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Use of the Aquacrop model for the simulation of wheat evapotranspiration in north-eastern Tunisia

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Improvement of rainfed cropping systems is based on the use of rainfall water for crop transpiration. This could be achieved by the appropriate partitioning of rainfall between green water and blue water. Under semiarid conditions, the AquaCrop model which has a driving engine based on the direct link between dry matter production and crop evapotranspiration, seems to be a powerful tool to perform this task. For this purposes, an experimental work was conducted on the wheat crop, grown under various farming conditions, to determine how simulation modeling could be used to monitor canopy changes and actual crop evapotranspiration. The study area -CapBon- is located in north eastern Tunisia where rainfall is about 500 mm and ET0 around 1200mm Field monitoring consisted in regular measurements of the leaf area index (LAI), vegetation cover changes (CC) and soil moisture content profiles over the cropping season December 2009-April 2010. The usefulness of using hemispherical and standard images to determine LAI and CC was also investigated for their adoption as a standard methods for the assessment of these important parameter as input data. Results show that good estimates of LAI and CC could be obtained from digital images. Fairly reliable linear relationships were obtained between measurements on samples using a leaf area meter and indirect assessments (r2 = 0.78) Aqua-Crop simulations where also mostly accurate in estimating soil moisture temporal variations and soil water content of well textured soils. However for soils with high clay content, important differences were observed between simulation outputs and direct gravimetric measurements.