

Remote Sensing Water Use of Irrigated Pasture

What is it?

A desk top study was conducted to compare ground reported soil moisture and remote sensed transpired crop water use.

Why?

To answer the questions: “Does a remote sensed report of transpired crop water use in irrigated pasture, provide useful irrigation scheduling information when compared to soil moisture probes reporting soil vacuum pressure?”

“Could satellite information be used in place of ground reports to inform irrigation scheduling and farm management decisions?”

How it works?

Irrigation, rainfall and soil vacuum pressure was measured on the Tamworth Optimised Dairy daily. I used the reported irrigation and rainfall as input to the IrriSAT Application and generated a remote sensed transpired crop water use report. The reports were viewed to see how well irrigation and rainfall wet the soil or met crop water use requirements.

What use is this information?

This information can be used to inform scheduling and farm management decisions.

This information can be used to optimise pasture productivity from applied water by matching crop requirements with water applied. The information can be used to benchmark fields to allow comparison of irrigation systems, crop varieties and management to refine production systems.

Low cost remote sensing can be applied to any field with good information about irrigation and rainfall to get an accurate report of transpired crop water use.

Benefits

Low cost; informed scheduling decisions; No equipment to damage; Cloud based historical record of transpired crop water use that can be shared with farmers and consultants to view or edit.

Benchmarking of transpired crop water use per unit of pasture production to improve management of water resources. This will inform the choices made about how to use available water.

Use the tool on more paddocks and make better decisions to increase productivity and income on-farm for every unit of water used.

Opportunity

To make more informed decisions about water use to increase water and farm productivity through benchmarking crop water use and productivity.

What is now known?

The two reports of water use are similar.

The result from the comparison of ground and remote sensed data of Tam o'Id LM Lucerne 2 field is that the two reports are **similar** and suggest a deficit of irrigation during the extreme heat of late February and early March.

Figure 1: Capacitance probe data report of soil moisture. Gypsum block probes report soil vacuum pressure at a point and a few depths which indicate root use of soil moisture by reduced vacuum pressure at those levels. Top Soil was saturated at 15 and 40 cm (Blue and Black lines) on 6th, 10th and 22nd March following rain. The green line indicates the marked use of moisture (~200KPa) at 1.2m (green) occurred between 4th and 8th March but steady use (~80KPa) following those times.

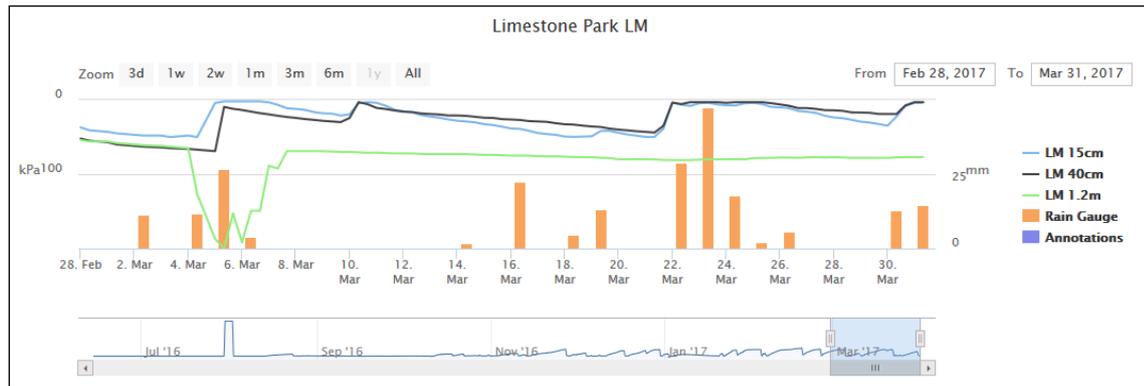
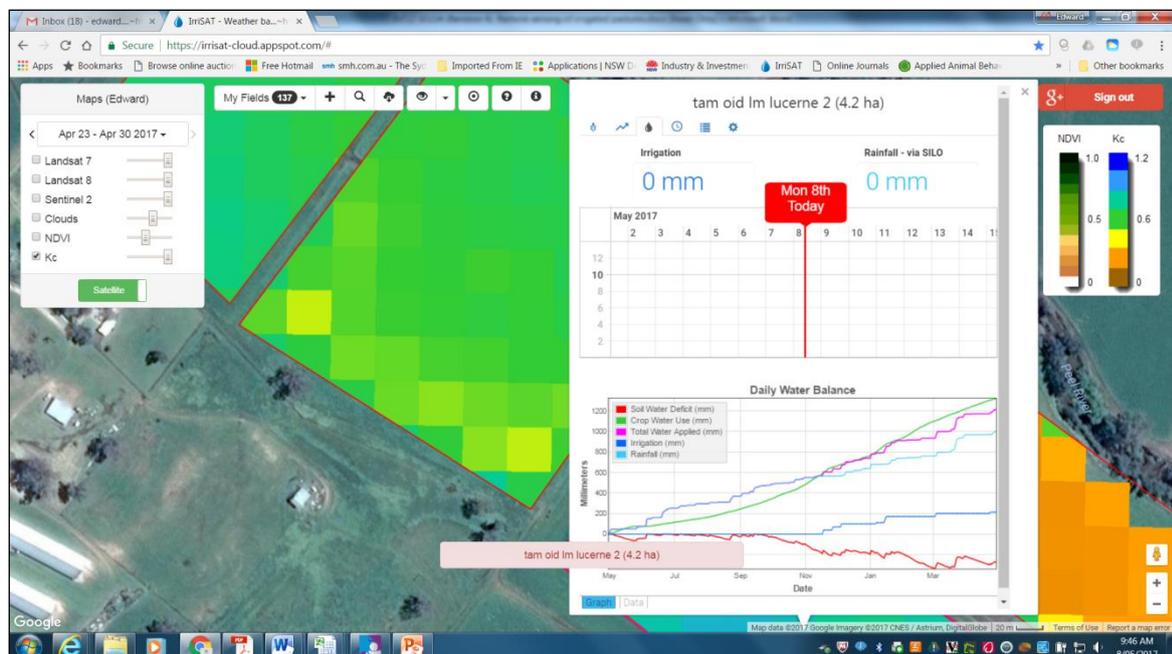


Figure 2: Remote sensed transpired crop water use report. Satellite data shows sensed transpired crop water requirement (green line) of the whole area compared to total water applied (purple line) and soil moisture (red line), the space between the lines indicate the difference. The difference exists between 1 Feb and 29 April when data ceased reporting. This deficit was not brought close to crop requirements by rainfall until late in March.



The reports look at the same situation from different perspectives. The deficit (-80KPa or 150 mm) between water applied and crop water requirements shown by both measures of water use suggest that crop productivity of the Lucerne pasture during February to April may have been limited.