MAKING EFFECTIVE IRRIGATION DECISIONS
February 2020 Irrigation Report: October to 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.

Key points of the period

- From October to mid-January, there was only 70mm of rainfall at the sites - including an extreme dry spell from mid-November to mid-January with only 7mm recorded.
- Due to no flow in the Bowman River, the Bowman Farm site has had no irrigation water and so no summer crop was planted due to extreme soil moisture depletion.
- Kywong Flat has had intermittent access to water from the Barrington River. In early November there was a small opportunity to irrigate, then again for a 6 day period in late November. At this time the study site was irrigated for 24hrs/day to lift soil moisture to above the refill point. With rising evapotranspiration (ETo) rates 6-8mm/day), soil moisture depleted quickly. A three day opportunity to irrigate in early December did not have a lasting effect.
- Both farms have purchased and hand-fed significant feed over this time. The effects of not growing summer crops will remain throughout the year.
- Since the 10th of January, 143mm of rainfall has been recorded. This has increased optimism and plans for recovery strategies have moved into full swing.
- Kywong Flat has access to irrigation water again. F3 & F6 are to be sprayed and prepared for early sowing to an Italian/annual ryegrass mixed pasture.
- Bowman Farm will use current moisture to also prepare the site and sow an Italian ryegrass/ cereal mixed pasture in approximately 6 weeks. Cereal seed will be expensive and difficult to source, though there are strategies planned to manage these costs separately for early and late sowing.
- Upcoming rainfall forecasts provide a promising immediate outlook.

<table>
<thead>
<tr>
<th>Date</th>
<th>ETo* (mm)</th>
<th>Chance of Rain (%)</th>
<th>Rain Range (mm)</th>
<th>Rain Estimate (mm)</th>
<th>Temp Range °C</th>
<th>Avg R. Humidity (%)</th>
<th>Avg Wind Speed (km/hr)</th>
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<tbody>
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<td>Wed, 05-Feb</td>
<td>4.9</td>
<td>20</td>
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<td>15-28</td>
<td>60</td>
<td>9</td>
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<tr>
<td>Thu, 06-Feb</td>
<td>3.1</td>
<td>90</td>
<td>7-20</td>
<td>17.1</td>
<td>17-23</td>
<td>81</td>
<td>7</td>
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<tr>
<td>Fri, 07-Feb</td>
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<td>90</td>
<td>15-45</td>
<td>34.8</td>
<td>17-25</td>
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<td>10</td>
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<tr>
<td>Sat, 08-Feb</td>
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<td>15-30</td>
<td>22.4</td>
<td>18-26</td>
<td>86</td>
<td>11</td>
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<td>Sun, 09-Feb</td>
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<td>15-35</td>
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<td>17.7</td>
<td>18-27</td>
<td>88</td>
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<tr>
<td>Tue, 11-Feb</td>
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<td>80</td>
<td>6-20</td>
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<td>86</td>
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Forecast provided by the Bureau of Meteorology, © Commonwealth of Australia. Sponsored by SWAN Systems.

- The February rainfall outlook is 75% chance of 100-200mm, with a total of 200-300mm for the 3 month outlook. ETo may remain high, potentially with intermittent relief, prior to decreasing in late March/ April.
Bowman Farm Soil Moisture Commentary

- Unfortunately with no access to water the irrigation infrastructure on this site at Bowman Farm has remained unused since May 2019 and the last feed off the site was June 2019 by the milking herd.
- Soil moisture remained at extreme stress levels from August until welcomed January rainfall events, totalling 150mm, have seen the profile fill rapidly to field capacity.
- This rainfall has given Tom confidence to prepare the site for sowing. With rainfall stimulating significant weed growth, the site will be sprayed, followed by a short fallow and then sowing to an Italian ryegrass/cereal pasture mix.
- The site will continue to rely upon rainfall if the Bowman River remains dry.
- The farm is putting in measures to recover from prolonged drought conditions, with kikuyu feed now available in paddocks across the platform.
- Supplement feed is being used to balance the diet to avoid animal health issues relating to new flush feed which is high in nitrogen from mineralised soil sources.
- Later in the season, as the kikuyu drops, wheat seed may be sourced from the silo to avoid current high costs of purchased seed. Although not ideal in quality, Tom believes that the numbers stack-up for late season sowing.

