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The IoT as a tool to combine the scheduling of the irrigation with the geostatistics of the soils

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Abstract

Persistent droughts, population growth, and consequences of the climate change put sever constraints on agriculture in many Regions. This emergence can be ameliorated by: i) either increasing the water supply, or ii) reducing the water demand. One viable avenue is to enhance the irrigation's efficiency by increasing on one hand the water supply (via the use of recycled waters), and on the other by decreasing the water consumption (via the use of drip irrigation, autonomous network of sensors and predictive models). To this aim, we propose an IoT-framework to assess and control the environmental risks associated with the use of recycled water(s). The IoT-framework is organized along the following main streams: i) design an autonomous network of sensors that collect data about soil moisture and concentration of dissolved contaminants; ii) assimilate these data together with precipitation forecast into predictive models of soil moisture dynamics and contaminant migration; iii) use these data-driven models to optimize the irrigation practices while minimizing their environmental impact. The fundamental pre-requisite common to i)–iii) is the proper processing of the soil data. The present paper will focus on such a topic by showing how it works within the IoT-framework.

Keywords: irrigation, soil hydraulic properties, heterogeneity, geostatistics, IoT

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