



Smarter Irrigation for Profit Project

Hunter Optimised Dairy Irrigation Farm (NSW)

‘Glenhaven’ Irrigated Pasture Update

January 2018

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Irrigation Report

Irrigation tips for February

- The weather outlook for February is for wetter and cooler conditions with a 65% chance of above median rainfall (which is 45 mm) and only a 45% chance of above median temperature. 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 January

January continued the run of extremely dry weather with only 2.8 mm of rain recorded at Scone airport (up to 26th January). The long-term median rainfall for January is 45 mm. The reference crop evapotranspiration (ET_o) for Scone airport was 214 mm (up to 26th January). 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 three times up to 22nd January with a total of 90 mm applied and zero rainfall. From ‘IrriSat’, up to 27th January, the crop water use at Glenhaven was about 231 mm. Assuming that all irrigation applied was available to the plants, the crop water demand was undersupplied by 141 mm and the pasture was in stress for significant periods of time (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 26th January and highlights the pasture stress. The continued drier weather and limited irrigation meant that the Lucerne suffered stress for most of the month (the green line). If the hot, dry weather persists, the applied water must be increased to meet the crop water demand if severe stress and reduced yield is to be avoided.

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.

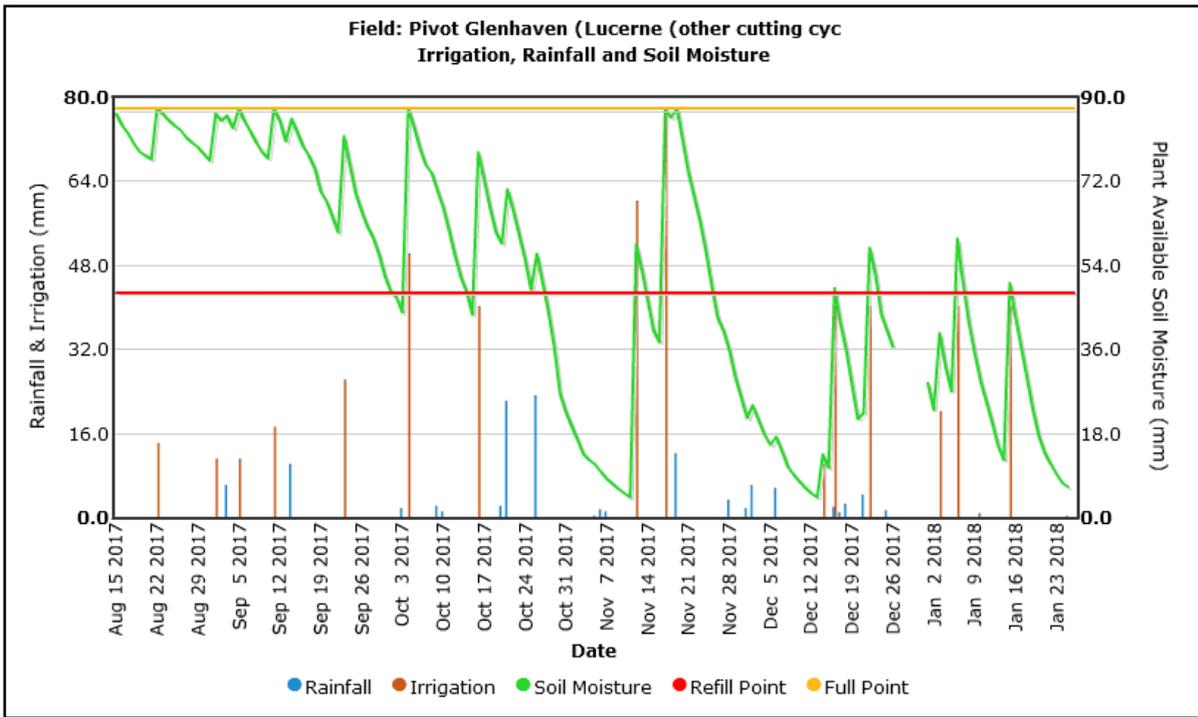
The project is also supported in the Hunter region by the following organisations:



