



Australian Government
Department of Agriculture
and Water Resources



Smarter Irrigation for Profit Project

Hunter Optimised Dairy Irrigation Farm (NSW)

‘Glenhaven’ Irrigated Pasture Update February 2018

**Prepared by Peter Smith (Sapphire Irrigation Consulting) &
Dan Clydesdale (Clydesdale Rural Pty Ltd)**

Irrigation Report

Irrigation tips for March

The weather outlook for March is for normal conditions with above median rainfall (which is 53 mm) being ‘likely’ and median temperatures being likely. Streamflow is forecast to be below average. Pastures should be irrigated in accordance with evapotranspiration (ET) measurements or soil moisture readings to avoid stress and lost production. Consider not entirely filling the profile to increase the opportunity for rainfall capture if rainfall looks likely.

Comment for February

February continued the run of dry weather with only 32.6 mm of rain recorded at Scone airport. The long-term median rainfall for February is 45.2 mm. The reference crop evapo-transpiration (ET_o) for Scone airport was 193.5 mm. The probable outlook of cooler wetter conditions did not eventuate, with the Upper Hunter experiencing a particularly dry and hot spell.

The lucerne was irrigated four times up to the end of February with a total of 115 mm applied. Rainfall recorded at Glenhaven was 61 mm, about double the amount recorded at Scone airport. From ‘IrriSat’, for the month of February, the crop water use (ET_c) at Glenhaven was about 154 mm. Assuming all irrigation and rainfall was available to the plants, the crop was supplied with 176 mm, so the crop water demand was over-supplied by 22 mm and the pasture was in no stress for the entire month. However, reference crop water use (ET_o) at Glenhaven was 199 mm, indicating that the crop coefficient (K_c) was less than 1.0 suggesting that the Lucerne growth is slowing (Refer to the Agronomy Report for further detail).

The seasonal summary of irrigation, rainfall and soil moisture from the Scheduling Irrigation Diary (SID) overleaf demonstrates the growing season to the end of February and shows that the pasture was stressed (ie. The green line was below the red line) for about half of the month. However, as the hot, dry weather continued until the end of the month, this improved situation shows that management adapted by increasing the applied water to meet the crop water demand. The crop water demand has been met from mid-December until the end of February. If the irrigation early in the season had matched the crop water demand, the pasture would have rarely been in stress (ie. The green line would have been mostly above the red line) and increased yield would have resulted.

This Project is funded by Dairy Australia and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.

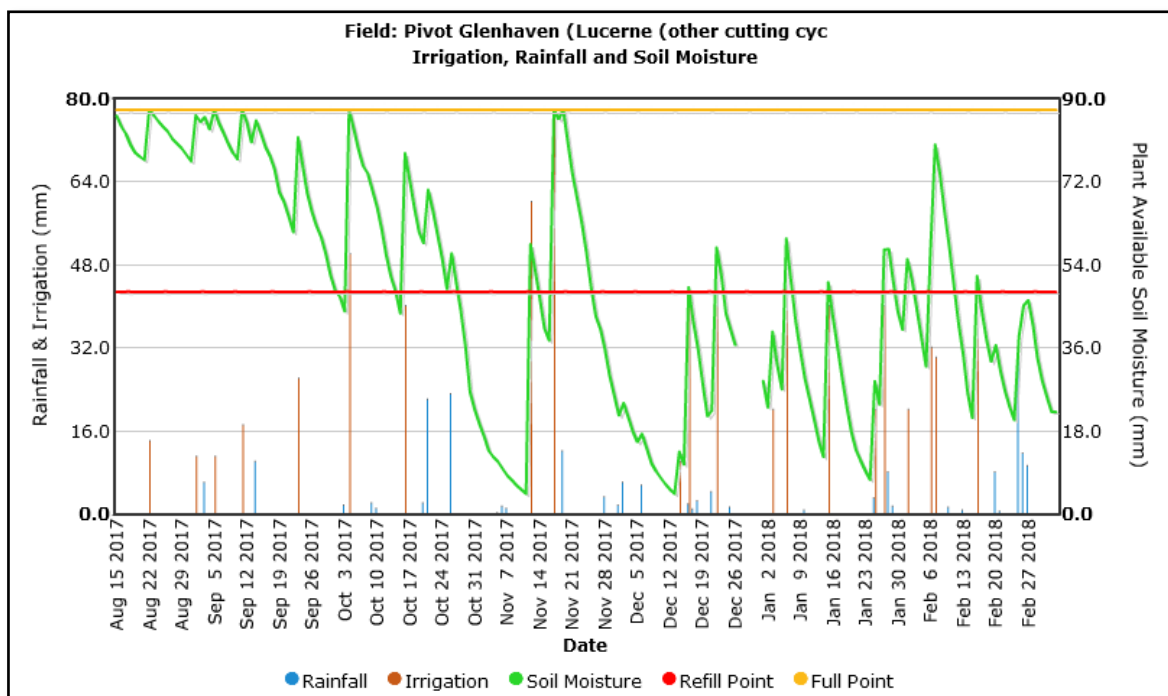
The project is also supported in the Hunter region by the following organisations:



