The study site at Bowman Farm has had no access to irrigation water since May and has experienced only 17mm of rainfall since early July.

Key points of the July to September period
- Due to no flow in the Bowman River, Bowman Farm has had no access to water for the period. With only 42mm of rainfall, the irrigation area has been taken out of the milking platform.
- Kywong Flat has access to water from the Barrington River. Frequent irrigations, increasing over the period from 8mm to 25mm 7 day totals, have generally maintained soil moisture at adequate levels as Eto (2.3-4.2mm/d) has increased.
- At this point in time soil moisture levels are now declining across both sites at Kywong Flat as a result of increased plant water demand and recent windy, dry days.
- Kywong Flat plans to manage irrigation to assist paddock F6 Annual Rye and paddock F3 Italian Rye persist through until mid to late November.
- The November rainfall outlook is 75% chance of 25-50mm, with a total of 100-200mm for the 3 month outlook. As Eto rises SMM should be closely monitored and response should see increased irrigation frequency and rates.

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. Tom remains positive that installing the pivot was the right decision as the return on investment to date has been strong.
- After the last period there was only 2 x 2 day feeds for the milking herd on the site (Winter Rye-Wheat-Brassica pasture). The quality of feed rapidly declined as plant available water declined.
- Tom has been using 9am soil temperature readings from the probe to monitor conditions for the possibility of planting sorghum on the site at a temperature of 16°C or above. He will also use SMM to gauge the effectiveness of rainfall events. If he sees a rainfall event of approximately 25-30mm penetrate to 35cm (red line), he will plant sorghum with a confidence that the soil moisture will provide a 30 day establishment opportunity.
- Significant rainfall resulting in run-off is required to reinstate water access to the Bowman River.
Seasonal Summaries for Bowman Farm - Winter Rye-Wheat-Brassica pasture

Soil Moisture Graph

Stacked Graph

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Kywong Flat Rainfall & Irrigation

Seasonal Summaries for Kywong Flat- Paddock F3 Italian Rye Grass

Soil Moisture Graph

- **Refill point**: 25mm rainfall increasing soil moisture levels early.
- **Stress point**: Earlier rainfall stimulus to keep soil moisture in the effective zone over this long no rainfall period. 8mm increasing over time to 18mm applied every 7-10mm days weekends (off peak power used).
- **Increasing daily evapotranspiration (Av. 4mm)** and growth rate sees soil moisture levels decrease.
- **30mm application made to increase soil moisture of profile followed a week later by a rainfall event (17mm).**

Current application of 25mm over 7 days-17mm at weekends and 8mm mid-week overnight (off peak water used). With increasing evapotranspiration and strong growth rates, water applied is effective for short period and soil moisture is decreasing. Management needs to increase 7 day application and more frequently in October.

Stacked Graph

- **25cm**: 7mm rainfall increasing soil moisture levels.
- **95cm**: 8mm rainfall increasing soil moisture levels.

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**Soil Moisture Graph**

- **25mm rainfall increasing soil moisture levels early.**
- **Earlier rainfall stimulus to keep soil moisture in the effective zone over this long no rainfall period. 8mm increasing over time to 18mm applied every 7 days weekends (off peak power used).**
  
  *(August daily evapotranspiration Av. 3.2mm)*

- **Increasing daily evapotranspiration (Av. 4mm) and growth rate sees applications increased to 25mm over 7 days (split 17mm/8mm) which is effective in this shallow soil.**

- **Heading into early October soil moisture decreases as dry winds and increasing evapotranspiration effect moisture of shallow soils.**

**Stacked Graph**

- **25cm**

- **95cm**

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Kywong Flat Soil Moisture Commentary

- An irrigation schedule of matching frequency and rate, to respond to increasing Eto, has worked well into mid-September at Kywong Flat. Whilst no silage has been made, increasing growth rate has been observed and the milking herd is on a 19 day rotation.
- As Eto has increased in late September into early October (average of 5mm/day), overall soil moisture is trending downwards on F6 and remains in the effective zone on F3.
- Current management of 17mm weekend applications followed by 8mm mid-week applications are seeing only a short-term response in SMM to 65cm on F3 and 45cm on F6 (shallow soil).
- Increased frequency of smaller applications to meet weekly Eto (30-35mm) is needed on F6. By applying less more frequently the water applied would remain within the plant rooting zone.
- As irrigation during off-peak power is a major factor in irrigation scheduling, Adam may consider applying 20mm and split the mid-week irrigations into 2x 5-8mm applications in order to push the Italian Rye on F3 through to late November.
- On F3, Adam could maintain the frequency at a lower application but monitor SMM closely to increase rates again as Eto climbs.
- Segmenting applications to reflect the different soil types under the single pivot needs to be explored by Adam- manual increased/ decreased speed is required at this point in time with the current pivot capability.
- Kywong Flat is currently not experiencing water restrictions on the Barrington River.

October to January tips

- The rainfall outlook for November to January is 75% chance of 50-100mm. Irrigation forecasting should be determined using the Scheduling Irrigation Diary tool (water balance calculation using forecasted temperature, Eto & rainfall) along-side the in-situ SMM equipment at Kywong Flat.
- Should conditions remain dry, Kywong Flat may need to balance the decision to irrigate only during off-peak periods with the capacity of the pivot system to apply irrigation at the right rate to meet plant water requirements.
- Effective rainfall should be closely monitored. If rainfall is not penetrating to an effective rooting depth, supplementary irrigation needs to be maintained following rainfall.
- Bowman Farm can use SMM to gauge depth of rainfall effectiveness and soil temperature to assist in the decision to plant a sorghum crop.

Prepared by Marguerite White (ICD Project Services)
Email: mwhite@icdprojectservices.com.au
Phone: 0447 500 415