Australian Government
Department of Agriculture and Water Resources

Dairy Australia

Smarter Irrigation for Profit Project

Hunter Optimised Dairy Irrigation Farm (NSW)

'Glenhaven' Irrigated Pasture Update

November 2017

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Irrigation tips for December

- The weather outlook for December is for normal or average conditions for rainfall and streamflow but above normal temperatures. Pastures should be irrigated in accordance with evapotranspiration (ET) measurements or soil moisture readings. Consider not entirely filling the profile to increase the opportunity for rainfall capture.

Comment for November

November continued the run of dry weather with only 21 mm of rain recorded at Scone airport. The long-term median rainfall for November is 59 mm. The reference crop evapo-transpiration (ETo) for Scone was 173 mm.

The barley – early Lucerne mix on the Glenhaven site was cut for silage on 12th October leaving the plant base predominantly lucerne. The lucerne was irrigated only twice in November with a total of 137 mm applied plus about 15 mm of rain. From 'IrriSat', the crop water use was about 145 mm. Assuming that all rainfall and irrigation applied was available to the plants, the crop water demand was met with a slight excess. 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 November. With the silage cut, the aim of the irrigation has changed to grow the Lucerne pasture for grazing. Because the pasture is now primarily lucerne and has a much deeper root zone, the Readily Available Water (RAW) has increased from 23 mm to 48 mm. This is shown in the SID seasonal summaries as a greater gap between 'Full point' and 'Refill point' compared to the seasonal summary in the October Irrigation Update. The continued drier weather and limited irrigation meant that, even with the greater RAW, the Lucerne suffered stress for about a fortnight from the end of October to early November. It appears to be suffering mild stress again in the last week of November. As the weather gets warmer, 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.

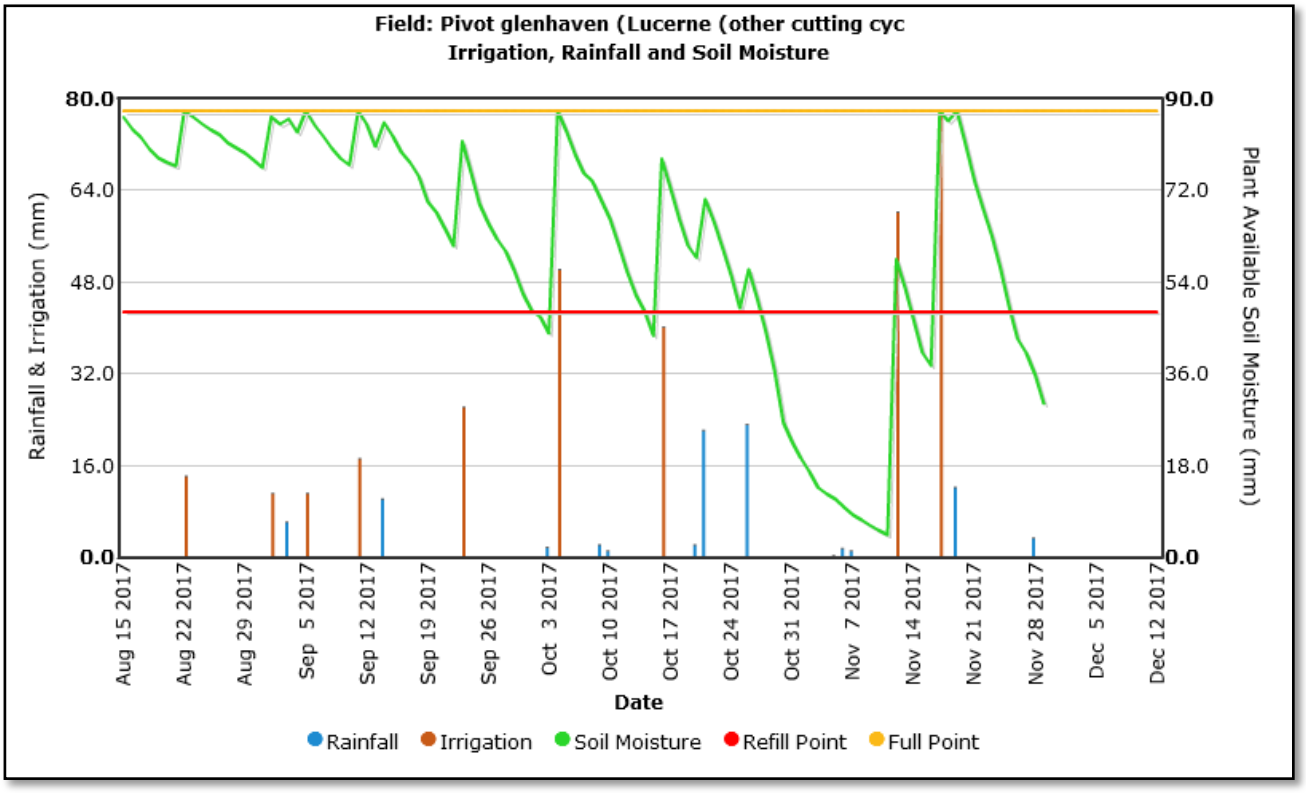
The project is also supported in the Hunter region by the following organisations:

