Smart Sensors and Systems as Enabling Technologies for Climate-Smart Agriculture

ICOS International Cooperation On Semiconductors

Politecnico di Torino
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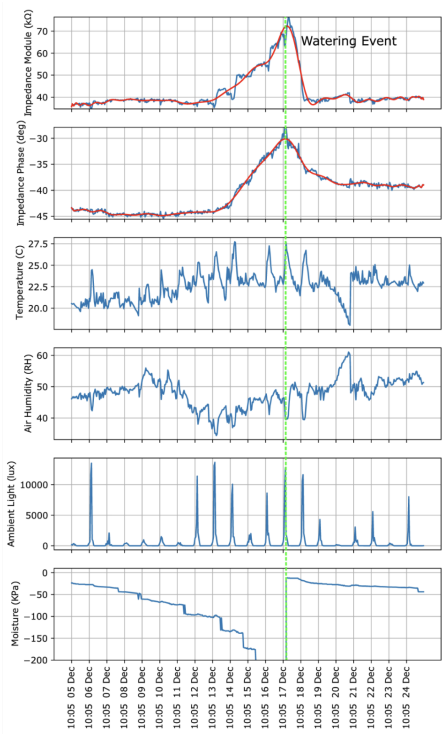
Application Target

As reported in the IPCC Report 2021, **the benefits that technology provides to a green and sustainable economy are evident and important**. Smart Sensors, Circuits and Systems bring the needed functionalities and performances for reaching **eco-friendly, circular and practical solutions**.
More controlled quality production, water use optimisation, and a lower spreading of pesticides and fertilisers are some key issues, serving the improvement of food quality, but also helping the respect of agriculture for the environment. Electronics are the perfect solution for interfacing the data sources, extracting the data and processing them, and obtaining the needed information along the whole food chain: from the farmer, and the professional stakeholders to the consumers.

Two Significant Examples

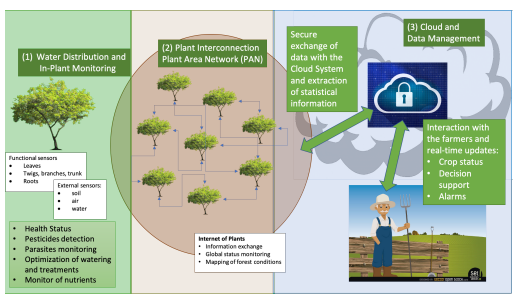
Let the Plants do the Talking: Climate-Smart Agriculture by the messages received from Plants and Soil

- Actual strategies are based on remote or indirect measurements like standard information derived from environmental conditions



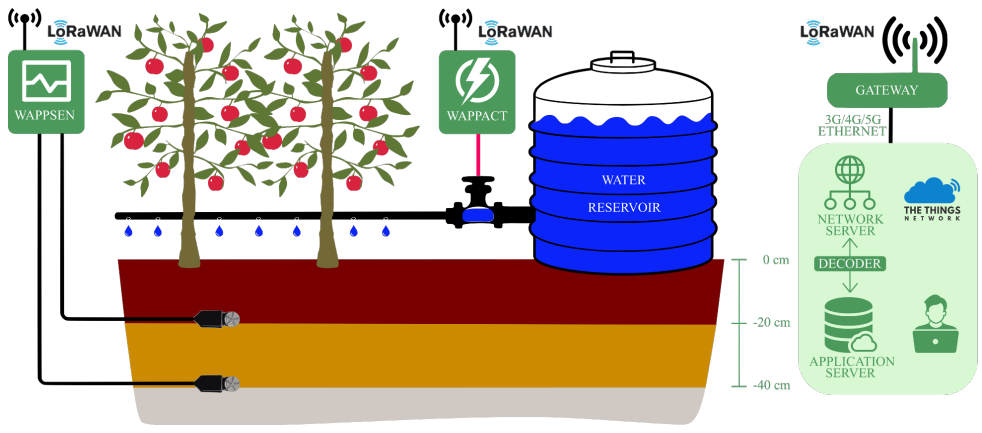
- To **measure the plant and soil parameters directly from their (bio)signals** (a.k.a. **Let the Plants do The Talking**) brings a highly innovative approach, with the possibility of obtaining the **direct information of their health status and needs**

- This new and disruptive technology, related to **Wearable Sensors for Plants**, the World Economic Forum has recently identified it as **one of the "Top five technologies about to change the world"**, indicating it as one of the key solutions to increase food production by 70% by 2050 to be able to feed the world population



WappFruit Project FertIrrigation by Ultra-Low-Cost and Ultra-Low-Power Electronics

WAPPFRUIT

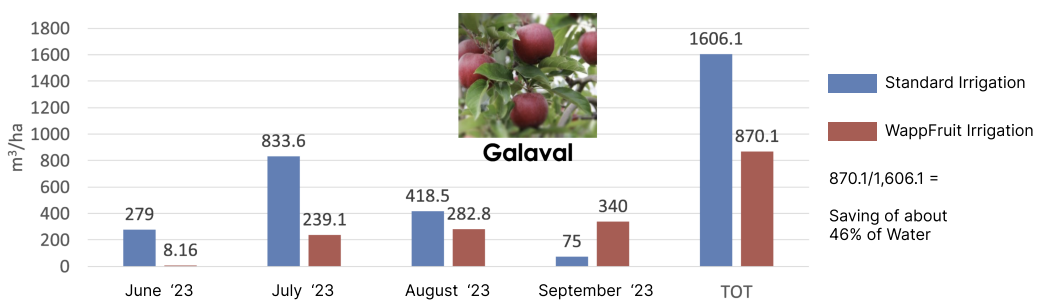


Motivation: Agriculture irrigation accounts for 70% of water use worldwide and over 40% in many OECD countries. Sustainable water management in agriculture is one fundamental pillar in the mitigation of anthropological effects (SDG 13) on AgriFood

WappFruit Project: develops cutting-edge technologies for fertirrigation by innovative electronics for an autonomous irrigation system based on real-time data

Obtained Results:

- Saved about 46% of Water with same quantity and quality of product (apples and kiwis)
- Implemented an ultra-low-power system, based on simple and ultra-low-cost-sensors



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