



WHY USE SOIL MOISTURE SENSORS

Water plays key role in the life of a plant. It helps moves nutrients from the soil to the plant for the food it needs to grow. It also regulates plant temperature through transpiration. The root systems of plants are better developed when growing in moist soils.

Reliance on rainfall, the most variable facet of weather, is generally not sufficient for a plant to reach its growth potential. Irrigation is increasingly utilized by growers to enhance soil moisture, minimizing their risk exposure while maximizing production. Soil moisture sensors enable the grower to efficiently manage their irrigation resource and maintain soil moisture at optimal levels.

Soil moisture sensors allow you to:

- Monitor soil moisture and temperature levels at different depths in real-time
- Avoid over or under watering, minimizing associated yield penalties
- Manage water scheduling, helping to prioritise areas as necessary
- Forecast soil moisture levels to predict if and when you reach critical soil moisture deficit or field capacity
- Better understand and manage the movement of nutrients through the soil profile
- Better manage fertiliser application timing



Figure 1: Moisture sensor in wheat crop

To make the most efficient use to your water you need to know the upper and lower water holding capacity limits of your soil, its present condition and its predicted decline over time with no further water. By monitoring the soil moisture you can quantify the plant available water and assess how your irrigation system is handling current climatic conditions, when your crops may reach critical stress point and be likely to incur yield penalties, or when your soil is reaching field capacity and at risk of leaching nutrients.

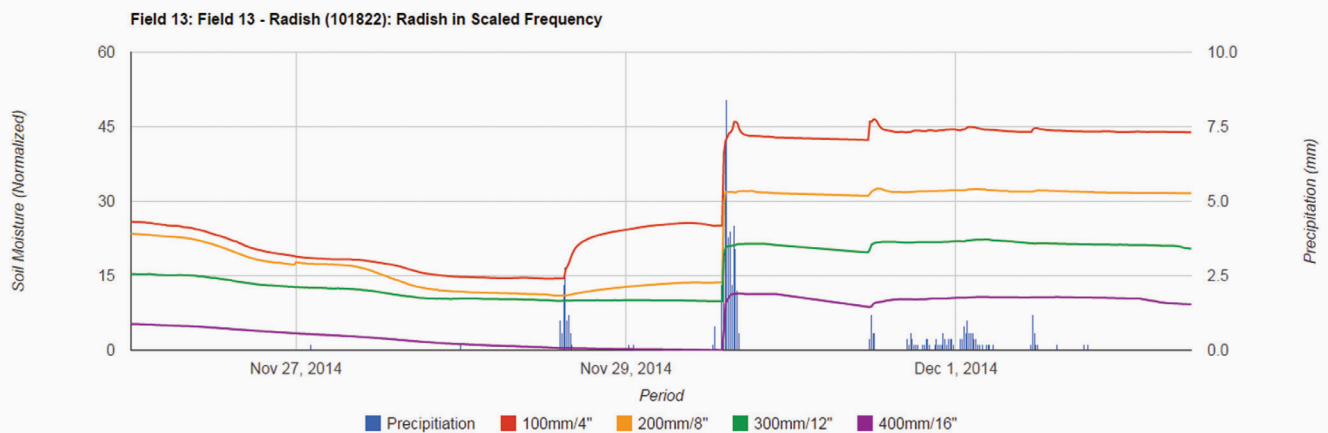


Figure 2: Data showing soil moisture at four depths along a sensor, and any rainfall or irrigation events, all viewable online.



WHERE TO LOCATE SOIL MOISTURE SENSORS?

Correct placement of soil moisture sensors is critical in ensuring the data you receive is useful. If installing only one sensor per field, it should be installed in an area of average soil type and average slope. If your soil moisture sensor is to be used in conjunction with variable rate irrigation the sensors will need to be placed in the designated soil management zones.

