



IRRIGATION MANAGEMENT WITH REMOTE SENSING TECHNIQUES. Crop Water Requirements and Biophysical Indicators

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Saving water in irrigated agriculture is increasingly relevant, as the irrigation sector is in many regions the biggest water consumer, but must be a sustainable activity. Therefore, the need urges for water use control methods and water resources planning. In irrigated agriculture, the right way for saving water is constituted by the increase of efficiency in water management.

This work validates procedures and methodologies with remote sensing to determine the water availability in the soil at each moment and therefore the opportunity for the application of the water volume strictly necessary to optimize crop growth (irrigation opportunity and irrigation amount). The analysis applied to the Irrigation District of Divor, Évora, having used 7 experiment plots, which are areas watered by center-pivot systems, cultivated to corn.

Data were determined from multispectral and infrared images of the cultivated surface obtained by satellite or by flying unmanned platform and integrated with parameters of the atmosphere and of the crops for calculating biophysical indicators and indices of water stress in the vegetation (NDVI, K_c, K_{cb}, CWSI). Therefore, evapotranspiration (ET_c) was estimated, with which crop water requirement was calculated, with the opportunity and the amount of irrigation water to allocate.

As this information is geographic referenced, maps can be prepared with GIS technology, describing water situation and the opportunity for watering crops. If the remote images are available with enough high spatial and temporal resolution, the frequent availability of maps can serve as a basis for a farmers irrigation advice system and for the regional irrigation authority to make decisions on the irrigation management at the regional scale. This can be a significant contribute to an efficient water management technology and a sustainable irrigated agriculture.

Key-Words: Remote Sensing, Vegetation Index, Crop Coefficients, Water Balance