



Precision Farming

From viticulture to irrigation Innovation in farming is more and more connected to ICT application to agronomic management, irrigation, phytopathology, phenological monitoring. ICT solutions support data mapping, transmission, collecting and elaboration: web platforms allow exchange and management of agro-meteorological, eco-physiological, epidemiological, irrigative information and distributed wireless sensor networks collect real-time data about humidity, temperature, pressure or water stress.

Precision farming techniques support prevention from phatologies, water saving and rationalization in plants protection products use; it leads to a higher quality and a less expensive production process. Research focuses also on new transmission technologies and protocols: narrow-band networks ,such as DMR (Digital Mobile Radio), prove to be stable and effective, supporting a more rational band usage and lower infrastructural investiments. Agriculture is therefore a fertile ground for ICT innovation, with wide potential applications.

THE PROJECTS

ICT 4 Agro

Financed by the Regional Government, the project deals with distributed sensor networks for automatic and optimized irrigation systems.

The experimentation aims at developing an ICT system for water stress assessment in order to reduce water consumption. A pluviometer, dendrometers and humidity sensors have been installed on a vine shoot and in the ground, together with a datalogger, in a vineyard in Settimo Vittone (Piedmont Region): all the sensors are wireless and low-power.

The firmware for data acquisition was developed in CSP laboratories and all measurements on stems narrowing or dilatation due to water stress / irrigation cycles, have been compared with "Scholander camera" measurements (the standard technique based on leaf water potential).

The experiments proved a good correlation between measurements and the technical efficiency of the innovative monitoring system.



Viniveri

The project aims at supporting vineyard management through the use of ICT technologies, in particular as regards pathologies onset and the relative chemical antiparasitics interventions.

The solution puts together web platforms, wireless sensor networks and farm tractor localizers to provide real-time agro-meteorological information.

Based on "Geowhisper" prototype (embedded system for data collection from digital and analogic sensors) the projects integrated the available technology with remote micro-sensors (slaves) connected wireless to the master node with the ZigBee protocol. The master node hosts the software module, collecting remote and local data, and sends them to a central system for elaboration and publication by broadband wireless networks (5GHz). The whole architecture is optimized for energy saving, using solar panels and batteries.

Sigevi

Growing processes are conditioned by environmental factors such as temperature, solar radiation, humidity and rain. Thermic conditions are strictly involved in all physiological processes affecting phenological and physiological development.

Climate and the vineyard management determine quality and quantity of the final product and guide strategies and behaviour of the farmer.

In this context, identifying a stable correlation between climate conditions, plants growing and production quality allow the development of automatic systems for vineyard management.

SIGEVI projects develops, tests and implements innovative DSS - Decision support systems - starting from data collection (historical, from remote sensor networks, from the farmer using mobile systems), data elaboration and a user friendly feed-back - to support everyday decisions about vineyard management (irrigation, pruning, harvesting, productivity evaluations, phyto-pathologies defense strategies...).