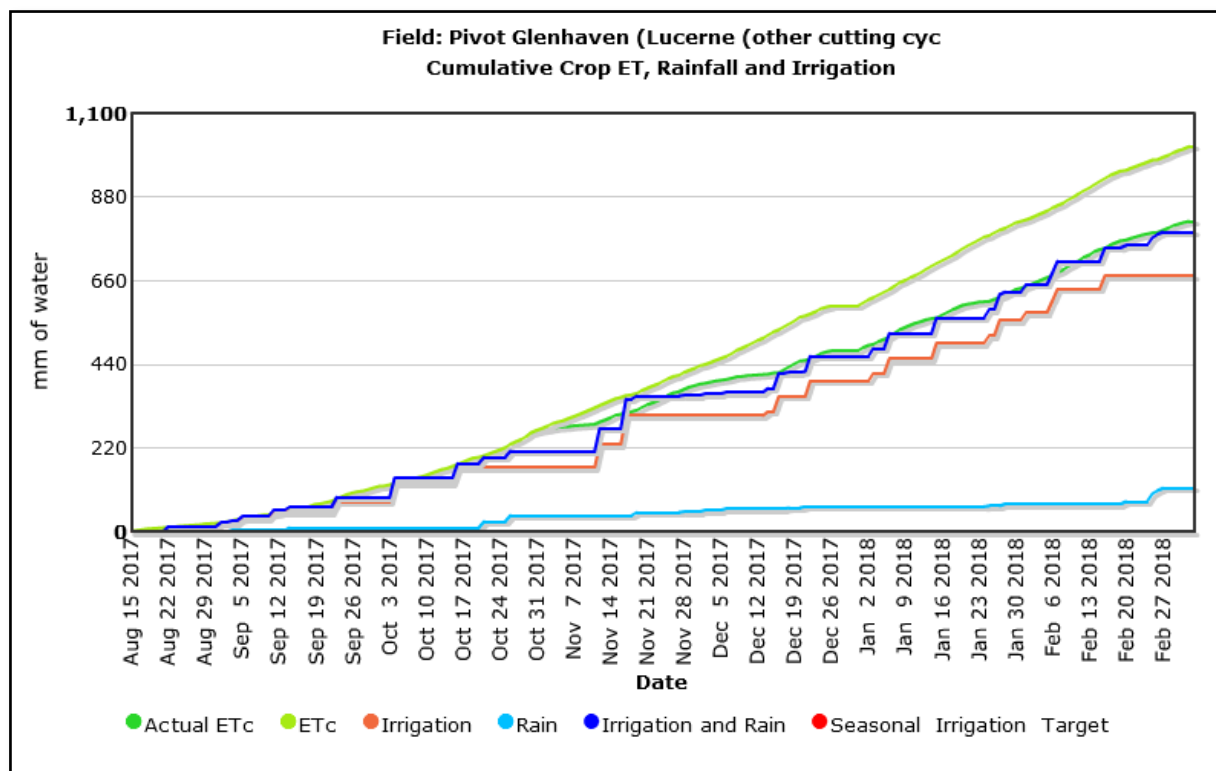
**Local Land
Services
Hunter**



Seasonal summaries from the Scheduling Irrigation Diary (SID) for Glenhaven



The matching of the irrigation and rainfall to the pasture water demand is also evident in the cumulative ET, rainfall and irrigation summary (below). It shows that at the end of February there was a close alignment of Actual ETc (dark green line) and the Rainfall + Irrigation (dark blue line), confirming that the actual crop water use was met by the irrigation and rainfall. The ETc (light green line) shows a difference of about 200 mm with the Actual ETc for the whole of February, meaning that the mismatch which occurred earlier in the season has not got worse during this month.



