

Determination of the Water Needs of Some Crops Irrigated with Treated Water from the Sidi Khouiled Wastewater Treatment Plant in Ouargla, Algeria

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Abstract : The irrigation method is fundamental for maintaining a wet bulb around the roots of the crop. This is the case with localized irrigation, where soil moisture can be maintained permanently around the root system between the two water content extremes. Also, one of the oldest methods used since Roman times throughout North Africa and the Near East is based on the frequent dumping of water into porous pottery vases buried in the ground. In this context, these two techniques have been combined by replacing the pottery vase with plastic bottles filled with sand that discharge water through their perforated walls into the surrounding soil. The first objective of this work is the theoretical determination using CLIMWAT and CROPWAT software of the irrigation doses of some crops (palm, wheat, and onion) and experimental by measuring the humidity of the soil before and after watering. The second objective is to determine the purifying power of the sand filter in the bottle. Based on the CROPWAT software results, the date palm needs 18.5 mm in the third decade of December, 57.2 mm in January, and 73.7 mm in February, whereas the doses received by experimentally determined by means of soil moisture before and after irrigation are 19.5 mm respectively, 79.66 mm and 95.66 mm. The onion needs 14.3 mm in the third decade of December of, 59.1 mm in January, and 80 mm in February, whereas the experimental dose received is 15.07 mm, respectively, 64.54 and 86.8 mm. The total requirements for the vegetative period are estimated at 1642.6 mm for date palms, 277.4 mm for wheat, and 193.5 mm for onions. The removal rate of the majority of pollutants from the bottle is 80%. This work covers, on the one hand, the context of water conservation, sustainable development, and protection of the environment, and on the other, the agricultural field.

Keywords : irrigation, sand, filter, humidity, bottle

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