



Geographic information system applied to the estimation of the plant water status

Cristina Castillo, Jose M^a de la Rosa, Abdel Temnani, and Alejandro Pérez-Pastor

Technical University of Cartagena, Higher Technical School of Agricultural Engineering, Plant production, Cartagena, Spain
(alex.perez-pastor@upct.es)

The importance of Geographic Information Systems (GIS) at handling managing geospatial data is demonstrated in a large number of scientific and professional disciplines that have an impact on the territory. Thus, in agriculture, it is a transversal tool that includes the recopilation of: (i) geographic information: soil-plant geolocated sensors in experimental fields, water and fertilizers consumption for each irrigation sector, energy consumption and digital surface models (ii) representation and analysis: obtaining temperature maps, aspect models, solar radiation, run-off and salinity, as well as hardware, software and the people who compose it, results in the optimization of resources (goods, energy and workforce) what it makes the farm more efficient and more beneficial for the environment. In addition, in this project, the use of new technologies, such as satellite imagery or drones with multispectral cameras, allow to obtain other parameters that are not observed with the naked eye, like the state of the crop in spectroradiometric terms (remote sensing), stressed crops through indexes like NDVI, that may lead to take decisions like: (i) irrigation variations (ii) early detection of fillings in droppers (iii) affected areas for a pest, helping to distribute the workforce efficiently (pesticide use in an optimal way).

The main objective of GIS use in this project is to establish direct relationships between parameters taken from the soil and plant with image processing in four different crops, orange, peach, apricot trees and table grape. In this way, the leaf area index (LAI) can be calculated, assessing how different irrigation management affects: i) Control (CTL), irrigated to ensure non-limiting water conditions (120% of crop evapotranspiration) and ii) Regulated deficit irrigation (RDI) irrigated as CTL during critical periods and decreasing irrigation in non-critical periods.

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