Vantage NZ Ltd can conduct an Electro-magnetic (EM) survey of your property. This highlights the variability with the different EM zones relating to variability in moisture holding capacities of the differing soil types. This variability can be broken into different management zones and used for variable rate irrigation.

Using our software platform combined with the clients background knowledge, we can find the optimum site for probe placement using an EM soil survey map and an elevation map if necessary to mark probe locations. Probes can be placed in the light, medium and heavy soil zones, enabling water application to be tailored to soil requirements and slope and aspect can also be taken into consideration for hill-country sites.

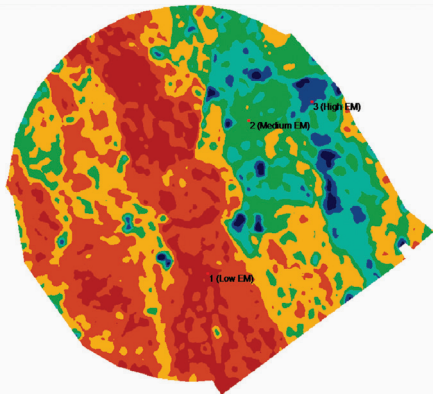
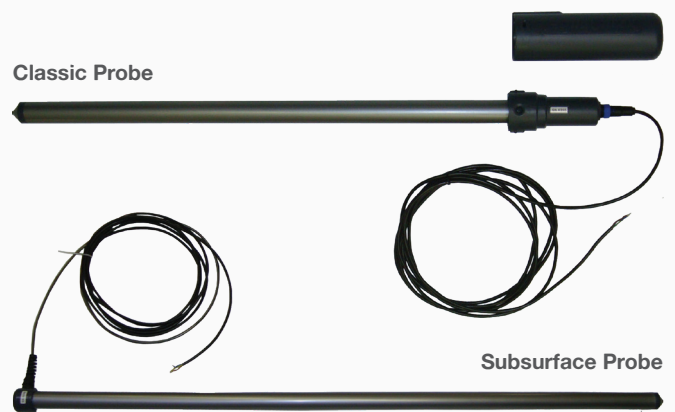


Figure 3: EM soil map with three sensor locations identified.

SOIL MOISTURE SENSOR OPTIONS?

There are a wide range of sensors currently available on the market. At Vantage NZ we offer two types of capacitance sensor. Which one you select depends on your farming system. If you have stock that will be grazing where the sensor is situated then we recommend the subsurface probe. However, if situated where nothing will be able to interfere with the probe head, a classic probe can be used. Probes come in various lengths; in a pasture regime we would recommend a 40cm probe with 4 sensors down its length at 10cm intervals. In a cropping scenario we would recommend a 60cm probe with 6 sensors spaced at 10cm intervals down its length. The limiting factor for a longer probe is the stone fraction in the soil profile. Where the soil depth is not restricted then longer probes can be used. Each sensor along the probe also measures the soil temperature at that depth and all data is logged at a desired interval using telemetry.



We recommend using the AquaCheck 3G telemetry system for automated logging of sensor data. The data is then sent to the AquaCheckWEB online viewer as pictured in figure 2. Additional telemetry options are also available.

SUMMARY

- The AquaCheck soil moisture probe offers capacitance based soil moisture measurement offering up to six soil moisture and temperature measurement depths per probe
- By placing sensors in different soil types you are in a better position to make accurate irrigation decisions
- Vantage NZ can match the correct sensor to your needs and locate it in the optimum site, taking into account EM survey data, elevation data and the client's historic knowledge of the site
- The more information available, the more targeted the irrigation recommendations and applications can be
- AquaCheck soil moisture and temperature data is displayed on an easy to use website platform allowing you to view the data graphically for either the whole profile or individual sensors
- The use of combined soil moisture and temperature sensor data improves fertiliser application scheduling
- AquaCheck probes can be easily removed and re-installed every year for cropping situations or as needed
- Accountability and traceability are now essential requisites for best farming practice. By using soil moisture probes you can monitor moisture levels and justify water applications

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