

MAKING EFFECTIVE IRRIGATION DECISIONS

November 2021 Irrigation Report: August – early November period



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Winter transpired as a true irrigation season!

Experiencing what was almost a completely dry August, with only 6mm of rainfall recorded, the *Hunter Smarter Farming: Irrigating for Profit Project* Gloucester sites were plunged into a full winter irrigation season until the second week of October. August to October 30-year average rainfall for the region is 325mm, this year only 143mm was recorded, over half of which fell in October.

Both Tom Middlebrook, of Bowman Farm, and Adam Forbes, of Kywong Flat, used all their knowledge to maintain soil moisture in the Readily Available Water (RAW) zone, though their strategies were truly tested. With daily evapotranspiration (ET_o) ranging between 3.5-5.1mm, single weekly irrigations of 25mm did not quite keep-up with ET_o on Bowman Farm where soil moisture slowly declined until improved rainfall mid-September (41mm between 14th-18th). At Kywong Flat, 8mm mid-week and 18mm weekend applications maintained levels throughout on F6, though F3 saw soil moisture dip into stress levels until the September rainfall, and again before significant October rainfall.

Bowman Farm

Whilst Tom managed to keep soil moisture within the RAW of the summed graph, it dipped close to the refill point on three occasions. Figure 2 shows the stacked graph for the rye/barley/brassica mixed pasture site. It demonstrates that his irrigations in August and early September were most effective to 55cm, not to the rooting depth of the brassica and barley of approximately 1m. It also shows top 45cm dried very quickly and would have impacted the active growth of the dominant ryegrass. The most effective water applications that can be seen to 95cm were by rainfall in mid-September (41mm) and the second week of October (57mm).



Figure 1. Tom Middlebrook of Bowman Farm is ready to plant the summer maize crop later in the week. After sowing pre-emergent herbicide will be applied and watered-in.

