

Assessing water delivery performance of irrigation schemes: a case study of haouz plain, morocco

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This study aims to propose and evaluate a simple methodology for assessing the water delivery performance in an irrigation scheme in the Haouz plain, a semi-arid agricultural area in the south of Morocco, during two growing seasons. For that, crop evapotranspiration and irrigation water requirements are estimated and mapped over the irrigation scheme by implementing a remote sensing-based approach. Time series of high resolution NDVI imagery (Normalized Difference Vegetation Index) provide estimates of the actual basal crop coefficient (K_{cb}) and the vegetation fraction cover (f_c), which are then implemented in the FAO-56 Soil Water Balance model. The performance of the irrigation scheme was assessed with indicators reflecting the equity and adequacy. Adequacy was determined according to Relative Irrigation supply (RIS), Depleted Fraction (DF), stress coefficient (K_s) and Irrigation priority index (IPI) whereas equity was assessed according to the coefficient of variation of crop evapotranspiration (CV_t-ET). The combined analysis of these indicators was performed using different matrices that reflect the impact of the water supply condition on the uniformity of water consumption within the scheme and inform how effectively the manager has supplied irrigation water to reduce the crop water stress. The crop ET estimated by the FAO-56 method based on remote sensing was validated using the *in-situ* measurements by eddy-covariance system over the main crops in the region showing an acceptable accuracy. The results suggested that the water distribution within the irrigation scheme needs to be improved in order to achieve an efficient and productive use of water in the irrigation system.

This study showed that methods combining remote sensing techniques, models and hydro-climatic data are useful for managers since they provide interesting insights of the effectiveness of the water delivery rules in irrigation schemes.