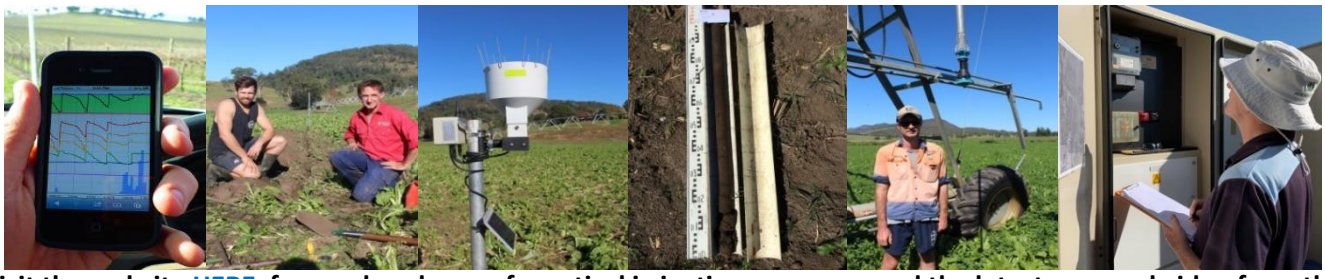
Hunter Irrigating for Profit Project

MAKING EFFECTIVE IRRIGATION DECISIONS

February 2021 Irrigation Report: November-January period



Visit the website HERE for an abundance of practical irrigation resources and the latest seasonal video from the Gloucester soil moisture monitoring sites.

A watchful eye on weather forecasts pays dividends

There are production and input cost benefits associated with using weather forecast information to better inform irrigation scheduling! That is certainly the key message of the quarter from *Hunter Smarter Farming: Irrigating for Profit Project* Gloucester dairy farmers, Tom Middlebrook, of Bowman Farm, and Adam Forbes, of Kywong Flat.

Managing the dry before the rain

With soil moisture sitting within the optimal Readily Available Water (RAW) zone in early November, the late November to early December period saw soil moisture decline with a dry spell (aprox. 50mm rainfall) and rising evapotranspiration (ETo) rates (30-45mm/week). With available irrigation, over this period Adam applied approximately 120mm to Paddock F3 (heavier, deep soil- Italian ryegrass/ kikuyu) and half that to Paddock F6 (lighter, shallow alluvial soil- Lucerne/Chiccory). He used off-peak Monday to Friday evenings to apply rates at 8mm and off-peak weekend days to apply larger applications of 20mm. This strategy of segmenting irrigation application rates was an ideal response to irrigation requirements of the different soil/ crop types of the two areas under this one pivot. Both paddocks remained in the RAW through this management (Figure 1).

“There was great growth as the irrigation worked well with the warm conditions on both sites. We were on 18-19 day rotations,” said Adam.