Outlook from 'Irrisat'* for March

		Glenhaven		
		ETo	Chance of rain	Forecast
Thurs	8	4.9	24%	Partly cloudy starting in the afternoon, continuing until evening
Fri	9	5.0	27%	Partly cloudy until evening
Sat	10	4.9	21%	Mostly cloudy until evening
Sun	11	4.9	9%	Partly cloudy in the morning
Mon	12	5.2	5%	Mostly cloudy starting in the afternoon
Tues	13	5.1	19%	Mostly cloudy until evening

*Using data from both Landsat satellites and on-ground weather stations, Irrisat is a web based tool more broadly used in the cotton industry to calculate crop coefficients and forecast crop water use. The *NSW Smarter Irrigation for Profit project* has been trialling its application to dairy pasture systems.

Data records for February

ETo at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
5.3	4.9	6.9	6.9	7.3	7.9	7.6	6.8	9.3	8.3	9.5	9.7	7.6	10.3	9	9.1	8.3
18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
6.8	5.7	2.7	6.7	5.9	5.7	5.5	6.3	1.6	5.9	6	-	-	-	193.5		

Rainfall received at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
									1.2			0.6				
18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
		9.6	0.4					11.6	9.2		-	-	-	32.6		

Note: ETo and rainfall readings for Scone Airport were available only to 26th January.

Rainfall at Glenhaven (mm) (manual rain gauge)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
									1.2			0.6				

18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
		8	0.4				30	11.6	9.2					61

Irrigation events (mm) (from Scheduling Irrigation Diary)

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Glenhaven	20					32	30									35	

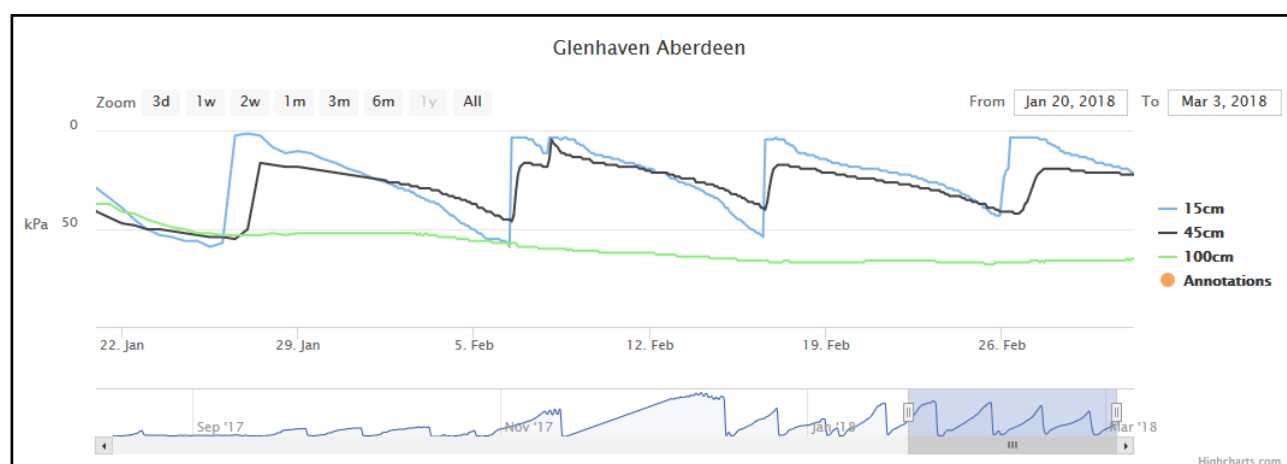
Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Glenhaven															115

The Readily Available Water (RAW) at soil probe sites in the Upper Hunter region:

Soil probe site	Crop	Root depth	Soil texture	RAW
Glenhaven	Lucerne	100 cm (assumed)	Light Medium to Sandy Clay	48 mm
Garoka	Mixed pasture	40 cm (assumed)	Sandy Clay	24 mm
Rossett Park	Mixed pasture	40 cm (assumed)	Light Medium to Medium Clay	22 mm
Dalara	Mixed pasture	40 cm (assumed)	Clayey Sand to Loamy Sand	18 mm

Soil moisture watch

Glenhaven soil probe traces as at 3/03/18



The dry month of February was characterised by well-timed irrigation events and one decent rainfall event that was also well-timed. The exception is the spike on February 8th which was a second irrigation in two days. Water use is evident mainly at 15 cm and 40 cm depths indicating that the Lucerne was consistently actively growing throughout the month.

