

Insights into soil moisture monitoring

An interview with Dale Boyd, Seasonal Risk Agronomist (Agriculture Victoria)

When a well-respected knowledge source was no longer accessible, a group of farmers found themselves in a pickle. They had thought their agronomist was a genius given his knowledge of soil moisture and how this aided their decision making. This was one of the catalysts for Agriculture Victoria Seasonal Risk Agronomist, Dale Boyd, to initiate a successful pilot of introducing soil moisture probes used for irrigation into dryland paddocks, that was 10 years ago.

“At the time soil moisture probes in the broadacre grains industry were placed in the paddock after sowing and removed prior to harvest, collecting data during the season,” Dale said. A removable probe system may not allow you to know when your soil’s water bucket is full or empty. Advantages with a permanent sub surface probe with long term data collection was identified.

Dale believes the network has provided greater insight in:

- greater understanding of the effect of out of season rainfall
- the benefits of summer weed control, knowing your soil moisture base for crop rotations and options
- identifying the connection of deep soil moisture to in season rainfall
- the impacts of hay versus grain and the benefits that soil moisture left can provide for the next season
- the economics behind hay versus grain.

For people considering purchasing a soil moisture probe there are a few things that you need to know and can do to get the most out of the system, Dale explained.

“Determine if there is an existing soil moisture probe network in your location. Existing networks can provide you with insight into any local issues that you should consider with your soil moisture probe, but also enable localised networks to expand and strengthen,” Dale says.

There are many different networks across Victoria, South Australia and New South Wales, Dale is currently unaware of any in Tasmania positioned in an unirrigated site, but is keen to hear from anyone in Tasmania that does have one. Many of these networks have been set up by grower groups, Landcare networks and agronomy firms.

“Determining the location of your soil moisture probe is critical. Preferably the location can provide you with a farm reference point, it is your average performing area with your most common soil type. This will mean you can then extrapolate the information for the other parts of the farm,” Dale said.



Dale explained you also need an area that is not influenced or affected by trees or is a high or low-lying area. Having the ability to situate the telemetry hardware component of your soil moisture probe system on a fence line will mean you are less likely to damage it with a vehicle and it also doesn't increase your weed burden by sowing around it.

Preferably the soil moisture probe would be accompanied by a rain gauge, to help understand the data.

“A cost to these systems is the ongoing telemetry fees, be that 3G or 4G, Bluetooth, WiFi or LoraWan, and the online interface where you are able to visualise your information,” Dale said.

The Agriculture Victoria network is a 3G and 4G system, which have been successful for this system, but it will solely depend on your area, probe, cost and connectivity.

There are different types of probes, the Agriculture Victoria network is made up of capacitance probe 80 cm long, with sensors every 10 cm. They are positioned deep in the soil to a depth of 30 cm, therefore measuring from 30 cm down to 100 cm. Dale's recommendation is that deep soil moisture is the critical information, so don't give yourself gaps in information by having less sensors or sensors further apart.

Dale recommends at least 80 cm probe, but in some soil types where root growth goes beyond a metre, consider a longer probe.

“The ultimate end goal from the Agriculture Victoria network is to have grains industry farmers with knowledge of their soils and water holding ability so that in the future, whether it be by moisture probes, spatial imagery, models or whatever form of monitoring seasonal conditions they use, they will have knowledge of per cent full or available mm when asked how the season is going.”

Dale Boyd; dale.boyd@agriculture.vic.gov.au