

Sustainable agricultural production and water use in Cyprus under global change

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During the past three decades, on average 13% of the rain falling on the Republic of Cyprus has been converted to agricultural products. In addition, some 70% of the rain water that flows to dams and recharges groundwater, has been used for irrigation. Climate change projections indicate that Cyprus is becoming hotter and drier. This will have a significant impact on the future of agriculture. The aim of the AGWATER project consortium is to provide recommendations for climate change adaptation for the agricultural sector in Cyprus and the wider Mediterranean region.

The project has developed an agro-meteorological database for the period 1980-2010 and has mapped Cyprus' agro-climatic zones (Pashiardis, 2013). Future climate data have been statistically downscaled using data from 3 different Regional Climate Models. High resolution gridded rainfall and temperature data have been developed for 1980-2010 and for 2020-2050 (Camera et al, 2014). Three global energy price scenarios have been prepared to assess future water prices and production costs. A new 1:50,000 soil map is generated with the use of an intelligent classification algorithm (Random Forests), and a large geo-referenced database prepared by the Geological Survey Department. The dataset contains all factors that affect soil formation, including geology, geomorphology, geochemistry, land use and climate. Expertise on crop production in Cyprus has been provided by the Agricultural Department. Analyses of long-term research trials of the Agricultural Research Institute indicate that crop yields have not only been affected by rain but also by high temperatures.

The green-blue-water model, based on the FAO-56 dual crop coefficient approach, has been set up to compute agricultural water demand and yields for all crop fields in the country under different future scenarios. A set of agricultural production and water use performance indicators will be computed by the model, including green and blue water use (m³/ha), crop yield (ton/ha), crop water productivity (kg/m³), net value of crop production (€/ha) and economic water productivity (€/m³).

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