Soil & Plant Monitoring for Irrigation

Irrigation management often relies only on soil moisture monitoring. However, irrigation is for growing plants, therefore plants *and* soils should be monitored.

This application note demonstrates how measuring both soils and plants may lead to possible reductions in expensive inputs, such as water and electricity, without sacrificing crop growth.

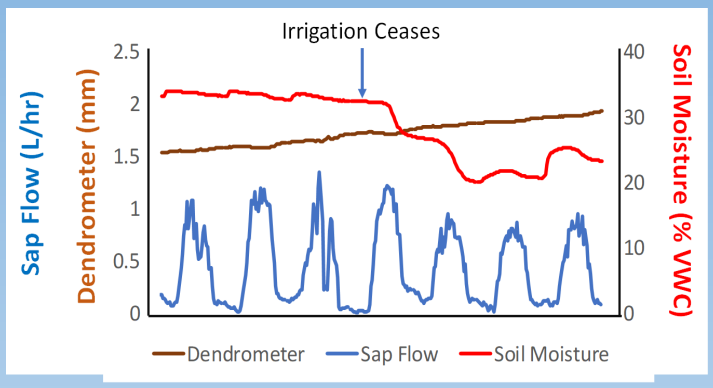

Figure 1. Example data over 7 days of monitoring.

Visual Inspection of the Data

Figure 1 shows soil moisture, tree growth and water use data before/after cessation of irrigation.

On visual inspection, it is clear that soil moisture declines rapidly and it appears that sap flow (plant water use) also declines. Therefore, on first inspection of the data, that suddenly stopping irrigation is causing plant stress.

Table 1. Analysis of data presented in Figure 1.

	With Irrigation	Without Irrigation
Daily Growth (mm)	0.12	0.11
Daily Water Use (Litres)	10.87	10.16
Water Use Efficiency (µm/L)	10.99	10.98

Testing Traditional Irrigation Management

An almond orchard in western New South Wales irrigated crops every day to maintain maximum plant growth and yield. In order to save costs, the amount of irrigation was reduced to determine if there was a negative impact on almond growth.

Soil moisture was monitored with a capacitance sensor. Tree growth was monitored with a DE-1M Dendrometer. And plant water use was monitored with the SF3 Sap Flow Sensor.

The Bigger Picture

Analysing the data from Figure 1 in more detail revealed that the daily growth rate and water use remained constant after irrigation ceased (Table 1).

Although this is only a preliminary result, it does suggest that lowering irrigation may not have a significantly negative impact on crop growth.

A study over a longer period, and with more trees, can be justified given these early promising results.

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