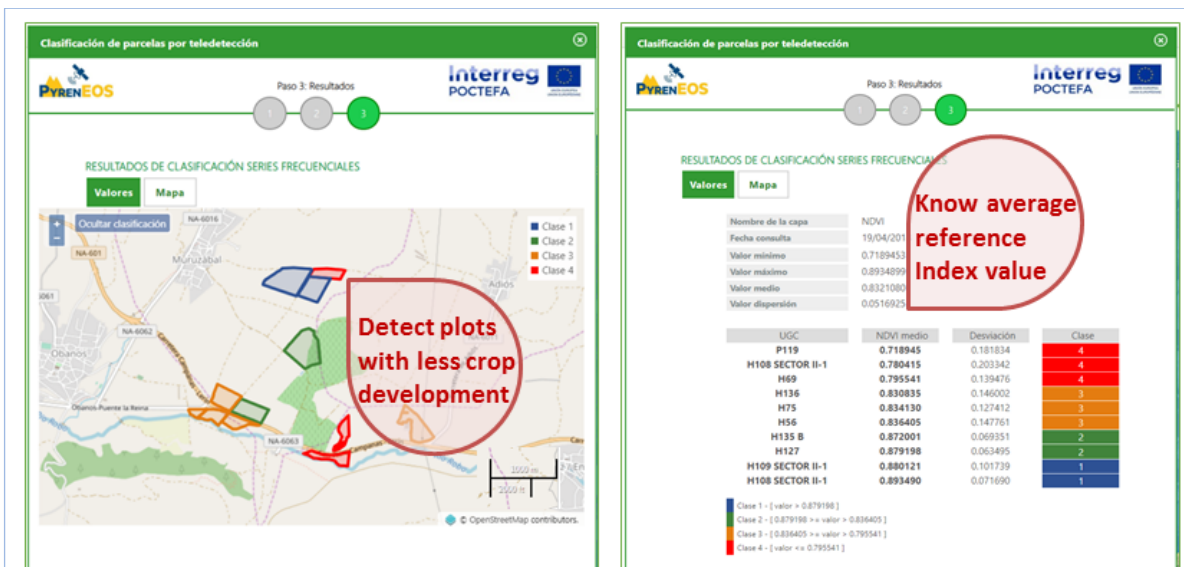
Users can consult the classification according to three vegetation indexes: normalized difference vegetation index (NDVI), soil adjusted vegetation index (SAVI), and merris terrestrial chlorophyll index (MTCI) and the response of reflectance in the short-wavelength infrared (SWIR).

In addition, this service allows the user to analyze the intra-field variability, by zoning into 4 classes, that can be used to conduct soil or plant samplings, or to evaluate different crop responses to nutrients or soil characteristics (*Figure 1*). This tool provides the option of exporting maps in shapefile, which can be integrated in variable rate machinery.

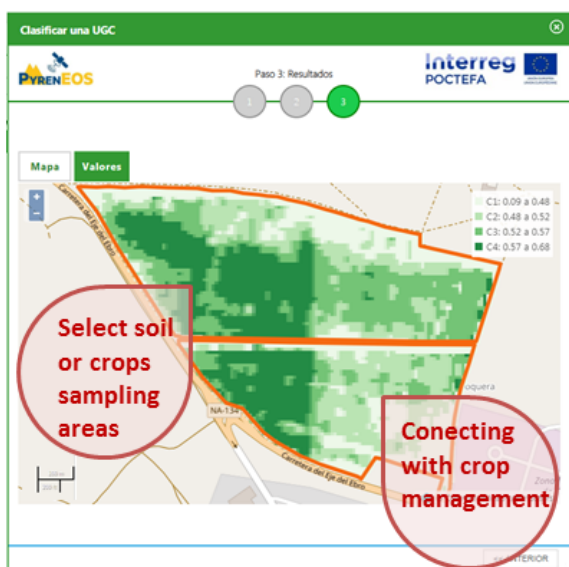
The DST has been integrated into the AGROasesor platform, which is being developed within the LIFE program. Its main goal is to create an on-line platform that will support collective management of crop information, based on a complete set of information at field scale from AGROasesor platform.

It has been possible to integrate the interoperability of WMS and WCS services between the PyrenEOS and AGROasesor platforms, to provide alerts to farmers and advisors, with coverage in 5 regions of Spain.

The relevance of the classification tool as part of the DST for providing information on crop development, has been demonstrated by a pilot program involving farmers and cooperatives.



Classification of Marcopolo wheat plots by NDVI index 19/4/2018



Olive trees in high density, classification by NDVI index on 17/8/2018



Wheat Marcopolo, index classification NDVI on 23/2/2019

Figure 1. Visualization examples of DST classification in AGROasesor platform