Seasonal Summaries for Bowman Farm

Soil Moisture Graph
An irrigation strategy of weekend applications of 20mm and mid-week (at night) of 8mm was maintained until mid-November when irrigation from the Barrington River was ceased. This strategy saw soil moisture levels sit just below optimal after irrigation and depleted quickly in the following days as ETo rates outstripped water rates applied.

A 6 day irrigation access window from the Barrington River was used to lift soil moisture to optimal - irrigation was applied 2.5hrs/day. Levels were short-lived following. Again a small window of 3 days provided some relief but not enough to raise levels significantly.

January rainfall events of 150mm provide necessary soil moisture and reinstate irrigation access. No irrigation used at this point.

Soil moisture levels near stressed.
Seasonal Summaries for Kywong Flat - Paddock F6 Lucerne/chicory/ryegrass

Soil Moisture Graph

Stacked Graph

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Kywong Flat Soil Moisture Commentary

- Whilst irrigation was available in October to early November, irrigating to use off-peak power at the weekend and once per week day was adequate for the F6 shallow soil, however, it was a strategy that left the deeper soil of F3 below optimum. As ETo increased (5mm – 6mm/day) in early November irrigation refill was not reaching deep into the soil profile - the “bucket” was not truly full deep into the profile.
- With the “bucket” not full on F3, when irrigation was ceased in November, soil moisture declined rapidly. Although the “bucket” appeared completely full on F6, the shallower nature of the soil meant that it also dried quickly throughout the profile.
- The use of monitoring soil moisture was invaluable to the management of irrigation in a six day irrigation window that occurred in late November, Adam reports that he used the monitors to justify keeping irrigation going 24/7 until he could see the graphs reach above the refill point on both probes. A smaller three day window in early December allowed moisture levels to increase but still well below optimal on both sites.
- Summer cropping was no option for Kywong Flat without irrigation and significant feed was purchased to see the business through the summer and to fill the feed gap which will remain throughout the coming year.
- With the commencement of good rainfall events in mid-January, the soil moisture on both sites has increased dramatically and irrigation access has been reinstated.
- Adam is now using the SWAN seven day forecast notifications (see above) in his decision making. With good rainfall predicted in coming days, he has decided to monitor the effectiveness of this upon soil moisture and use irrigation to supplement after the events, if and when required. This will assist to keep power costs down.
- Both sites are now being prepared for early sowing into Italian/annual ryegrass. As ETo will remain high over the next month, good establishment of the paddocks will rely upon scheduling irrigation to supplement rainfall. Rainfall + Irrigation (Total Water) needs to at least equal ETo.

Forecast tips

- The strategy of monitoring the effectiveness of good rainfall predicted in the next week is sound. Soil moisture monitors will allow Adam to ascertain when and how he should supplement irrigate.
- Kywong Flat may need to consider management of soggy soils in the shorter term, however, monitoring soil moisture will be integral in March/April when less rainfall is predicted. The key is to ensure irrigation is commenced again, and scheduled ongoing, at this time to keep soil moisture in the optimal Readily Available Water (RAW) zone.
- The timing of sowing versus good establishment soil moisture availability is important on both farms. There is an opportunity to take advantage of recent and imminent rainfall to provide ideal soil moisture though a balanced approach with potentially saturated soils will be important.
- As winter pastures develop, nitrogen application decisions should be based upon available soil moisture to drive yield. Care must be taken to ensure Nitrogen is not applied to saturated soils volatilisation loss is a waste of money.

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