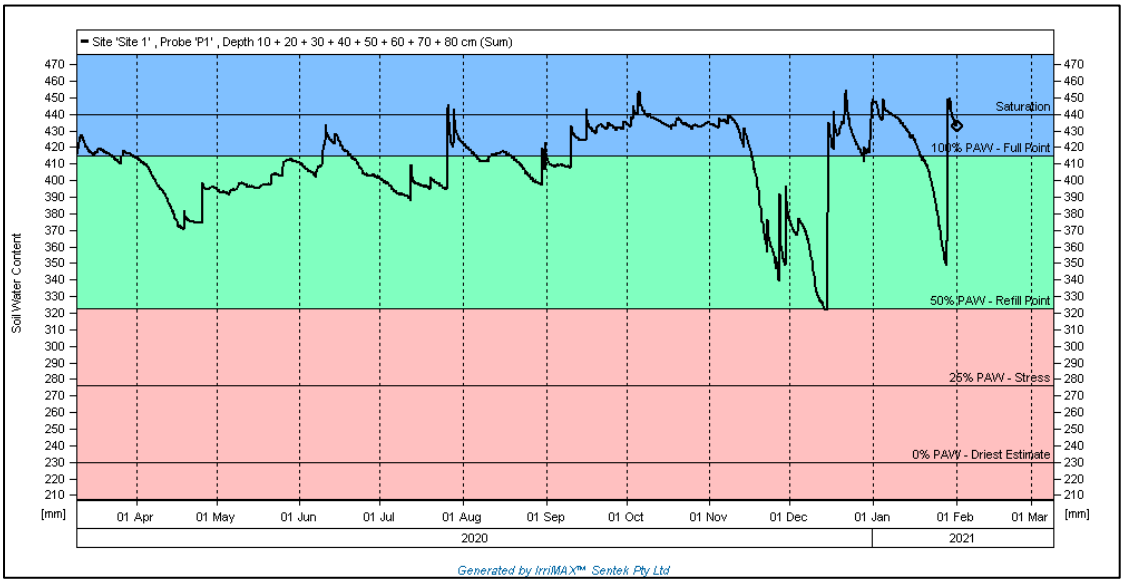


Figure 1- ***Kwong Flat soil moisture graph shows that Adam maintained RAW during the Nov-Dec dry-spell then waited for forecasted rainfall mid-December to lift soil moisture. Decline was again addressed by forecasted rainfall in late January.***

NSW GOVERNMENT Local Land Services

At Bowman Farm, the response was a little different. As the Sorghum crop had been heavily "watered-in" during early November, and the crop was still immature, plant water demand was not high. Whilst soil moisture trended downwards, there was enough moisture in the RAW 'bucket' to see levels remain in the optimal zone (Figure 2).

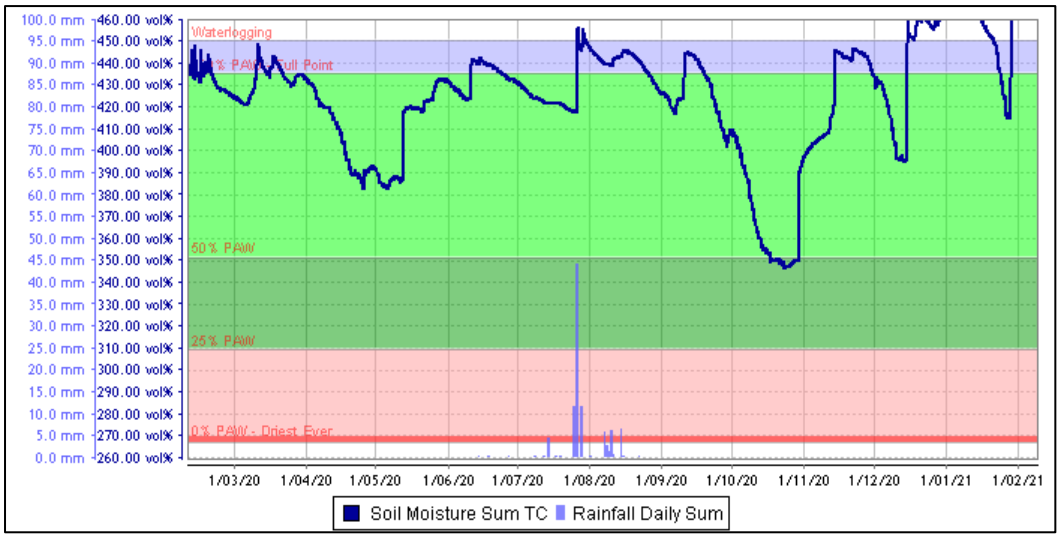


Figure 2- ***Irrigation applied in late October and early November on the sorghum crop lifted soil moisture above the full point. The dry-spell of mid-November to mid-December still saw levels remain in the RAW zone. Forecasted rainfall saturated the site from mid-December.***

Response to predicted rainfall

By mid- December, as both farms saw soil moisture continue to trend downwards, Tom prepared the irrigator to start-up and Adam considered his options to increase his weekly schedule on both sites.

