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Improving irrigation management in L'Horta Nord (Valencia, Spain)

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L'Horta Nord is an important irrigation district in Valencia (Spain), especially for vegetable crops. The traditional cropping pattern in the region consists of a rotation of chufa with crops such as potato, onion, lettuce, escarole and red cabbage, being all these crops furrow irrigated. Currently, the quality of the water used is acceptable, water is not expensive and there are no limitations on supply. Consequently, growers are not aware of the volumes of water used, application efficiencies, nor water productivity for any of the crops cited. The European Framework Directive 2000/60, based on the precautionary principle, considers preventive action for measures to be taken; moreover, drought periods are becoming more frequent and extended, and water is being diverted to other uses. Thus, water use is an issue to improve. In this sense, the current situation of the irrigation in the area is analysed using chufa (Cyperus esculentus L. var. sativus Boeck.) as representative of the crops, since most of the crops in the area have shallow root systems, as chufa, which are irrigated in similar patterns. In order to analyse the irrigation performance of the traditional chufa crop as well as to achieve more sustainable results, different studies have been carried out, during the last decade. Efforts have been directed to increase water productivity, increasing yield and minimising the volumes of water applied. Different planting configurations and different irrigation thresholds, not only in furrow irrigation but also in drip irrigation, are examples of how the irrigation performance could be improved. Herein is presented a two-year study, comparing, in both furrow and drip irrigation, two irrigation schedules based on the volumetric soil water content, which was continuously monitored using capacitance sensors. Yield was significantly affected by the growing season, the irrigation system and by the irrigation schedule, and by the second order interactions of the irrigation system with the other studied variables. Greater yields ($p \leq 0.01$) were obtained in the first growing season, drip irrigation and maintaining a higher soil moisture level. When considering the irrigation water use efficiency, the irrigation system showed significant differences ($p \leq 0.01$) with greater efficiencies for drip irrigation. Considering the homogeneity of the plots in the area and the similarities of the irrigation managements of chufa with the other crops, the results could be extended to most of the plots and crops in the area.