NSW GOVERNMENT Local Land Services Hunter

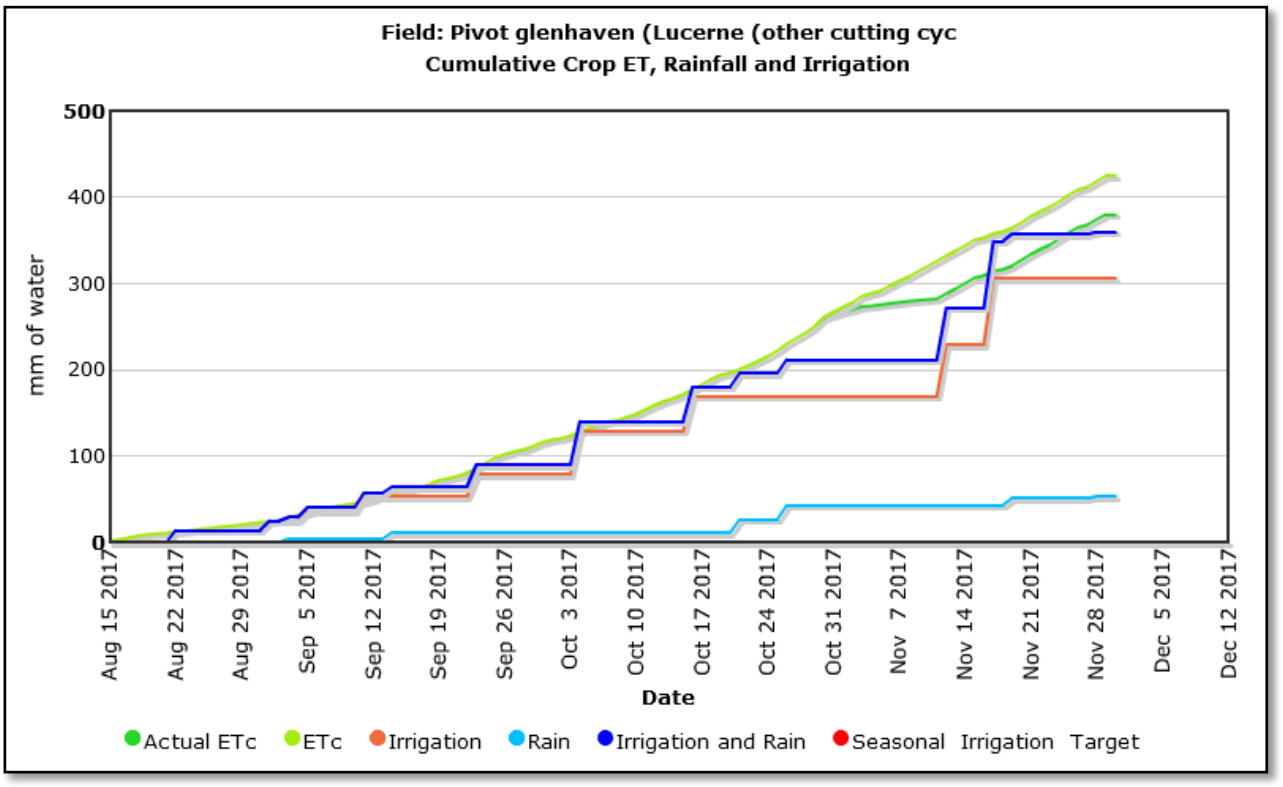
BLOOMSWATER

TainData Tierra Soil Moisture Logger

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



The cumulative ET, rainfall and irrigation summary (below) shows that at the end of November there was a shortfall of applied water of approximately 20 mm compared to Actual ETc (dark green line) and of approximately 85 mm compared to potential ETc (light green line), highlighting the potential loss of yield.



Outlook from 'IrriSat'* for December

		Glenhaven		
		ETo	**Chance of rain**	**Forecast**
Mon	4	4.6	71%	Rain starting in the afternoon
Tues	5	5.3	64%	Mostly cloudy until afternoon
Wed	6	5.5	55%	Partly cloudy starting in the afternoon
Thurs	7	7.8	7%	Partly cloudy starting in the afternoon
Fri	8	6.6	6%	Partly cloudy in the morning
Sat	9	6.4	7%	Partly cloudy in the morning
Sun	10	7.6	5%	Partly cloudy overnight
