

Irrigazione e stress idrici II

Environmental impact and water use of sustainable fruit orchards in Mediterranean area

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Climate change is gradually affecting regional and global food production. Warming temperatures and intensity of extreme weather events may lead to significant reductions in crop yields. The LIFE AgroClimaWater project provides adaptation management strategies to increase water productivity in fruit orchards, reducing pollution and resource use. The increase of water use efficiency was achieved through a sustainable irrigation strategy based on the integration of the daily soil water balance with soil moisture measurements (from 0 to 90 cm depth). The monitoring of the soil profile contributes to optimize irrigation volumes, avoiding nutrient loss and percolation in the deep layers.

The experimental sites of fruit orchards (peach, apricot, citrus, olive) have been divided into two plots: one managed with sustainable practices (no-tillage, supply of organic fertilisers, mulching of pruning residues, cover crops and guided irrigation, controlled water stress) and another one conventionally managed (weeding, distribution of mineral fertilizers, empirical irrigation). Effectiveness of good agricultural practices (GAPs) applied in sustainable plots was assessed by performance indicators as Water Use Efficiency (WUE), Water Footprint (WF), Nutrient Use Efficiency (NUE) that were compared to conventionally managed plots.

Results revealed that the sustainable irrigation strategy leads to a more than 30.0% decrease in the WF, a more than 20.0% increase in the WUE and a nitrogen use efficiency (NUEN) greater than 1.5 times in the sustainable orchards compared to that conventional ones. Moreover, the sustainable management has a beneficial effect on natural resources (soil and water) conservation and restoration, implementing the water productivity of the agroecosystem and highlighting the mitigation role of agroecosystems.

Research supported by LIFE 14 CCA/GR/000389 AGROCLIMAWATER Project.

Keywords: resource use efficiency, sustainability, irrigation strategy, nitrate leaching, compost addition.