

## Valorising European Research for Innovation in Agriculture and Forestry



### VALERIE Stakeholder Trials:

### Maize and Tomato drip irrigation in Alessandria, Italy.

#### The problem

In the county of Alessandria, the availability of water for agricultural use is low and unevenly distributed. Highly productive crops, such as maize and processing tomato (and other industrial crops), require a large amount of water which is drawn from limited underground sources (wells). Over the last few decades, farmers have started adopting more sustainable techniques for irrigation, such as sprinklers and drip irrigation system. In this way, they have reduced the amount of water required.

The use of low-volume irrigation systems requires a higher level of technical knowledge in terms of crop needs and irrigation scheduling according to weather data. Decision support tools (DST) (and systems) could help farmers manage water shortage and increase water efficiency use during the summer, ensuring yield and crop quality.

#### The proposed solution

The chosen DST for this field demonstration comprises a “sensor station” which is able to detect simultaneously **weather data** and **soil humidity values**, covering a wide area thanks to wireless technology. Every **sensor station** is composed of one weather station connected to two wireless units in which two soil humidity probes are connected. The sensor station can transfer all data in real-time by GPRS network to a web platform, accessible from any electronic device with internet access, such as a computer, tablet or smartphone. The front-end of the web platform is intuitive and user-friendly. Netsens ([www.netsens.eu](http://www.netsens.eu)) have developed this innovation, in cooperation with some Italian Universities, in previously financed projects.

#### Stakeholders

The stakeholders comprised a small group of farmers, technicians from cooperatives and processing factories and a few retailers concerned with increasing yield and the viability of irrigated crops in the area. Among the numerous knowledge gaps that were identified during the first project discussions in 2014, irrigation management through sensors emerged as more innovative and suitable for a field demonstration over three years. In addition, this technology has started to develop and spread, and many enterprises have now developed their own systems with different features and specifications.

Although benchmarking of all these systems was not possible for the case study, this particular technology was selected with the stakeholders to determine its feasibility.



### Aims and Method

Our trial is structured as a field demonstration. Three sensor stations were rented and together with the probes were set on three different farms and on different fields, and where possible, selected in areas representative of the local agricultural system.

The aim of the field demonstration was to let farmers try and use a DST to manage the irrigation of maize and tomato regardless of the irrigation system, as long as it was sustainable.



### Results



During the first year of trialling (2015, one year after the project started) we encountered many technical problems related to the placing of the sensor stations.

Three farms offered to host and to try the technology for the following crops: onion (one field) + maize (two fields) + fresh tomato (one field) + processing tomato (two fields) + white beans (one field).

As this first experiment was conducted on many crops it was possible to collect a lot of technical and practical information. Eventually, we identified that this technology can be difficult to implement with tall crops, such as maize (about 2.5 meters in height) and underground crops (onions). The best data feedback and the most practical ease of use occurred with the processing (or fresh) tomatoes in open fields.

During the second and third years (2016 and 2017) the activity was more effective due to the previous years' experience as we selected three different farms specialising in processing tomato production.



What have we learned from the experience?

- The innovation is very useful but it is not manageable by the farmer: it is very complex to use and results can be influenced by major mistakes such as probe positioning and interference with machinery;
- It is necessary to continue the demonstration because it meets an important need for the crop (processing tomato), especially if a module of predictive models on pathogens (mildew) is added;
- The system soil + weather can be expensive for a farm;
- The system should be set up as a network over a cultivation area at the field scale.



## Overall stakeholder involvement and feedback

The stakeholders identified the knowledge gap and were directly involved in the demonstration from the start, as together with them, the technology was set up on their own farms and fields. They received access to the online platform to access the data from their computer and smart phone. Farmers involved were really satisfied with the innovation and it meant they could modify and improve their irrigation schedule. Moreover, they also asked to implement the modelling on mildew for processing tomatoes that Netsens developed at the end of 2017, thanks to our technical contribution.





## Key findings

The main findings regarding this field demonstration are more related to the use of the technology and not to the technology itself.

We found out that:

- The introduction of this technology is very complex and it can easily result in failure if not used correctly;
- Even if this innovation is useful for the farmer and has a positive return on his/her activity, it does not mean that the farmer is the direct user of the innovation



## Further reading

[www.netsens.it](http://www.netsens.it)

## Acknowledgements

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