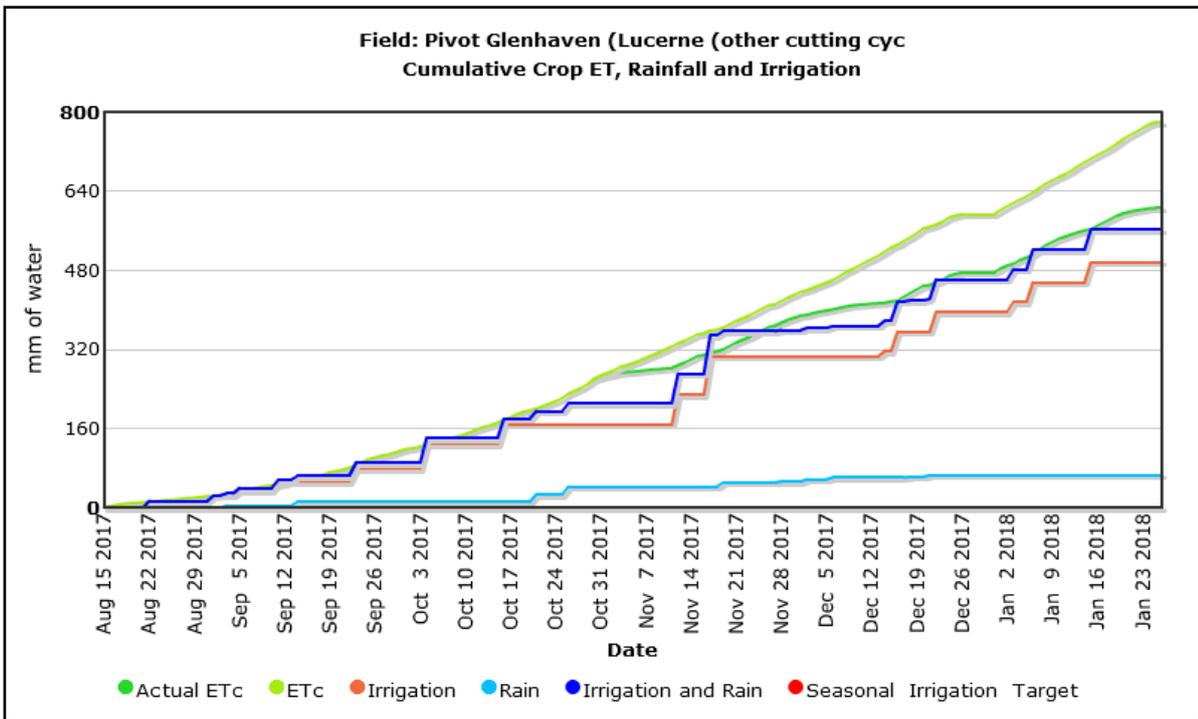
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Seasonal summaries from the Scheduling Irrigation Diary (SID) for Glenhaven



The stress of the pasture is also evident in the cumulative ET, rainfall and irrigation summary (below). It shows that at the end of January there was a shortfall of applied water (blue line) of 44 mm compared to Actual ETc (dark green line) but of 217 mm compared to potential ETc (olive green line). If the applied water (blue line) was more closely matching the potential ETc (olive green line), the yield from the field would be much higher.



Outlook from 'Irrisat'* for late January – early February

		Glenhaven		
		ETo	Chance of rain	Forecast
Mon	29	7.8	6%	Partly cloudy in the morning
Tues	30	7.1	6%	Partly cloudy overnight
Wed	31	4.5	35%	Mostly cloudy throughout the day
Thurs	1	6.8	14%	Partly cloudy until afternoon
Fri	2	6.6	14%	Clear throughout the day
Sat	3	6.9	9%	Partly cloudy until evening
Sun	4	6.5		Partly cloudy throughout the day

*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 January

ETo at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
9.3	8.6	7	7.9	7.2	8.2	10.1	9.7	7.3	7.5	6.7	8	10.2	8.8	7.7	8.3	7.4
18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
8.1	9.5	10.5	8.9	7.4	8.5	8.6	4.9	7.6	-	-	-	-	-	214+		

Rainfall received at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
									0.6							
18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
							0.2	2.0	-	-	-	-	-	2.8+		

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
18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
														0		

Irrigation events (mm) (from Scheduling Irrigation Diary)

