



## WHAT IS ENORASIS

**ENORASIS** is a revolutionary smart irrigation system for farmers and water providers. It helps to monitor water use and irrigate only where and when is needed and only for as long as needed. It was developed within an EU-FP7 funded research project from a group of scientists all around Europe. It integrates the latest advances in the fields of:

- weather prediction systems that exploit satellite observations
- irrigation optimization techniques and
- wireless sensor networks applied in crops

## HOW ENORASIS WORKS

In a field that uses the **ENORASIS** system, wireless sensor and water valves are distributed over the cultivated area. The sensors compile raw data for various parameters that influence the evapotranspiration of the total input of water, such as soil moisture, air temperature, humidity, solar radiation, wind speed and rain gauge. The **ENORASIS** system server collects both the sensors measurements and the water valve activity.

The advanced **ENORASIS** Meteorological Analysis Tool produces a personalized weather forecast with a resolution of about 2km. Daily forecasts for rain probability, soil humidity and other atmospheric parameters that affect irrigation management, are generated specifically for each field.

Information from the sensors, the water valves and the weather forecasts is combined once a day by the system, in order to generate an individual daily irrigation plan. This plan is tailored to each field and its soil characteristics to ensure maximum yield for the crop. Farmers can receive irrigation recommendations directly on their smartphone, tablet or computer.

Furthermore, water management authorities are provided with real time information about water demand. This information helps them set water prices and estimate short and long term pressures on water reservoirs. A long term, detailed collection of valuable statistics concerning irrigation water consumption is also available for them.

**ENORASIS** system presents all information and data on a GIS interface, infrastructure in a user friendly way.

An operational field prototype of the **ENORASIS** system is currently in use at 4 pilot sites across Europe. In these pilots, **ENORASIS** is tested in different crops, climatic conditions and operational approaches.



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## HOW ENORASIS PREDICTS WEATHER

In existing smart irrigation systems, information on weather is delivered by weather stations and predictions are based on historical data. This approach lacks in cost effectiveness and geographical coverage as it requires the installation of an adequate number of weather stations in the field to produce reliable data. Despite relying on historical data only, **ENORASIS** Meteo Tool uses the advanced WRF model combined with satellite images of the field. The result is a personalized daily weather forecast of resolution as high as 2km with high accuracy prediction of rainfalls, minimum and maximum temperature, mean relative humidity, average wind speed and solar radiation.



## HOW ENORASIS CALCULATES CROP WATER NEEDS

ENORASIS combines a set of properties such as plant development stage, depth of roots, soil type etc. along with various physical atmospheric observations of the field that influence evaporation. These calculations are based on FAO56 model and are specific for each crop, field, soil type, temperature and time.

### BENEFITS

- Optimize water consumption without risk for the crop
- Have access to accurate and personalized weather forecast
- Gain convenient and user-friendly control and monitor through computer or smartphone
- Receive real-time alerts
- Track irrigation by water usage reports



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## GLOSSARY

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### **Smart irrigation system**

A system that utilizes prevailing weather conditions, weather forecasts, current and historic evapotranspiration, soil moisture levels, and other relevant factors to adapt water applications to meet the estimated needs of plants.

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### **Evapotranspiration**

A measurement of the water lost from the soil surface by evaporation and the moisture loss from the plants by transpiration.

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### **Wireless sensors network**

A network of spatially distributed autonomous sensors that monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and cooperatively pass their data through the network to a main location.

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### **GIS (Geographic Information System) maps**

Various information and data about fields are captured, managed, analyzed and displayed in geographic maps.

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### **FAO56 model**

A methodology for computing crop water requirements published by Food and Agriculture Organization of the United Nations

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### **WRF (Weather Research and Forecasting) model**

A next generation mesoscale forecast model and data assimilation system designed to serve both operational weather forecasting and atmospheric research needs.

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## LEARN MORE

Visit the **ENORASIS** portal knowledge base at [www.enorasis.eu](http://www.enorasis.eu) to get access to useful material about various technological and scientific aspects about irrigation management.

[www.enorasis.eu](http://www.enorasis.eu)

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