

# BEST PLANT YIELDS: WATER AND ENERGY USE OPTIMISED THROUGH PRECISE DECISION TAKING

With FIGARO, farmers and growers will save resources and money

## The FIGARO project: Precision irrigation systems at work

The FIGARO project is developing a decision-support system to allow farmers and growers to benefit from cutting-edge technology. The aim of the project is to offer reliable, cost-effective, user-friendly and flexible tools to optimise the use of water on farms, through the application of precise irrigation criteria, while achieving the same or even increased yield.

The FIGARO system will collect and integrate environmental and crop data from sensors, prediction models and remote imaging, feed this data into state-of-the-art crop models and provide accurate, precise and reliable recommendations for how much and when farmers should irrigate their crops, using a simple user interface. The result is a user-friendly yet sophisticated DSS (decision support system) that will provide daily irrigation recommendations to each individual farmer and grower, based on the particular crop, conditions and parameters monitored in the field.

These suggestions are presented through web or smartphone interface and can be automatically downloaded into the irrigation controller for automatic execution.



## The product: A multi-source integrated management system

The envisioned project result is an operational decision-support platform able to integrate and manage information coming from many sources, such as weather forecasts, soil and plant sensors, meteorological data and satellite images. The platform provides an optimised estimation of irrigation requirements which is validated and tested by farmers and researchers at eleven sites. This application is composed of software with both a PC-web and

a smartphone interface with a server which will run selected crop models, specific hydraulic and weather forecast models and is linked to a large database. Each day the farmer/grower will get an updated recommended irrigation plan for the next seven days based on the mentioned models, sensors and database. According to these recommendations, it will be possible to optimise the exact quantity of water and fertilisers, increasing water productivity without causing any harm to the crops and, when possible, improving the yield.

## The end users: Farmers, growers, agricultural counselors, precise farming suppliers

Agricultural counselors will most benefit from the FIGARO developments as they will spread news of the available technologies as well as implementing the ready-to-use platform for the farmers.

Agricultural and horticultural producers will reap the benefits of using energy, and cost-saving irrigation technologies.

Software companies can adapt the project findings towards integrated e-applications for end users.

## The inventors: Industries, academics, associations, public bodies

The FIGARO consortium is industry driven, as it is coordinated by Netafim, a large multinational company specialising in irrigation technology, and includes an additional six SMEs, most bringing expertise in precise irrigation-related technologies.

The consortium is augmented by eight academic institutions including seven prestigious universities and a research centre. They will collectively contribute with their vast experience and expertise in order to provide a real and tangible product by the end of the project.

The academic teams represent leading academic institutions in this field and include the Danish University of Aarhus, the Polytechnic University of Valencia, the Technical University of Lisbon, the University of Bologna, the Technion-Israel Institute of Technology, the Democritus University of Thrace, the University of Twente and the Consorzio di Bonifica per il Canale Emiliano Romagnolo (CER) research centre. These universities and research institutes will contribute to the various models and apply academic standards, the proof of concept and they will also analyse the performances of the project.

The industry is represented by Netafim LTD, a leading irrigation



company from Israel as well as small/medium enterprises including Hydrologic Research from the Netherlands, C-Tech Innovation & Eden from UK, Hidromod from Portugal and AgroSens from Denmark. Together, these companies will translate the academic contributions into commercial solutions and will run the field tests with both large industrial and small farmers. Agora Partners provides the necessary project management expertise.

Last but not least, the project includes some grower representatives and public bodies: the FAO of the UN, CER from Italy and Regional Union of Municipalities of Eastern Macedonia-Thrace in Greece.

### **Development stage: Field testing and platform prototyping**

The project includes 11 field tests throughout different climate regions in Europe testing the main water-intensive crops (maize, potato, orange, cotton and grape). The prototype of the system is already installed in the test fields, together with different sensors, such as weather stations and soil-moisture sensors. For the crop model we use the AquaCrop model from the FAO and the well-known Daisy model. For the hydraulic model, we use EPANet and for the weather forecast we use the Hydrologic research model.

Over the next two years this platform prototype will be improved and open to additional models and sensors, which will be tested in field immediately. The last year of the project will be devoted to the dissemination and exploitation of the results as well as to the training of potential users.

### **Policy impact: Environmental and climate-protection goals**

As this project aims to develop practical tools to save water, FIGARO could facilitate many policy opportunities for policy and decision makers. For instance, policy measures aimed at increasing agricultural water productivity while fulfilling EU regulations, such as the water framework directive (WFD 2000/60 EC) could include the FIGARO platform as an essential.

### **Next steps: Demo sites, field days for farmers and exploitation**

The project includes the preparation of a dissemination-and-exploitation plan. For the duration of the entire project, with an emphasis in the last year of the project, we intend to meet with policy makers, farmers and growers' representatives at the regional, national and European level, agronomic service providers and other

agriculture and water stakeholders, to expose them to the potential benefits of using the FIGARO Decision Support System (DSS).

Out of the eleven field tests, seven will be chosen for demo sites where open-field days for farmers and growers as well as for policy, and decision-makers will be organised in order to present the system capabilities. The open platform of the system will increase the exploitation as each grower can use the best models and sensors to meet their individual needs.

The FIGARO DSS-system is a modular and flexible platform and thus always open to the addition of more models, sensors and other sources of data in order to further enrich the system capability and output quality.

The need to save water is not only a European issue, but a global one and the consortium intends to distribute the system across Europe and beyond to other continents.



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