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## **Wireless sensors to improve irrigation in agricultural areas at risk of salinization**

*The Life Agrowetlands II project working group, coordinated by the University of Bologna, has developed a decision support system able to advise farmers on how, when and how much to irrigate the fields*

Hi-tech agriculture to manage irrigation and the risks of soil salinization. The Life Agrowetlands II project working group, coordinated by the University of Bologna, has obtained the first expected results in the development of the Smart Agrowetlands system: a wireless sensor network capable of detecting meteorological parameters, humidity and soil salinity, beyond depth, temperature and salinity of water, both surface and groundwater, sending information to a decision support system. The target? Create an automatic tool that can advise farmers on how, when and how much to irrigate the fields: a particularly valuable aid especially for areas affected by salinization problems.

The system - a Decision Support System (DSS) - receives real-time environmental information regarding soil, water and meteorological parameters from the sensors of the WSN network. In turn, the DSS, using the appropriately adapted AquaCrop model, provides irrigation advice, depending on the environmental parameters that have been sent to it. The researchers have tested this for the first time this year - with excellent results - in an agricultural area in the province of Ravenna, as part of the European research project Life Agrowetlands II.

### **THE PROBLEM OF SALINIZATION**

The idea of creating a network of sensors that interact with a DSS to improve irrigation strategies arises as a response to a problem that involves many European agricultural areas: soil salinization. In fact, with little attention to irrigation, and in environments with a Mediterranean climate, with hot and dry summers, the salts present in the water tend to accumulate in the upper layers of the soil, compromising the growth of most plants until they arrive. extremes, to desertification.

"It is estimated that today, in Europe, about a quarter of agricultural areas irrigated in the Mediterranean environment are affected by this phenomenon", explains Maria Speranza, a professor at the University of Bologna, who coordinates the project. "And looking at current climate change, it is very likely that the areas affected will increase even more, especially in Southern Europe.

### **TECHNOLOGICAL IRRIGATION TIPS**

The Smart Agrowetlands system was developed by simulating the development of some maize varieties grown in an experimental area in Ravenna, a few kilometers from the Adriatic coast, between the mouth of the Reno and the Lamone: a reclaimed area in the early 1900s and the '60s, today affected by high salinization.



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"The data collected by the system have been translated into advice on how much and when to irrigate during the crop cycle, also taking into account the effects of soil salinity and ground water, and the quality of the water used", says the Professor Speranza. And the results achieved were very positive.

But Agrowetlands II does not stop there, in fact it is only halfway through its path. The goal is to arrive at a more advanced version of the system, which can be tested directly by the farmers, and which can also be adapted to other territories. "We want to get to export the system in a second experimental area, located near Elche: an area of southern Spain with a hot and arid climate, high salinity of soil and water", explains Maria Speranza. A good test, in short, to continue to improve the soundness and flexibility of the system.