

## The Optimal Irrigation in the Mitidja Plain

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**Abstract :** In the Mediterranean region, water resources are limited and very unevenly distributed in space and time. The main objective of this project is the development of a wireless network for the management of water resources in northern Algeria, the Mitidja plain, which helps farmers to irrigate in the most optimized way and solve the problem of water shortage in the region. Therefore, we will develop an aid tool that can modernize and replace some traditional techniques, according to the real needs of the crops and according to the soil conditions as well as the climatic conditions (soil moisture, precipitation, characteristics of the unsaturated zone). These data are collected in real-time by sensors and analyzed by an algorithm and displayed on a mobile application and the website. The results are essential information and alerts with recommendations for action to farmers to ensure the sustainability of the agricultural sector under water shortage conditions. In the first part: We want to set up a wireless sensor network, for precise management of water resources, by presenting another type of equipment that allows us to measure the water content of the soil, such as the Watermark probe connected to the sensor via the acquisition card and an Arduino Uno, which allows collecting the captured data and then program them transmitted via a GSM module that will send these data to a web site and store them in a database for a later study. In a second part: We want to display the results on a website or a mobile application using the database to remotely manage our smart irrigation system, which allows the farmer to use this technology and offers the possibility to the growers to access remotely via wireless communication to see the field conditions and the irrigation operation, at home or at the office. The tool to be developed will be based on satellite imagery as regards land use and soil moisture. These tools will make it possible to follow the evolution of the needs of the cultures in time, but also to time, and also to predict the impact on water resources. According to the references consulted, if such a tool is used, it can reduce irrigation volumes by up to up to 40%, which represents more than 100 million m3 of savings per year for the Mitidja. This volume is equivalent to a medium-size dam.

**Keywords :** optimal irrigation, soil moisture, smart irrigation, water management

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