Mon	11	7.5		Mostly cloudy starting in the 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 November

ETo at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
5.6	5.8	7.8	3.7	3.3	5.9	6	5.4	6	6.3	6.5	6.4	5.8	6.5	6.9	2.7	5.4

18	19	20	21	22	23	24	25	26	27	28	29	30		**Total**
2.1	4.4	7.1	7.4	5.7	5.7	6.9	8.1	6.8	3	7	6.8	6.2		**173.2**

Rainfall received at Scone Airport (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
				0.2	1.4	1.0										

18	19	20	21	22	23	24	25	26	27	28	29	30		**Total**
	10					5.4				3.2				**21.2**

Rainfall at Glenhaven (mm) (manual rain gauge)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
				0.2	1.4	1										

18	19	20	21	22	23	24	25	26	27	28	29	30	31	**Total**
	12													**14.6**

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												60					77

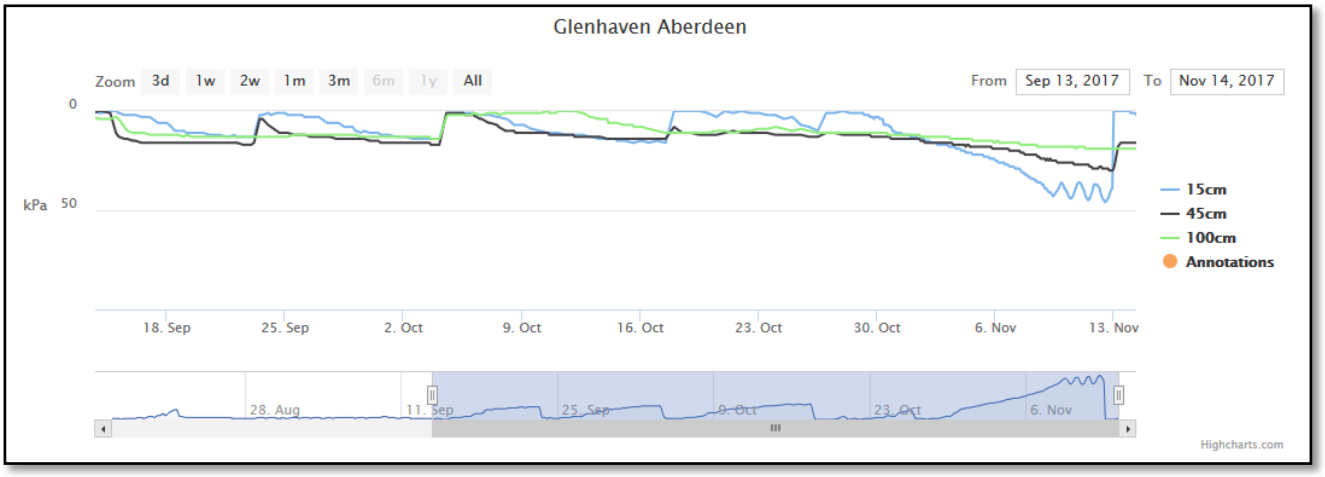
Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31	**Total**
Glenhaven															**137**

