Deliverable 3.4: Irrigation scheduling protocols based on plant and soil water status data and sensors (Public Summary)

In the last few years, great economic efforts have been carried out to supply water-user associations (group of fields that share facilities for the collective use of irrigation water) with efficient hydraulic installations. In addition, new technologies, such as localized and pressure irrigation systems, have been introduced. Nevertheless, the effort devoted to irrigation scheduling optimization (amount and frequency of water to be supplied to the crops) has been lower, although this would ultimately allow for a more efficient use of water resources. This issue is nowadays of paramount importance due to the high increase in energy costs associated to irrigation, which directly influence on the cost of water use. Moreover, the current scenario of water scarcity at the global level makes necessary to use all the available tools for increasing water use efficiency.

In order to determine amounts and frequencies (scheduling) for irrigation, nowadays, available methods include those based on climate and crop evapotranspiration data, soil moisture and crop water status. In this deliverable, a brief introduction to the advantages and drawbacks of these two groups of methodologies for scheduling irrigation will be presented. Moreover, the results obtained by using these techniques within the framework of the WEAM4i project will be described.

One aim was to obtain an adequate soil moisture content (θ) threshold to be used as an optimal reference for scheduling irrigation for woody perennial crops such as citrus and olive trees. Patterns of frequency of irrigation applications have been derived. On the other hand, new tools for assessing plant water status were investigated. The YARA Water sensor was tested in persimmon, citrus, maize and potato crops under different environmental conditions. Advantages and limits in the use of these technologies have been identified and algorithms foe the interpretation of the sensor outputs were indeed derived.

It was concluded that for an efficient irrigation scheduling, an integration of the different methodologies is needed including the possibility of using remote sensing applications to up-scale the point-to-point information obtained by using field sensors.