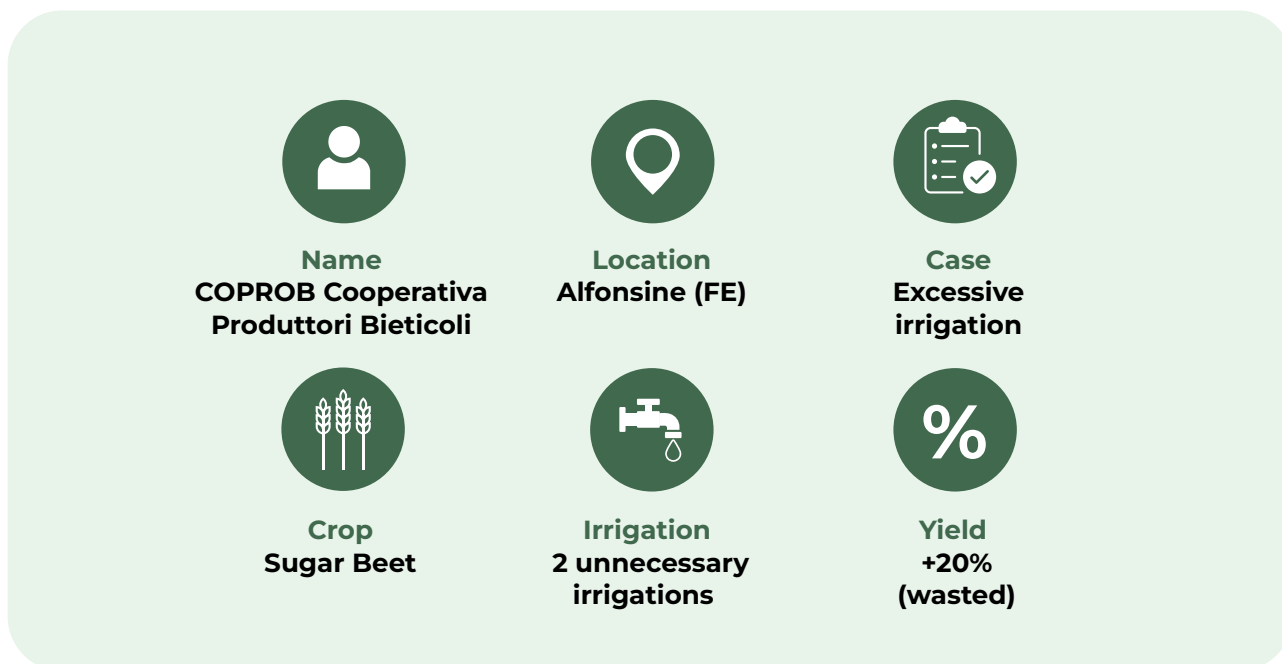# Sugar Beet

Monitoring of Water Management of Sugar Beet

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

Experience

A Finapp probe was installed to monitor the soil moisture in an entire sugar beet plot, thanks to the CRNS cosmic rays technology.

Name
COPROB Cooperativa
Produttori Bieticoli

Location
Alfonsine (FE)

Case
Excessive
irrigation

Crop
Sugar Beet

Irrigation
2 unnecessary
irrigations

Yield
+20%
(wasted)

