



Assessment of the efficiency and water productivity in the Spanish irrigation associations “Canal Toro-Zamora” and “Canal Villagonzalo” from the Duero basin

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Within a water scarcity scenario, the irrigated agriculture economic sector would be affected by the reduction on water supply and this might have a negative impact on the National gross income. Water for irrigation in Spain comprises the 75% of total consumption. Therefore, the search for irrigation strategies dealing with sustainable irrigation by saving water and improving the environment quality is encouraged. Within this framework the assessment of water use in the irrigation districts to assist water stakeholder decisions is reinforced.

Water resources can be assessed at field scheme or regional scale by analyzing the water use efficiency and the water productivity indicators. Which determine the water availability and the water supply quality in irrigation areas. Among then, the following are broadly used: water productivity WP, and irrigation water productivity IWP, annual relative water supply (ARWS) and the annual relative irrigation water supply (ARIS).

Keeping in mind the water scarcity scenario for irrigation in the short and long term and the probably scenario of water allocation for different uses following criteria of efficiency and productivity, this work is aimed at assessing the water use efficiency and water productivity of two modernized Spanish irrigation districts CCRRs: “Canal Toro-Zamora” and “Canal Villagonzalo” from the Duero basin. For that purpose, the above indicators were estimated for years 2014 and 2015.

Crop water requirements are needed to calculate the indicators. For this study, maize was chosen since it is the major crop in the area and its water needs were estimated with the FAO program Cropwat. Local crop coefficients (Kc) were determined with the open access application SpiderWebGis (<http://maps.spiderwebgis.org/webgis/>) which uses satelital images to monitor Kc coefficients in all crops across Spain.

In both CCRRs the maize Kc coefficients were similar for all the phenology stages although a slightly spatial variability was observed. Likewise, water use efficiency was good (ARIS = 1) and the other indicators behave reasonably highlighting a good irrigation management. Thus, these indicators, and the methodology proposed to estimate kc, could assist water stakeholder decisions for water management strategies at the irrigation district. Moreover, the results could be references for benchmarking at regional, national or international level.