Cotton Catchment Communities CRC
Queensland Government Department of Primary Industries and Fisheries

COTTON *TALES*

Central Queensland

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Capacitance moisture probes – 'Do probes need to be calibrated in the field'?

Whilst the answer depends on their how they will be used, the answer is usually "No." However they do need to be "normalised".

Probes are normalised by matching the raw readings from each sensor at both 0% (held in air) and 100% water levels (submerged in water). Without normalising, these devices would only provide a range of irrelevant raw data that varies slightly with each sensor. By matching the raw reading from each sensor to both 0% and 100% water levels, a comparison of readings taken by different sensors can be made on a common scale. Equipment suppliers should provide you with procedures for normalising their product.

Following the normalisation process, readings can be displayed (typically graphically), permitting irrigators to monitor their soil water levels based on trend changes. This accepted practice, utilising a **default calibration equation** within a product's software, negates the requirement for a complex site specific calibration.

In many cases the graphs employ "millimetres" as the vertical axis units. Herein lies a problem - the readings from probes, presented as "millimetres", is only an **estimation** of volumetric soil moisture levels and therefore should not be taken literally.

Field capacity and the refill point can be determined through relating known soil moisture conditions to probe values, and analysis of soil moisture trends.

Uncalibrated capacitance probes will show changes in soil water content over time so scheduling irrigation based on the slope of the line is acceptable; however, it must be recognized that a change in the slope of the line can be due to soil moisture availability, change in evaporative demand in response to cooler or cloudy weather, or other factors.

Calibration becomes necessary when a device is to be used to determine the magnitude of plant water use, soil moisture deficit or to calculate a full soil water balance.

In Figure 1, it is clear that the data represents the same trends, regardless of the default or site specific calibration. However, if we look at the first irrigation event at point A:

- The calibrated soil moisture (top line) goes from 144mm to 173mm – a change of 29mm
- The default calibration soil moisture (bottom line) goes from 105mm to 146mm – a change of 41mm

If the default calibration was used and assumed to be correct, the change in soil moisture would be overestimated by 40%.

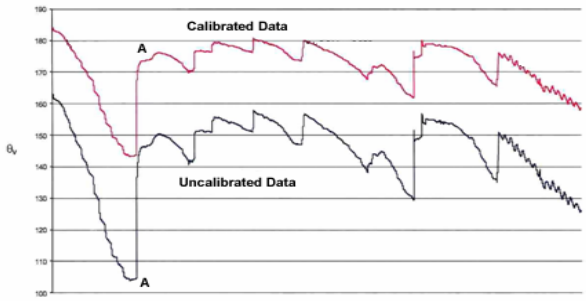

Figure 1: A single data set using a default and site specific calibration (***Source:*** *Anon. (2001) Calibration of the Sentek Pty Ltd Soil Moisture Sensors)*

Probes should be installed before the first in-crop irrigation. This irrigation allows them to "Bed-in" so as to be giving a reasonable reflection of soil moisture status thereafter i.e. they can be used to schedule the second irrigation.

Staff Changes

Many of you are probably aware that Doug will be leaving the Department as of the 12th of October. Doug will be starting with Brennan Mayne Agribusiness & Financial Consultants on the 15th of October, so he is not going very far and, no doubt, will still be seen around town regularly.

Susan Maas will be filling in as the regional extension officer until a permanent replacement is appointed. Advertising for this position will begin on Saturday the 13th of October.

Doug: "I would like to wish all growers well in the coming season and thank them for their guidance and support over the last 3 years. Certainly the cotton industry is facing some large challenges in Central Queensland, but I am sure the steadfast dedication to farming well and being innovative will ensure success for the industry in Central Queensland."

Healthy Soils Regional Forums

This forum provides an opportunity for farmers, agronomists and catchment bodies to hear a range of speakers discussing the benefits of healthy soils and provide direction in management options for profitable and sustainable cotton & grain farming systems.

7th November - Narrabri RSL, Narrabri

8th November- Community Centre, Goondiwindi
For more information contact: Anna Melbourne Ph: (02) 6799 1501