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Vineyard

Environmental sustainability, productivity, health and efficiency of the vineyard, thanks to the accurate measurement of soil moisture

The measurement of water content in the soil to increase productivity in agriculture

Experience

Producing high quality wine requires precise control of water and nutrient content. To be competitive and to mitigate the effects of climate change, it is not possible to rely only on rainfall.
The amount of water needed in the vineyard depends on many factors, such as rainfall, evapotranspiration, age of the plant, its stage of development, soil type, environmental conditions, variety and cultivation techniques.
Soil type and its moisture content affects the distribution of the root system. There are many critical stages during which water requirements must be monitored, managed and guaranteed: during sprouting, between flowering and fruit set stage, from fruit set stage to veraison, during the ripening phase and after harvesting in wood production. **Precision irrigation keeps grapes healthy, improves quality and increases yield.** In order to achieve real benefits by applying the right irrigation strategy, it is necessary to have reliable data precisely calculated. The target of this installation is to provide a decision support for the irrigation strategy in order to optimise vineyard growth.

Name
CAVIT

Location
Mezzolombardo (TN)

Case
Emergency irrigation, drought

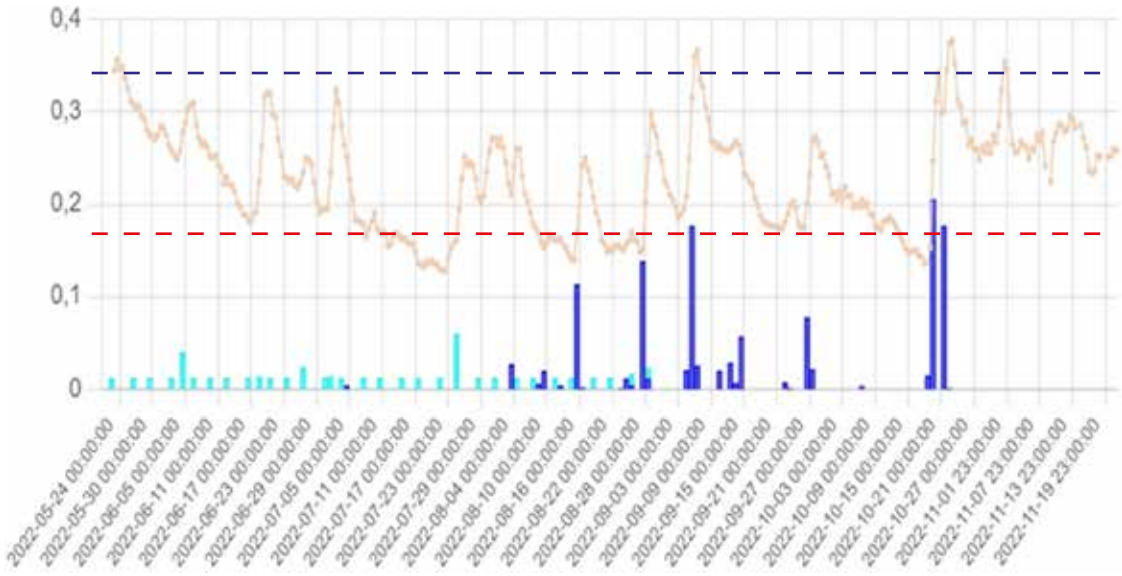
Crops
Teroldego vineyard

Irrigation:
Drip, surface

Use

During the 2022 season, characterized by exceptional water stress, two Finapp probes was installed in a vineyard in Trentino.
The rainfall in June (blue histogram), supported by drip irrigation on Wednesdays and Sundays, maintained the soil moisture in the optimal range, i.e. between field capacity (approx. 28% gravimetric moisture) and the wilting point (approx. 13% gravimetric moisture). The drip system has provided irrigation of approximately 2.0/2.3 litres per day at a distance of 50 cm. In July, the almost total absence of rainfall, combined with strong sunshine and temperatures well above seasonal average, brought humidity to values close to the wilting point for which an extraordinary surface irrigation was applied at the end of the month (highest green histogram).
This practice has a series of disadvantages, because a large inflow of cold water from a nearby irrigation canal can cause a dangerous thermal shock

