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Assessment of water use in the Spanish irrigation district "Río Adaja"

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Abstract

Intensive agricultural practices combined with the increasing pressure of urbanization and the changing lifestyles, have strengthened the problems of competing users over limited water resources in a fragile and already stressed environment. Sustainable irrigated agriculture is prescribed as a policy approach that maximizes economic benefits while maintaining environmental quality. Within this framework a proper management of irrigation systems saving water is required. On the other hand, crops with high tolerance to water stress and deficit irrigation are recommended. However, crop yield, among other factors, is very sensitive to water Thus, studies addressing the relations among crop water requirements, irrigation depth and crop yield are necessary. This type of study has been carried out in the Spanish irrigation District "Río Adaja" in the year 2010-2011 with the crops: wheat, barley, sugarbeet, corn, onion, potato, sunflower, clover and carrot. A soil hydrology balance model was applied taking into account climatic data for the nearby weather station and soil characteristics. Effective precipitation was calculated by the index curve number. Crop water requirements were calculated by the FAO Penman-Monteith with the application of the dual crop coefficient. Likewise, productivity was measured by the following indexes: annual relative irrigation supply (ARIS), relative water supply (RWS), relative rainfall supply (RS) and water productivity (WP). Results show that water applied with the irrigation of clover, sugarbeet, corn and onion was less than their water requirements There was a 35 % difference between the amount of water simulated with the model and the gross amount applied during the irrigation period by the irrigation district. WP values differed among crops depending, mainly, on the crop's market price and the amount of irrigation water. The highest values corresponded to potato and onion crops.