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

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 14/11/17



Due to difficulties downloading the data, the soil moisture traces are available only up to 14th November. For this period, the sensors displayed a wider range of activity and water use is evident at all three depths indicating that the Lucerne is actively growing. The shallow 15 cm sensor (blue line) displayed no further waterlogging after the end of October and a pattern of significant water use by the crop until 9th November where a series of three small refill events occurred. This period of significant water use coincides with the period of stress for the Lucerne in the SID seasonal summary of irrigation, rainfall and soil moisture (above). It's not clear what caused these three events as there was no rainfall recorded on Glenhaven nor irrigation applied during this period. This was followed by irrigation on 12th November of 60 mm that filled the profile at 15 cm. This trace was flat for the next day indicating it was waterlogged for that period. The 40 cm sensor (black line) shows the crop drawing water from this depth. The increasing slope of the trace indicates that the rate of water use of the crop is increasing, which is to be expected as heat and day length increase. The irrigation on 12th November reached to this depth but did not fill the profile. The flat trace immediately following the irrigation suggests that drainage from this profile layer was slow. The 100 cm sensor (green line) shows a fairly constant level of water use from the end of October. This indicates that the Lucerne is actively growing and drawing water from the whole soil profile. The irrigation on 12th November did not penetrate to this depth but there is a slight decrease in the rate of water extraction from 9th November when the unexplained small refills occurred in the 15 cm layer followed by the irrigation. This indicates that the crop preferentially drew more water from the shallow depth.

Agronomy Report

Agronomy tips for December

- Grazing rotation length remains as an important management tool in Lucerne pastures during December to maximise dry matter yield and forage quality. The Wheatleys have planned to mow Lucerne paddocks in front of the cows to help increase utilisation and maintain feed quality.
- Insect damage continues to be an issue in both established Lucerne stands and young summer crops such as sorghum, millet and maize. Carefully monitor all insect activity across the farm and take action if damage is significant.
- Consider Soil testing in December so that the results can be used as a tool for the 2018 season.
- Decisions on paddock planning and sowing requirements for the autumn should be front of mind during December.
- Control annual summer weeds to increase pasture yields. Of particular interest at the moment is Liverseed Grass.

Lucerne based pasture for direct grazing

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

- 16th July - Barley Sown
- 12th October – Cut for Hay Silage
- 7th November – Grazed for 8 days
- 7th December – Grazing to commence

November Grazing

The dry matter under the pivot was measured before grazing commenced on the 7th November with the electronic pasture meter. The results showed: -

- An average dry matter of 2185kg/ha was measured.
- There was a range of 700kg/DM/ha to 3330kg/DM/ha measured.
- Scott Wheatley aimed to allocate the 290 cows 8kg/Lucerne Pasture/each graze
- An average residual of 507kg/DM/ha was measured after grazing. The cows consumed most of the Lucerne leaves and left mainly stem behind.
- Utilised 1678kg/DM/ha.
- This utilisation equates to 8.61kg/DM/cow/grazing.

December Grazing

The dry matter under the pivot was measured before grazing commenced on the 7th December with the electronic pasture meter. The results showed: -

- An average dry matter of 2116kg/DM/ha
- A range of 459kg/DM/ha to 2669kg/DM/ha.
- Scott Wheatley aims to allocate 6-8 kg/DM/cow/graze.
- The Lucerne pasture will be cut with a mower conditioner prior to grazing.

