

Application of Sentinel-2 for precision viticulture

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The advent of satellite technologies has made it possible to make georeferenced observations of the entire globe at periodic intervals of a few days and with high spatial resolutions.

ESA's Copernicus mission makes available open-source data from the *Sentinel-2* constellation created to provide useful information for agricultural purposes.

Thanks to the sensors mounted on board the two satellites that make up the *Sentinel-2* constellation (Sent.-2A and Sent.-2B), it is possible to obtain appropriately calibrated multispectral images [4] that allow georeferenced digital processing using the main published radiometric indices among which NDVI (*Normalized Vegetation Index*) is the most widely used [3].

These indices are obtained by algebraic combinations of the reflectance of the visible and infrared bands obtained through the response of the light reflected by the vegetating biomass and can be correlated with some biophysical or agronomic variables of the vineyard [5].

Applications in the field mainly involve the assessment of within-plot variability, which is useful for directing field sampling or designing new plantings but also for determining differential areas of harvest and management intervention.

Using the remotely sensed data, it is possible to correlate vegetation indices with key viticultural production parameters such as LAI (*Leaf Area Index*), the canopy structure, number and weight of bunches and pruning wood together with some quality parameters such as sugar content and acidity of musts. [2]

The georeferenced vigor maps can later be processed to provide prescription maps that can be used to operate at variable rates in the vineyard (e.g., fertilization, seeding, mechanic leaf removal) using modern tractors and machinery set up [1].

The results of a two-year work carried out in the Piedmont area and involving some vineyards in the province of Turin through the processing of data provided by the *EOS Crop Monitoring* web platform, which provides pre-processed data in a user-friendly way, will be presented.

Thanks to appropriate arrangements, the experimentation made it possible to identify numerous correlations between the vegetative-productive parameters with the NDVI index, even on the scale of small plots.

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