



A low cost micro-station to monitor soil water potential for irrigation management

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The RISPARMiA project (which stands for “reduction of water wastage through the continuous monitoring of agri-environmental parameters”) won in 2013 the contest called “LINFAS - The New Ideas Make Sustainable Agriculture” and sponsored by two Italian Foundations (Fondazione Italiana Accenture and Fondazione Collegio Università Milanese). The objective of the RISPARMiA project is to improve the irrigation efficiency at the farm scale, by providing the farmer with a valuable decision support system for the management of irrigation through the use of low-cost sensors and technologies that can easily be interfaced with Mobile devices. Through the installation of tensiometric sensors within the cropped field, the soil water potential can be continuously monitored. Using open hardware electronic platforms, a data-logger for storing the measured data will be built. Data will be then processed through a software that will allow the conversion of the monitored information into an irrigation advice. This will be notified to the farmer if the measured soil water potential exceed literature crop-specific tensiometric thresholds. Through an extrapolation conducted on the most recent monitored data, it will be also possible to obtain a simple soil water potential prevision in absence of rain events. All the information will be sent directly to a virtual server and successively on the farmer Mobile devices.

Each micro-station is completely autonomous from the energy point of view, since it is powered by batteries recharged by a solar panel. The transmission modulus consists of a GSM apparatus with a SIM card. The use of free platforms (Arduino) and low cost sensors (Watermark 200SS tensiometers and soil thermocouples) will significantly reduce the costs of construction of the micro-station which are expected to be considerably lower than those required for similar instruments on the market today .

Six prototype micro-stations are actually under construction. Their field testing will be conducted on maize and peach orchard fields in the 2014 agricultural season, and the results will be published at the end of the year.

In this work the micro-station prototype will be described in all its components, and the experimental field activities will be illustrated.