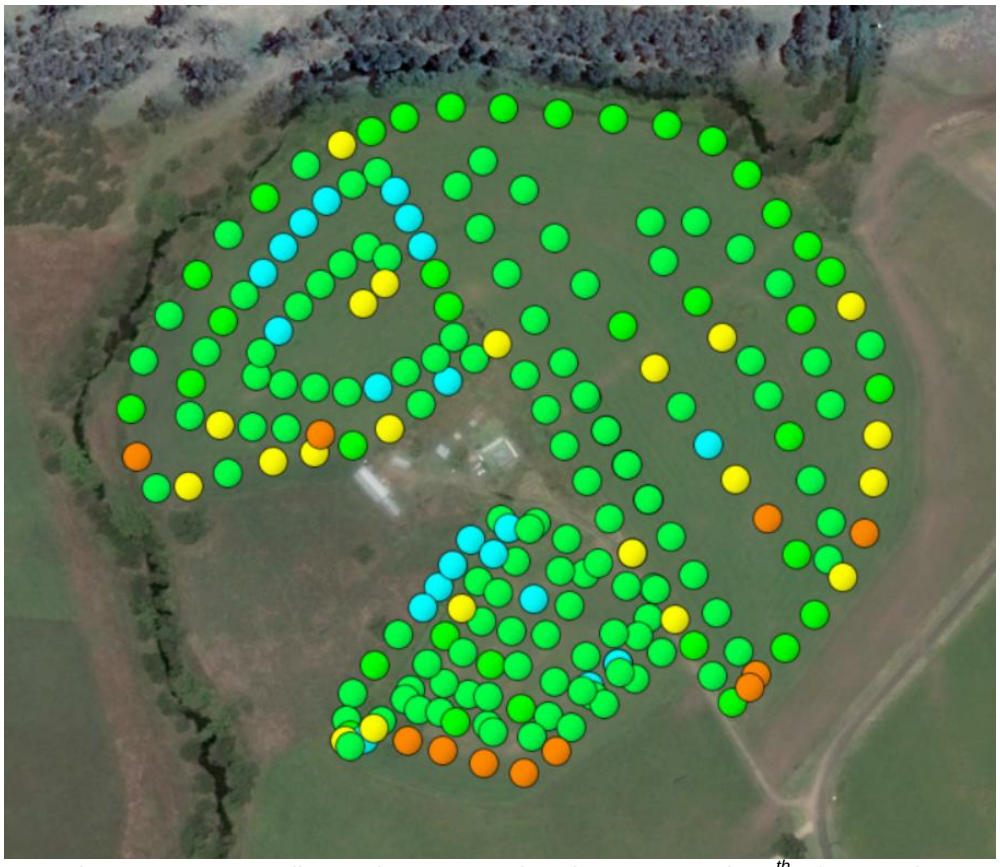


Photo: Pasture readings taken across the pivot area on the 6th of December

Legend Pasture Cover 6th November 2017

Legend Pasture Cover 6th November 2017	
Dot Colour	**Dry Matter (kg/ha)**
Blue	2500+
Green	2000-2500
Yellow	1500-2000
Orange	0-1500

A Farm Walk was held on the 5th of December- Peter Smith talks over the figures!

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

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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

Dairy farmers are encouraged to access the Tain soil moisture data for the four locations across the Upper Hunter by clicking on the following link:

https://panorama.taindata.com/

The login name: wheatley@brooknet.com.au

The password: abcabcabc

This login will show you all four sites: 'Glenhaven, Aberdeen' - Scott Wheatley, 'Garoka, Aberdeen'- Brad Smith, 'Dalara, Jerrys Plains' - Shane Gee & 'Rossett, Denman' - Andrew Farr

Note: Whilst the sites may not be of the same soil type and climatic conditions for your local area, the graphed trends in soil moisture versus Eto & rainfall are highly translatable to any dairy farming system at from time to time will provide some good insight into how your own soil moisture levels may be trending over the same period.