However, this operation had the benefit of bringing the soil moisture back to a level close to the field capacity. The exceptional irrigation was about 20 mm eq (200m3/ha) of **water and the decision to implement emergency irrigation has been based on measured, reliable and representative data on a large scale and in depth, which only the CRNS Finapp technology could provide.**
In exceptional climatic conditions, Under exceptional climatic conditions, planned irrigation was unable to maintain soil moisture at the required minimum level.
Even the moment of the decision has been crucial.
The return of rainfall in August, although much below average, allowed the humidity to be maintained within the optimal range



In figure:

- Soil Moisture
- Rainfall
- Irrigation during 2022 season
- Field capacity: Blue hatching
- Wilting point: Red hatching

Benefits

In order to manage agriculture effectively and make the right decisions at the right time, it is necessary to have highly reliable and measured information in relation to the terrain. Decisions based on long-standing practices or unreliable information can reduce production yields and frustrate the complex work of the professional. Agricultural decision support systems (DSS) can extract, from a large amount of data, useful information for a fast and versatile decision-making, and are today a decisive factor for a profitable management of the farm.
Technological developments and innovative cultivation techniques are no longer an option, but a necessity, enabling farmers to generate value and be competitive. Knowing the real water content, representative of the whole field helps technicians and farmers to analyze the decisions, making them at the right time.

The advantages are:
- Estimating the best time to irrigate the crop, based on agronomic and operational parameters
- The optimization of the water resource by irrigating in the right place, at the right time and saving water
- The direct measurement of soil water content and the water available to plant roots, without going through the water balance
- The reduction of product losses
- The reduction of water and energy consumption, avoiding waste
- The correct planning to always maintain optimal production conditions
- The help in preventing and monitoring the environment in order to avoid the development of diseases
- A greater understanding of the influence of soil moisture on the development of the root system

CAVIT

Cavit (Cantina Viticoltori del Trentino), is a cooperative which brings together 11 cooperative wineries in Trentino (Italy) with 5.250 associated winegrowers and 6.350 hectares of vineyards. Today Cavit collects, examines and selects the raw materials produced by the associated wineries, controlling every stage from maturation to bottling, while respecting the environment. Cavit collaborates with the renowned Agrarian Institute of San Michele all'Adige (Edmund Mach), which trains the most qualified technicians, and with other national oenological research centres. The result is a quality that has won countless national and international awards.

Fondazione MACH

For over 150 years, FEM has been an international research centre, a technical and vocational school of agriculture and a technology transfer centre, providing services and consultancy throughout the region. It has an experimental farm with numerous plots of land located in different parts of the province, which offer opportunities for research, experimentation and teaching.

The CRNS Finapp technology

Finapp's CRNS technology relates the neutron count of cosmic rays striking the soil, to the hydrogen atoms and thus to the water content in the soil itself. Finapp provides the measurement of soil moisture in a unique way:

- **No-contact: no need for sensors installed in the soil**
- **Area measurement: approx. 5 hectares, a radius of approx. 125 meters**
- **In depth: approx. 30-50 cm in the soil**
- **Continuous: 24/24h, 7/7 days**
- **Not influenced by structures or artefacts**
- **The type of soil does not influence the measurement**
- **Does not interfere with agricultural daily working routine**
- **Less energy consumption thanks to solar panels and no connection to the grid**
- **Data is just a click away on PC, smartphone, tablet, offering an intuitive user interface, clear graphics and the possibility of downloading all numerical values.**
- **Optional information such as DSS (irrigation decision support) is available or can be integrated, as well as meteorological data, data from other sensors, etc.**

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