



Fact Sheet: Interpreting Information from the BIGG Soil Moisture Monitoring Demonstration Sites

This fact sheet explains the graphs and data collected at the BIGG soil moisture monitoring demonstration sites located at Flaxman Valley, Keyneton and Koonunga. A sub-surface capacitance probe, automatic rain gauge, and a sensor measuring air temperature and relative humidity were installed at each site. The probe is buried below the soil surface and measures soil moisture and soil temperature at 10cm intervals to a depth of 85cm (Flaxman Valley, Keyneton) and 125cm (Koonunga).

A weblink has been set up to access the information collected at each site, with the data being summarised on two different webpages, entitled 'TRENDS' and 'LIVE INSTRUMENTS PANEL'. When opening the link, it automatically defaults to 'TRENDS' with users easily able to switch between both pages. To access the site of your choice, click one of the following links:

- [Flaxman Valley](#)
- [Keyneton](#)
- [Koonunga](#)

TRENDS

The graphs presented on this page are as follows:

Growing Season Rain

Shows both the daily rainfall and the total amount of rainfall throughout the growing season (beginning from 1 April).

Plant Available Water (PAW) estimate

Shows the daily rainfall and the PAW. Plant available water is an estimate of the total amount of water (mm) that can be accessed by the plant.

Soil Moisture Sum

Shows the daily rainfall and how much water is available in the soil profile between 15-85cm. The aim of the Soil Moisture Sum graph is to show the amount of water (mm) remaining for pasture growth. It is calculated using the formula:

$$\text{Plant Available Water} = \text{Soil Moisture Sum} - \text{Crop Lower Limit}$$

- The horizontal line on the graph showing the 'full point' (known as the Drained Upper Limit) is an estimate of soil saturation
- The horizontal line on the graph showing the 'onset of stress' (known as the Crop Lower Limit) is an estimate of when plants cannot physically extract any more soil moisture
- The area on the graph between the 'full point' and 'onset of stress' is the Readily Available Water (or PAW)
- The line on the graph showing the 'Soil Moisture Sum' is the total moisture (mm) measured between the depths of 15-85cm

(Note: The Drained Upper Limit and the Crop Lower Limit values are preliminary for each site, however throughout the course of the project estimates of these values will improve and be adjusted accordingly).

Soil Moisture Stacked

Shows the daily rainfall and how much water is available in the soil at depths of 15, 25, 35, 45, 55, 65, 75 and 85cm. The stacked graph builds a vertical representation of moisture through the profile and highlights the change in moisture levels at different depths. This is useful after a rainfall event so to identify how far moisture may have moved down the profile or how far down the root zone plants are accessing water.

Soil Temperature

Shows the temperature of the soil at depths of 15, 25 and 45cm. Soil temperature data is useful to identify if the soil is warm enough for specific nutrients to be taken up by plants, when perennial pastures come out of dormancy or when annual pastures will germinate.

Spray Conditions

Shows the air temperature (also known as dry bulb temperature) and the wet bulb temperature (the lowest temperature that can be reached by the evaporation of water only). The difference between these two measurements determines Delta T, an important indicator of evaporative potential when spraying pesticides.

Low Delta T values (<2°C) encourage droplet survival (which can increase the risk of spray drift), while high Delta T values (>8°C) reduce droplet survival (i.e. droplets evaporate too quickly). The green shaded area on the graph between the 'lower limit' (2°C) and 'upper limit' (8°C) is the preferred Delta T conditions for spraying.

Chill Hours and Degree Days

Shows the accumulated number of hours that the temperature has been below 5°C. This graph also shows the accumulated number of degree days for pasture growth (by adding the number of hours that the temperature is above a threshold). As growth and development of plants (and insects) is heavily influenced by temperature, this information could be used to compare the stage of pasture development between sites.

LIVE INSTRUMENTS PANEL

The real time information presented on this webpage shows the rainfall, temperature and relative humidity data. When opened, the webpage defaults to the 'Overview' tab but more detailed information about these parameters can be accessed by clicking on respective tab.

Users can click on one of the links in the table at the top of the web page ('Today', '7 days', 'Month', 'Year') and these changes will be reflected in the graph immediately below it. More detailed information can be accessed by clicking the 'Statistics' link and scrolling across to each day in the month. The 'Instrument panels' give a simple snapshot of the live data.