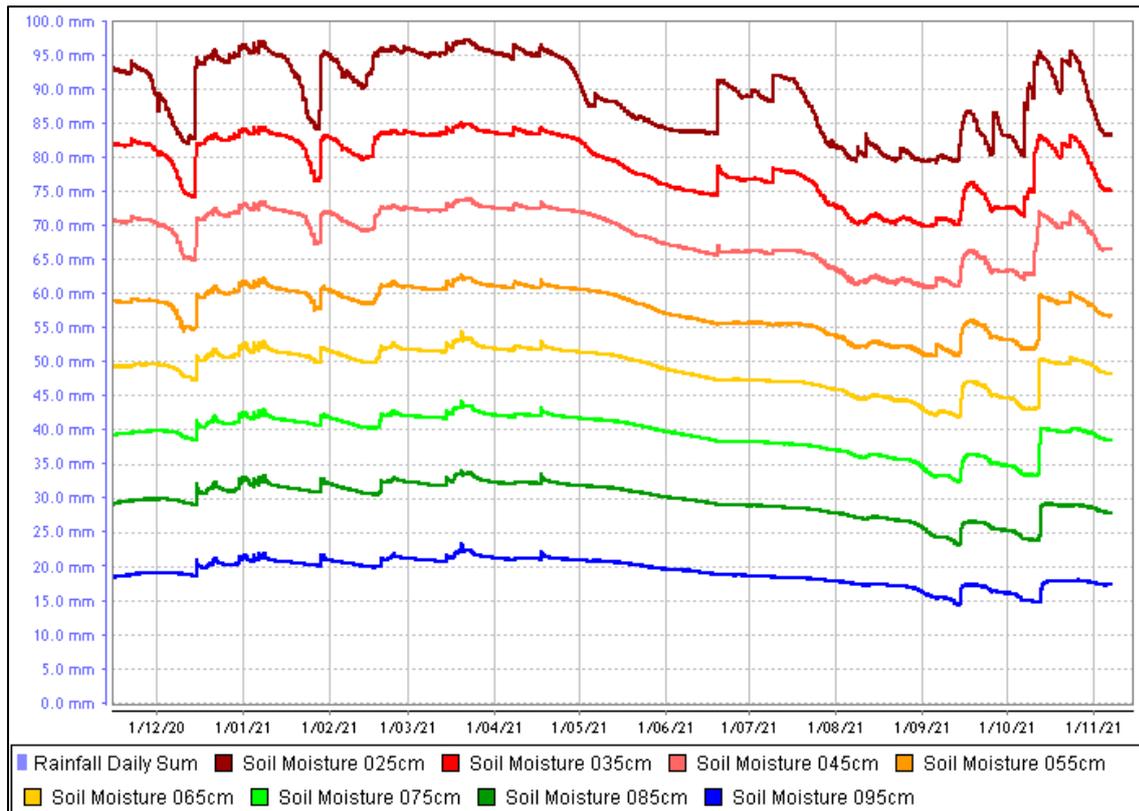


Figure 2. The stacked soil moisture graph at Bowman Farm shows that the upper levels of the soil profile were drying quickly after irrigations, potentially affecting the shallowest rooting pasture of the mix, ryegrass.

“We were just keeping-up over this period and ideally I should have applied more on the site, but I had to be mindful of water availability and spread the applications across the full milking platform. There was enough moisture on the graph to apply Greentop K (32.8:11:2.9) after each grazing throughout and the growth was actually right for what we needed. We certainly did not have to bring feed across to the site,” says Tom.

The site was last grazed in the first week of November, after which it was pre-sprayed. The plan is to plant the summer maize crop at the end of the second week of November if conditions are not too wet after forecasted rainfall of up to 70mm. Pre-sowing, 2.5t/ha lime, 15m³/ ha chicken manure and a customer fertiliser blend at 700kg/ha will be incorporated. Sowing will be at a rate of 85k seed/ha with 100kg DAP/ ha.

“While planting should be into a very moist soil, I will be watching the graph closely at the 25cm mark as this top-layer will be critical in the establishment stage and will require smaller applications more frequently if rainfall does not provide what we need,” says Tom.

The challenge for Tom will be to use the stacked graph to keep a close eye on soil moisture as the rooting depth of the crop develops. With roots of 1m, the developed crop will require larger irrigations to get at-depth penetration.

Kwong Flat

At Kwong Flat, Figure 3 demonstrates that there was a strict regime of mid-week (8mm) and weekend (18mm) applications applied, keeping soil moisture in the RAW. The Italian ryegrass is still remaining dominant at this time, with two silage cuts having been undertaken early September, just prior to the effective rainfall, and late October where the steep decline in soil moisture can be seen on the graph.

“At both these times I allowed to site to dry a little to make silage cuts easier, however, I think I took things a little too far at the end of October, I should have irrigated the weekend prior as I think growth rates had been stunted,” admits Adam.

Although the site is currently within the stress zone, Adam is holding off on irrigating with up to 70mm rainfall predicted later in the week. He will assess the need to irrigate afterwards.

