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WATER RESOURCES, IRRIGATION REQUIREMENTS AND CLIMATIC CHANGES

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In the Mediterranean region agriculture productivity depends on soil water availability. As a consequence, in order to drive the economic and the environmental planning at a regional scale, it is crucial to know the water amount required by the crops during their growing season. Many studies have been carried out for solving the calculation of the crop water requirements in the most effective way.

Any technique for determining the water needs is based mostly on the meteorological data. From the climate analysis current anomalies and some changes in the normal trend of the meteorological parameters are generally observed. As for the most common agro-meteorological parameters, these discrepancies concern mainly the rainfall and the air temperature patterns. The decrease in effective rainfall and the increase in air temperature imply that the water required by the crops tends to become higher. If in the Mediterranean region cropping systems do not change, it is expected that more water resources will be used for irrigation. Since most of incomes from the agricultural sector derives from the irrigated crops, farmers are forced to collect all available water resource. In Mediterranean region most of water resources are stored in groundwater tables. The over pumping provokes the decrease in the quality of ground water tables

The objectives of the task within the frame of “Climagri” project are: 1) to calculate for the main crops of the Mediterranean region water needs and irrigation amounts under different climatic scenarios; 2) Monitoring the quality of water resources used by agriculture from underground aquifer and rain, in coastal areas, during three years.

In order to calculate the irrigation amount, the water balance methodology is adopted. It consists in estimating the crop water requirements on the basis of the Penman-Monteith equation and the “dual crop coefficients”.

This methodology has been applied at the Apulia region, using the available “long series” of agro-meteorological data recorded at three localities. Irrigation amounts have been estimated for two typical crops of the region: tomato and sugar beet. Results show an high annual variability for all the parameters.

As an example, the average tomato evapotranspiration at Rutigliano (one of the three Apulian localities) is 521 mm. To compensate the consumptive water losses by the tomato during its growing cycle, 411 mm of irrigation water must be averagely supplied. The irrigation amount ranges substantially, from 152 mm (during a rainy season, when tomato was irrigated only 5 times) up to 598 mm (27 irrigations were required when the season was extremely dry).

The same methodology will be applied using the data provided by the “Climagri” task-forces involved in the elaboration of possible climatic scenarios for the Mediterranean region.

The water quality survey was carried out systematically at 15 locality where the irrigation water is withdrawn by the ground tables. The first observations show a great difference in the salinity (electrical conductivity expressed as dS m^{-1}) of the monitored water tables. Seasonal variations have been recorded only in few cases, localized in the coastal areas.