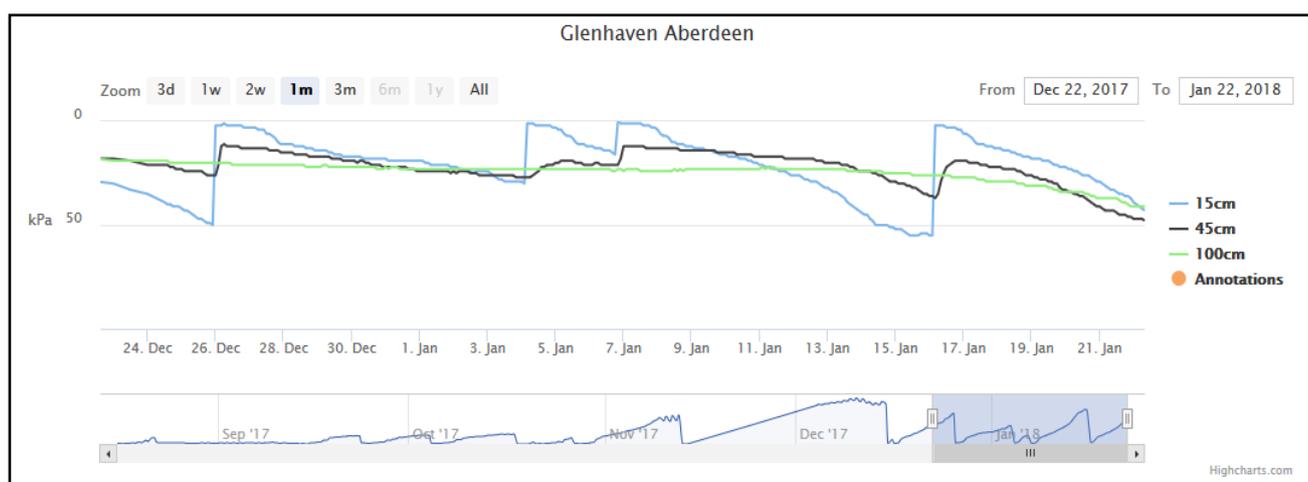
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Glenhaven			20			40									40		
Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total		
Glenhaven															90		

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 21/01/18



Water use is evident at all three depths indicating that the Lucerne is actively growing. From 17th January, the pasture water use increased significantly throughout the soil profile.

The shallow 15 cm sensor (blue line) indicates no flattening of the trace prior to irrigation being applied until January 15th where it reached about –55 kPa and held this level until irrigation was applied the next day. The flat pattern indicates that the refill point was reached at this soil depth, which is much sooner than –70 kPa from last month’s trace. This is probably due to the increased rate of water use, indicated by the steeper slope from January 12th to 14th, which the soil water release characteristic could not keep up with. The irrigation event was well timed as there was no flattening of the 45 cm or 100 cm traces, meaning the plants were still able to access ample water and not suffer stress. The amount of irrigation applied on that day was almost perfectly matched to the RAW as there was only a slight flattening of the 15 cm trace and no flattening of the 45 cm or 100 cm traces, meaning there was no real waterlogging and therefore no impediment to plant growth.

The 45 cm sensor (black line) shows a roughly similar pattern but less pronounced than the 15 cm trace. The slope is fairly consistent from Dec 26th to 31st then it flattens slightly until the irrigation application on Jan 4th. There is no apparent reason for this, as the ETo was fairly consistent during the whole period, but it is of no concern as the plants were actively extracting water from the 15 cm level. The 45 cm shows responses to the two irrigation events in early January, with the profile not being completely refilled at this depth. As mentioned above, the slope of the 45 cm trace increased at the same time as the 15 cm slope decreased in mid-January, showing that as the water became a little more difficult to extract at 15 cm depth, the plants accessed the readily available water at 45 cm depth. The irrigation application on 15th January did not refill the soil profile at 45 cm, allowing the plants to continue accessing water to meet their demand while the 15 cm depth was slightly too wet for them.

The 100 cm sensor (green line) shows a slow, constant level of water use until 17th January where the slope increases, indicating a higher level of water extraction from this depth. All three traces show this increased water use indicating that the plants are extracting water equally from all depths of the soil profile. The reason for the increased water use is not apparent, as the ETo increased at a fairly steady rate throughout January. This trace shows no up ticks, indicating that none of the irrigation 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 can vary by a day or two from the BOM station. 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 usually vary by one day to the BOM station.

Agronomy Report

Agronomy tips for January

- Take notice of evapotranspiration and the crops/pastures requirements and schedule irrigation accordingly.
- Autumn planting can commence as early as the end of February so paddock preparation and your sowing plan should be completed.
- The use of dry cows and heifers can be valuable in controlling excess crop/pasture residues before planting.
- Assessments on the production of aging Lucerne stands should be made moving into autumn. If plant numbers have declined resulting in reduced production assess any disease and pest damage that may be present. The decision then can be made to oversow with winter forage or to terminate the Lucerne phase.

