Early Estimate of Wheat Yield in Irrigation District N^0 38, Rio Mayo, Sonora, Mexico

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Abstract

At the irrigation district N^o 38, Rio Mayo, in Sonora State, Mexico, crop wheat accounts for about 70% of the area under irrigation (about 68,000 ha). Whereby, water users have requested studies aimed to find a method to obtain early crop yield estimation for wheat, using vegetation indices. These values have been obtained from Landsat 7, Landsat 8, and Deimos satellites images. Other studies have been done to estimates crop evapotranspiration (ETc), assessed by two methods, by the relationship: $ETc = Kc_b * ETr$, (ETr reference evapotranspiration) where Kc_b is evaluated as a function of NDVI, and by the method of moisture balance (MATRIC algorithm). Specifically, for early crop yield estimate it has been considered a relationship with the value of the index NDVI at heading of the crop, time when usually achieves its maximum value. There is sufficient background in literature about this kind of relationships among them, the works carried out by the International Water Management Institute in India. Moreover, to assure farmers know their crop conditions, there have built a couple of viewers, accessible in the WEB page of the district. So, as part of the PLEIADeS and SIRIUS projects funded by the European Commission, in which the authors' collaborated, the SPIDER viewer where developed and used for shows values of NDVI on each farm in this district; in addition there is other viewer developed by one of the authors which is available for transfer information to water users. To calibrate the proposed methodology to calculate relationship between the NDVI and the crop yield, the staff of the extension service has been working in measuring yields in many plots within the district, results are presenting in this work.

Keywords: NDVI, evapotranspiration, crop yield, remote sensing