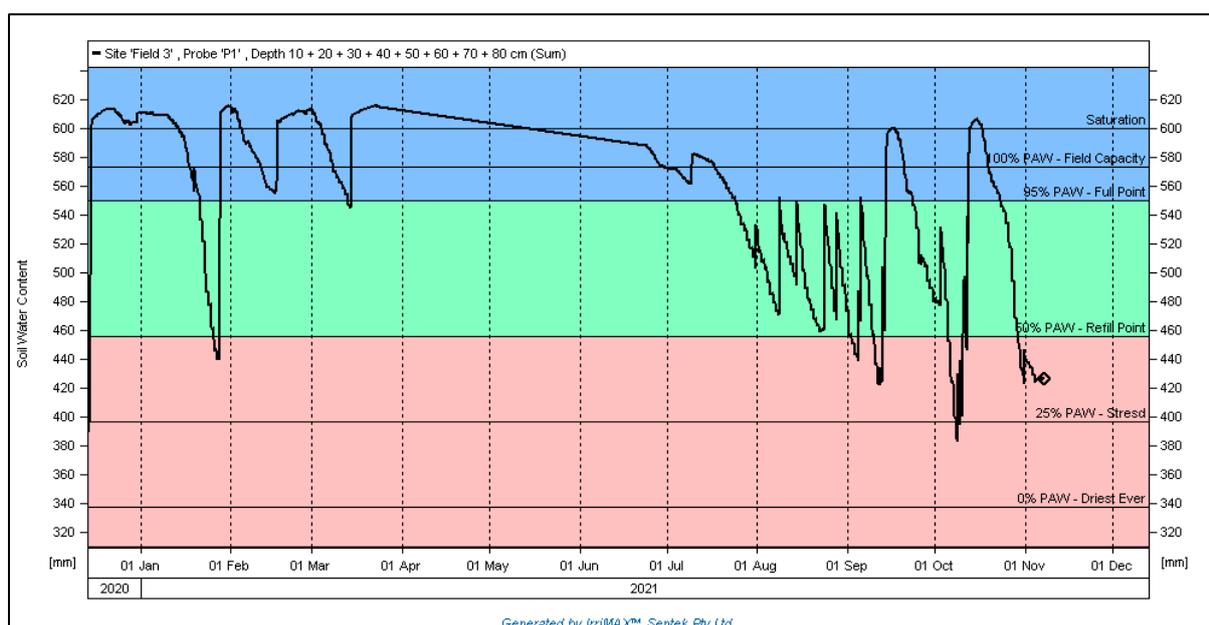


Figure 3. F3 was maintained in the RAW by irrigation, though allowed to dry when silage imminent.

Adam reports that on F6, the summed soil moisture graph did not directly correlate with what he was seeing visually in the paddock at the time.

“In August and to mid-September the graph shows we were primarily above the full-point, but the paddock certainly was not wet. I was also seeing the Prairie Grass stress in September and early October, although the graph says we should have been in ideal conditions,” says Adam.

Over the period Adam also observed that the overall ground-cover of the site improved and there was a better balance of Prairie/Lucerne/Chicory.

This highlights two important factors when using soil moisture monitoring:

(1) It is critical to use the stacked graph with the summed graph when monitoring soil moisture.

The stacked graph (Figure 4) shows that while at-depth soil moisture levels were maintained (rooting depth of the lucerne and chicory), the upper profile was drying more rapidly, likely causing stress to

the shallower rooting Prairie. Irrigating to match the water demands of the shallowest rooting pasture in an event mixed pasture is critical.

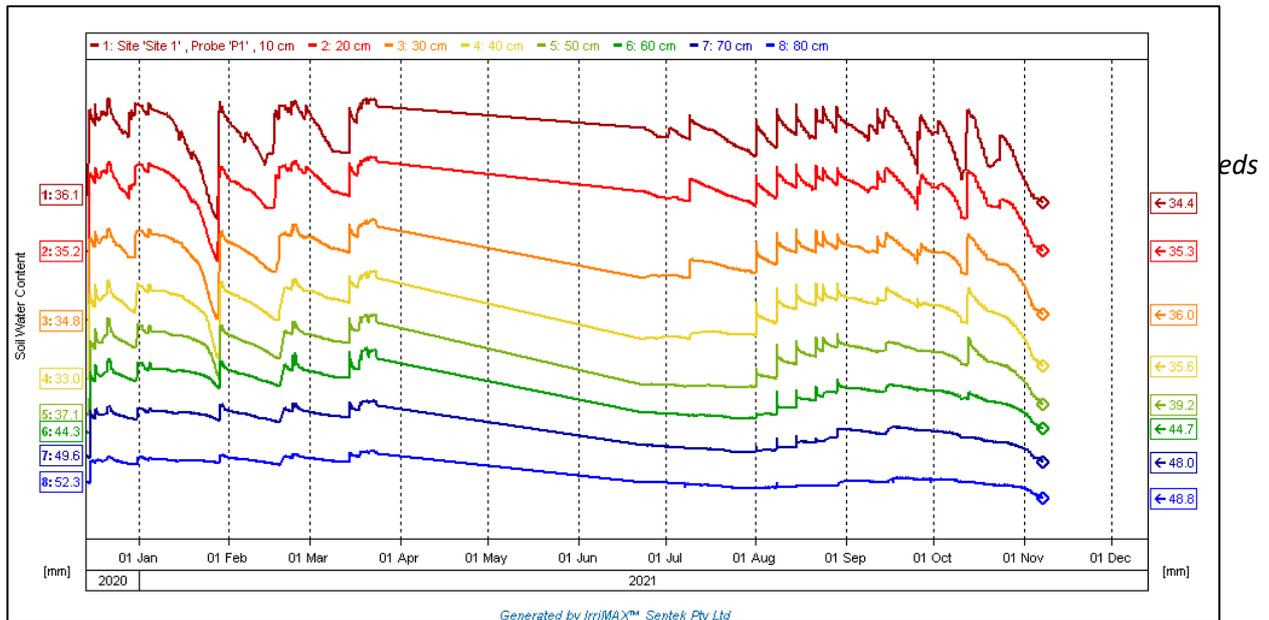


Figure 4. F6 displayed steep drying in upper profile which is reflected in the stacked graph but not obvious in the summed graph (Figure 5 below)

(2) It is important to reassess where the refill and full-point lines are located on the summed graph every season and have them adjusted by your platform provider.

