

DRIP: Development of an Advanced Precision Drip Irrigation System for Tree Crops

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Water resources are under constant pressure due to increasing demand, climate change and water pollution, both globally and locally, with the agricultural sector consuming 70% of the world's water abstractions. This creates a great environmental and financial incentive to increase the efficiency of irrigation systems and the adoption of advanced precision irrigation technologies that incorporate scientific information on soil, plant, and water interactions. DRIP aims to develop an innovative, efficient, and competitive product to reduce irrigation water consumption and promote sustainable water management while supporting and sustaining the agricultural production and the rural economy. To achieve this, DRIP will collect experimental data from a set of free lysimeters and an experimental olive grove, use them to calibrate the state-of-the-art soil moisture model HYDRYS 2D/3D and then apply its output to the development the DRIP system, an integrated operational system for data collection from environmental sensors, data evaluation based on soil moisture models, and command forwarding to irrigation actuators. Data transmission between sensors, processing, and control systems of DRIP will utilize Internet of Things (IoT) technology. DRIP will focus its actions on the island of Crete, Greece, where the irrigation of the very popular olive tree is mainly empirical and often without scientific background or professional guidance, thus leading to losses. The main expected results of DRIP will be the development of a state-of-the-art fully automated experimental lysimeters, an operational IoT system that can function in the harsh agricultural environment, a state-of-the-art soil-plant-water modeling system, an integrated irrigation system (DRIP), and its evaluation as a commercial product.

Keywords: Smart agriculture, Internet of Things, lysimeter, HYDRUS, soil moisture

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