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).

January Grazing

The dry matter under the pivot was measured before grazing commenced on the 23rd January with the electronic pasture meter. The results showed: -

- An average dry matter of 1693kg/DM/ha
- A range of 120kg/DM/ha to 2850kg/DM/ha.
- An average residual of 446kg/DM/ha was measured after grazing.
- Calculated utilised forage of 1247kg/DM/ha.

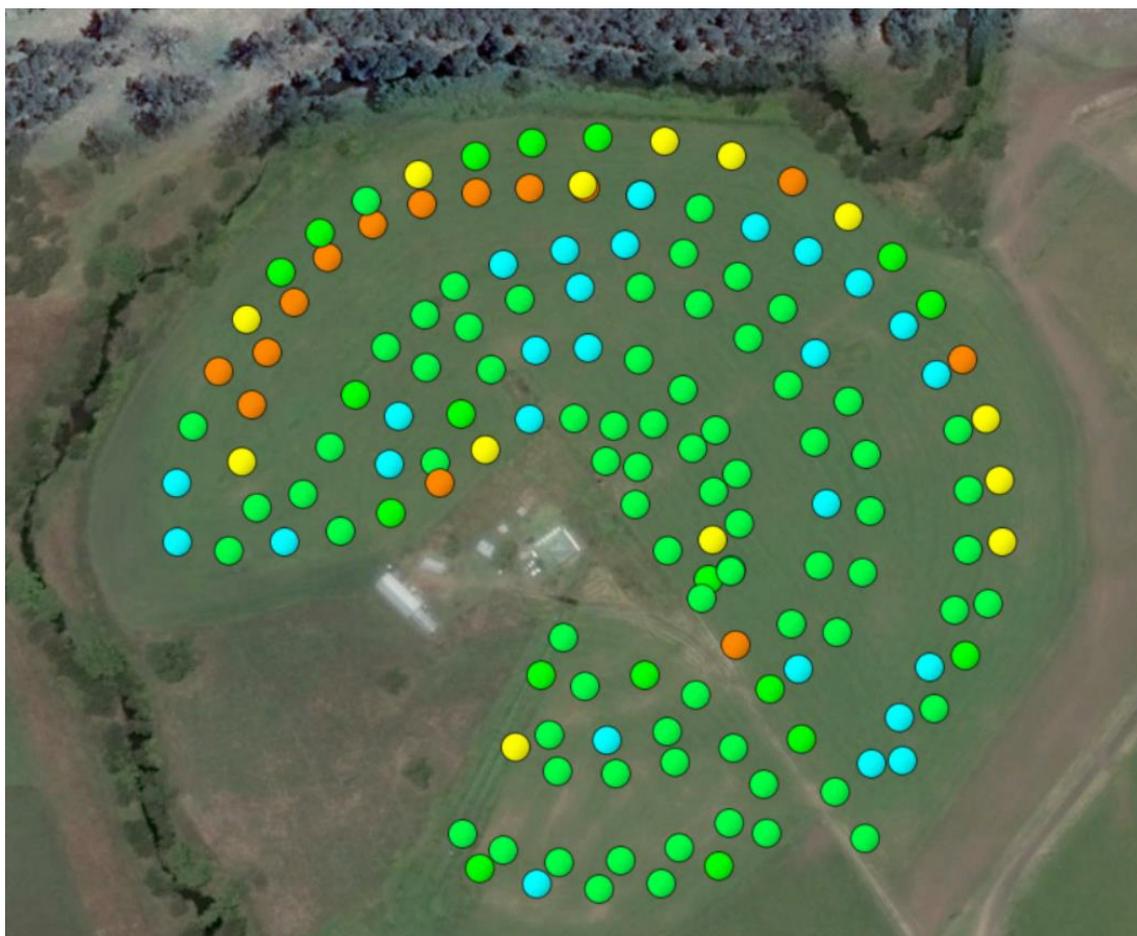


Photo Above: Shows pasture readings across the Pivot 23rd January 2018.

Legend Pasture Cover 23 rd January 2018	
Dot Colour	Dry Matter (kg/ha)
Blue	2000+
Green	1500-2000
Yellow	1000-1500
Orange	0-1000

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

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