RAW is determined by the soil type and the rooting depth of the pasture/crop. Whilst the soil type will not change, the plant rooting depth will. In this instance, Adam has a mixed pasture with both shallow and deep-rooted plants. He needs to make an agronomic decision on which plants in his mix have the greatest potential to add value to the milking platform over Spring into Summer and water accordingly. More frequent, smaller irrigations may be needed to maintain a more active Prairie sward in the mix. Also, an adjustment of the RAW zone to reflect this is needed and will be arranged (Figure 5).

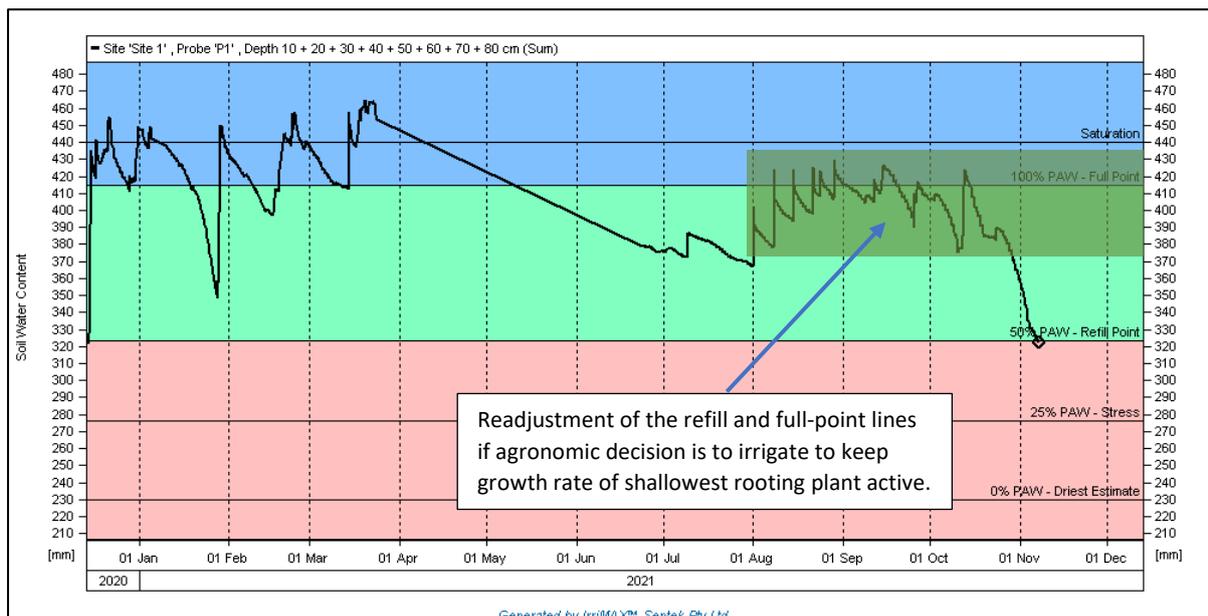


Figure 5. Irrigating to the shallowest pasture grass in the mix may require adjustment of the refill and full-point lines.

Upcoming considerations

- The Bureau of Meteorology's prediction for the remainder of November is 75% chance of 50-100mm rainfall, and November to January period of 75% chance of 300-400mm.
- While spring and summer are looking to be quite wet, rainfall has fallen in cells across the region, so site specific data will be important to monitor.
- Summer crops need to be irrigated with consideration for developing rooting depths, increasing rate with decreased frequency as roots develop.
- Mixed pasture species should be irrigated with consideration for the shallowest rooting plant, potentially requiring smaller irrigations more frequently.
- Using soil moisture monitoring will assist both farms to assess the impact of increasing ETo and the effectiveness of irrigation applications. With weekly ETo currently 25-30mm/ week, irrigation events need to provide at least this amount.
- Making sure irrigation starts on-time after rainfall events will be important.
- Undertaking system checks of irrigators prior to irrigation start-up is essential- access irrigation system check-lists and soil moisture monitoring equipment decision resources on the Dairy Australia Website: <https://www.dairyaustralia.com.au/land-water-and-climate/water/irrigation/smarter-irrigation-for-profit#.YJR8c7UzaUk>

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