Use

In the 2022 season, the farm has irrigated. Using, as a reference, the data of a punctual TDR probe has already been in the field for years, as it is considered reliable and already tested, using the Finapp probe only as a comparison. In the first months of the year, the dynamics of the water content were managed satisfactorily, with irrigation or with rain, the farmer kept the level of water content within the ideal range for beet.
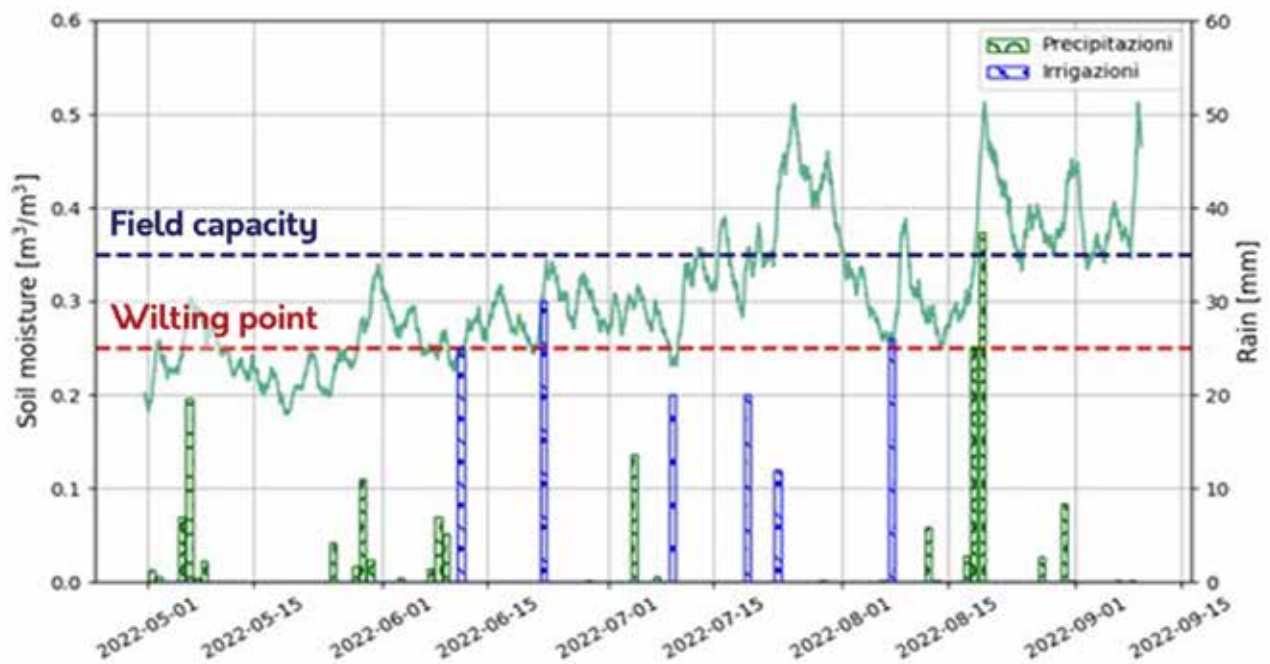
In July the soil surface was visibly arid. The continuous irrigation has led to an increase in soil moisture above the threshold value of 35%, that is, field capacity.

In August some storms, even intense, extended this high humidity condition. The result was a situation of asfissia that facilitated the onset of beet Cercospora, reducing the crop yield by 20%.

The soil moisture values provided by the TDR probe, although expensive and "high quality" sensor, were lower than the measurement obtained with the CRNS sensor.
This is because, its installation point could not be representative of the entire plot.
An irrigation management according to the information obtained from the CRNS sensor would have reduced energy costs and water consumption, and almost certainly avoided the rise of the fungus, resulting in greater productivity.

In figure:

- ⟋ Soil moisture
- ● Rainfall
- ● Irrigation during the 2022 season
- ▬ Field Capacity: threshold set by the agronomist
- ▬ Wilting point: threshold set by the farm agronomist

Benefits

In order to manage agricultural activity efficiently and make the right decisions at the right time, it is necessary to have reliable information, measured and related to your land.

Decisions resulting from established and handed down practices, or unreliable information, can compromise production by making the professional's complex work unnecessary.

The decision support (DSS) in agriculture: extracting in a short time and versatile way process-useful information from a significant amount of data, represent now a decisive factor in managing the farm efficiently.

Technological evolution and the innovation of cultivation practices are no longer an option, but a necessity that can of enabling the farmer to generate value and be competitive.

Knowing the real water content representative of the whole plot allows to provide support to technicians and farmers in the analysis of the decisions to be taken, as well as to take them at the right time.

COPROB

It's the only 100% Italian sugar supply chain with a production of 250,000 tons of sugar, produced in the factories of Minerbio and Pontelongo. The cooperative was founded in 1962 in Emilia Romagna, in sixty years of activity has imposed itself on the national market, increasing the turnover and the associative basin and establishing itself as the only cooperative producer of sugar in Italy. It manages about 33,000 hectares of beet basin between Emilia Romagna and Veneto.

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.**

life from cosmos
finapp

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