Date	ETo*	Chance of Rain	Rain Range	Rain Estimate	Temp Range	Avg R. Humidity	Avg Wind Speed
	mm	%	mm	mm	°C	%	km/hr
Wed, 09-Dec	6.3	< 5	< 1	0.0	11-29	54	9
Thu, 10-Dec	6.7	50	0-2	2.0	13-34	53	10
Fri, 11-Dec	3.2	95	15-45	34.9	17-21	79	14
Sat, 12-Dec	3.1	90	20-65	50.8	16-21	78	14
Sun, 13-Dec	3.4	85	10-30	18.5	16-22	77	15
Mon, 14-Dec	3.9	85	10-40	24.7	16-25	79	15
Tue, 15-Dec	4.8	65	1-10	8.5	17-27	74	10
TOTAL	31.4			139.4			

Figure 3- ***Swan Systems ® seven-day weather forecast on the 9th December 2020***

Holding back a couple of days in response to their SWAN Systems® daily weather notifications (Figure 3), both were rewarded with their decision to mark time for just a few days, seeing a significant rainfall event from December 12th to the 22nd. This saw all three monitored sites pass the "full-point" on their soil moisture monitors. With over 500mm of rainfall from mid-December to mid-January, both farmers were forced to manage their farms for wet conditions, with grazing rotations lengthened over Christmas as the paddocks became difficult to access.

Again, soil moisture began to decline in mid to late January. At Bowman Farm, having sat in the extreme saturation zone 28 days, the soil moisture monitors gave Tom confidence that irrigation was certainly not needed. At Kywong flat, Adam took relief from the wet, drying F3 deliberately to cut low quality kikuyu hay from the site for calf feed, whilst on F6, soil moisture fell to mid-RAW which allowed the milkers to access the site.

Again, at this point both farmers needed to consider a response to downward trending soil moisture in the next week. With the SWAN Systems® daily weather notification indicating that rainfall would outstrip ETo in the last week of January, both Tom and Adam decided not to irrigate. The 28th-29th of January rain event delivered 100mm, lifting all three sites again above full-point (Figure 1).

"There is no doubt that having a weather forecast I have confidence in has saved input costs such as power and nitrogen and also helped us manage impact to yield. If we had turned the irrigators on the site would be more saturated than it is," said Tom.

Key management decisions of the period at Bowman Farm

- 100- 120kg/ha urea applied during the moist (but not saturated) periods of early November and late January boosted growth rates.
- Not applying Urea during the wet of late December, when growth was slow, mitigated nitrogen losses, the main pathway of concern would have been denitrification. This saved on input costs and prevented loss to the environment.
- The sorghum crop (planted October 21st) has recently had its 4th grazing on a 14-day rotation.

Key management decisions of the period at Bowman Kywong Flat

- Keeping soil moisture in the RAW during the dry period increased growth rates and allowed Adam to optimise production.
- Wet paddocks were managed to avoid pugging but were individually strategically managed as they dried from mid-January.
- To increase the quality of kikuyu on F3 from late January (after cut for low quality hay), the paddock is on a 10-12 day rotation and is topped every second rotation.

Upcoming considerations

- The Bureau of Meteorology's prediction for the February to April period is a 75% chance of 200-300mm of rainfall.
- Although SWAN Systems ® forecasts 15mm of rainfall in the next 7 days, ETo is over 32mm. This means that soil moisture will begin to decline. At this time, drying of soil moisture may be welcomed, but Adam and Tom need to continue to monitor their moisture levels to maintain RAW.
- Making informed decisions using weather forecasting tools will be an ongoing requirement this summer and into early Autumn in order to manage wet, rather than dry, conditions.

Figure 4- Tom Middlebrook and Hunter LLS Senior Land Services Officer- Agronomy, Peter Beale, inspect the sorghum crop and discuss how nitrogen has been managed on the wet site over the period.

Prepared by Marguerite White (ICD Project Services), Hunter Irrigating for Profit Project Manager
Email: mwhite@icdprojectservices.com.au
Phone: 0447 500 415

NSW GOVERNMENT Local Land Services