

D1.2 Soil sensors used for general crop management

In agriculture, knowing the soil - especially about pH, moisture, fertilizers, temperature, EC, salinity - is the most important key to make decisions on crop growth and the best way to manage the harvests.

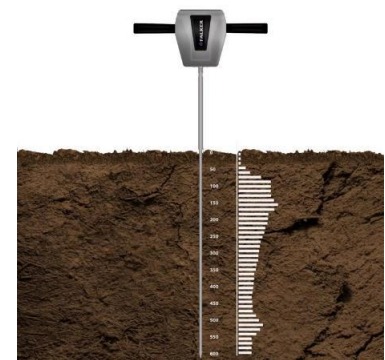
What are soil sensors?

There are different types of soil sensors, such as soil moisture sensor, soil temperature sensor, soil EC sensor, soil PH sensor, etc.

Due to differences in electrical resistance or electrical conductivity, information on soil moisture and soil particle composition can be clearly reflected, as well as intuitive conclusions on density, pH, salinity/conductivity and temperature. Through the network construction on the farm, the real-time parameters collected by the soil sensor are transmitted to the computer mainframe and connected with the system installed on the machine to realize automatic control spraying of fertilizer and pesticides.

How to use soil sensors for crop management?

A stainless steel probe is inserted into the soil's surface of soil profile to test soil moisture and temperature quickly. Moisture measurement part is designed on the basis of the principle of FDR (Frequency domain reflectometry), by measuring the dielectric constant of the soil in order to measure the volume of the soil moisture content. The temperature part adopts precision platinum resistance elements, the product built-in drift calibration and temperature compensation circuit can adapt to most applications. The probe can be permanently embedded underground and can be connected to a data logger for unlimited testing.



Many equipment for soil sensors have the same setup but different indexes.

Another example of a soil sensor is equipment that allows for the evaluation of the densification in deeper layers through the generation of the compaction profile up to 60 centimeters deep. The result is given in P.R. (Penetration Resistance) for every centimeter of measurement to identify where roots have the most difficulty to develop.



Benefits

Sensors that detect soil conditions have become an important tool for modern farmers in crop production. The benefits of soil sensors are obvious.

The reason why farmers need to measure soil moisture is that soil moisture plays an important role in the growth and development of plants. Soil temperature is often an important factor, especially in agriculture and land handling of organic wastes, because the growth of biological systems is affected



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by soil temperature. Besides, electrical conductivity (EC) and fertilizer measurements are also important to help farmers do their work more effectively.

Limitation

The experience of practicing farmers is unique and highly effective in applying for local crops and plants. When overused, technology may affect their learning of basic skills and help them to lose touch with nature.

Summary of learning objectives of the topic

To understand what soil sensors are.

To understand how to use soil sensors for crop management.

To understand the benefits and limitations of using soil sensors for crop management.

List of relevant topics

https://www.rikasensor.com/rk520-01-soil-moisture-temperature-sensor.html?gclid=CjwKCAiA9qKbBhAzEiwAS4yeDY7DHnOxgdeKQNbRUIE2GJycCVC_j9kDqPh-0SvrsP0RrQFV_MQkBoCzzoQAvD_BwE

<https://www.falker.com.br/en>

Key words

soil sensors

soil management

soil temperature

electrical conductivity



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