The shallow 15 cm sensor (blue line) indicates no flattening of the trace prior to irrigation or rain except for February 5-6th where it reached about –55 kPa. The flat pattern affirms that the refill point was reached at this soil depth at this suction. At each irrigation event, there was a slight flattening for about a day at around –3 kPa indicating slight waterlogging at this depth. This is not evident in the 45 cm trace, meaning the plants were still active and did not shut down for these short periods. The rainfall on Feb 26-27 resulted in waterlogging for slightly longer at 15 cm but did this is also not evident in the 45 cm trace. The amount and timing of the irrigation events were almost perfectly matched to the RAW and plant requirements for the whole month.

The 45 cm sensor (black line) shows a roughly similar pattern but less pronounced than the 15 cm trace. The 45 cm shows responses to the irrigation events, with the profile not being completely refilled at this depth except for February 8th. There are no signs at any time of flattening of this trace at the drier end, indicating the plants were still accessing Readily Available Water. The pattern indicates very timely and effective watering through this very dry period.

The 100 cm sensor (green line) shows a slow, constant level of water use until 16th February where the slope flattens, indicating water extraction has ceased from this depth at a suction of –66 kPa. This means that the plants are extracting water from the profile above this depth. This trace shows no up ticks, indicating that none of the irrigation or rainfall events penetrated to this depth.

Note: The dates from the SID and the Tain soil moisture loggers do not always agree. This is due to how data is logged and recorded. The SID data extracted from the Scone weather station is generally a day or more behind, as the BOM records any event up to 9:00am as occurring on the day before. The dates of irrigations and on-farm rainfall input by the farmer will depend on his method of record keeping and could easily be a day or two different from the BOM. Water movement through the soil profile will vary depending on how much water is already there and some other factors. The Tain loggers record in real time – as long as the time register is correct – so are usually a day different to the BOM.

Agronomy Report

Agronomy tips for March

- It's time to start planting winter forage. Measure soil temperature to determine the best forage option. Oats and Brassica are good options for early sowing.
- The use of dry cows and heifers can be valuable in controlling excess crop/pasture residues before planting winter forage.
- Fertilise perennial pastures to maximise growth moving into the cooler months.
- Maintain ground cover to aid in pasture recovery after the hot/dry summer.

Lucerne based pasture for direct grazing

Since the commencement of the project the following activities have occurred.

- 16th July - Barley Sown
- 12th October – Cut for Hay Silage
- 7th November – Grazing Commenced (8 feeds)
- 7th December – Grazing Commenced (7 feeds)
- 27th December – Grazing Commenced (6 feeds)
- 23rd January – Grazing Commenced (7 feeds with Milking Herd, residual clean up with Dry Cows and Heifers).
- 26th February – Grazing Commenced (200milking herd)

February Grazing

The dry matter under the pivot was measured before grazing commenced on the 26th February using the electronic pasture meter. The results showed: -

- An average dry matter of 1621kg/DM/ha was measured.
- A range of 181kg/DM/ha to 2660kg/DM/ha.

Smarter Irrigation for Profit- Tasmanian Dairy Tour

February 27th to March 1st saw dairy irrigators participate in the national Smarter Irrigation for Profit tour of Tasmania's north, with NSW outnumbering the other state representatives- go NSW !— coming from Bega, Hunter, Taree, Northern Rivers and Dorriggo (bottom photo). Both NSW Optimised Dairy Irrigation Farm Project farmers, Rex Tout (Tamworth) and Scott Wheatley (Upper Hunter), continued their skill development (top photo) by both attending. The tour visited three of the Tasmanian Institute of Agriculture (TIA) SIFP trial sites where local farmers praised the outcomes of the project which has resulted in measureable profit gains for their businesses.

For all materials and presentations of the tour, please go to the dairy Smarter Irrigation for Profit webpage.

www.dairyingfortomorrow.com.au/tackling-specific-issues/water/smarter-irrigation-for-profit



To find out more about the Smarter Irrigation for Profit- Hunter Optimised Dairy Irrigation Farm Project, please contact:

Marguerite White
Project Manager, ICD Project Services

Phone: 0447 500 415 or Email: mwhite@icdprojectservices.com.au

Make sure you keep up to date on the project by following:

www.facebook.com/SmarterIrrigation

or by regularly visiting the project website page at:

www.dairyingfortomorrow.com.au/tackling-specific-issues/water/smarter-irrigation-for-profit