

## **Building Resilience and Profitability of High Rainfall Farmers**

### **What's Happening**

This was the second year in a three-year project that is focusing on building resilient farm businesses and strengthening farm decision making. It is based on the highly successful Grain & Graze decision making model which incorporates four key parameters with vital real time information. The parameters being - soil moisture, pasture availability, commodity prices and climate data.

Workshops are being run with a key focus on women and young farmers to build confidence and skills. The culmination of the project will result in a website dashboard, with optional push notifications of the four key parameters. Providing information that increases farmer and agronomist ability to make better on-farm management decisions.

The restrictions imposed by COVID 19, combined with bushfire recovery meant that no workshops were held on the Island during 2020. Meanwhile, the recalibration of the new and improved Pastures from Space continued.

### **Soil Moisture Monitoring**

The project partially funded the installation of up to 30 soil moisture probes across the high rainfall zone in Tasmania, Victoria and South Australia. On Kangaroo Island, three 120cm deep Adcon Telemetry soil moisture probes and weather stations were installed in April 2020. These are located at Buck's (Gosse), Heinrich's (Parndana) and Berry's (Birchmore). This information is uploaded every 15 minutes and can be found [http://toip-server.net.au:8080/custdata/agbyte/kihrz/agb\\_index.html](http://toip-server.net.au:8080/custdata/agbyte/kihrz/agb_index.html)

The Buck Gosse site had the most rainfall during winter 2020 with several instances of saturation events down through the soil profile during August to mid-October. This was observed as the 'tabletop' effect where the graph lines flatten out for days/weeks prior to the water moving down deeper in the profile to drain away (Figure 1). There is the diurnal fluctuation evident with pasture root activity extracting moisture during the latter part of November as temperatures warmed up and plants got growing (clover, kikuyu, fog grass and capeweed). The February 2021 rainfall event did infiltrate to around 80cm, but evapotranspiration saw most of this moisture removed by early April 21. Rainfall during April/May 2021 infiltrated to around 60cm but there was slightly less moisture than same time last year.

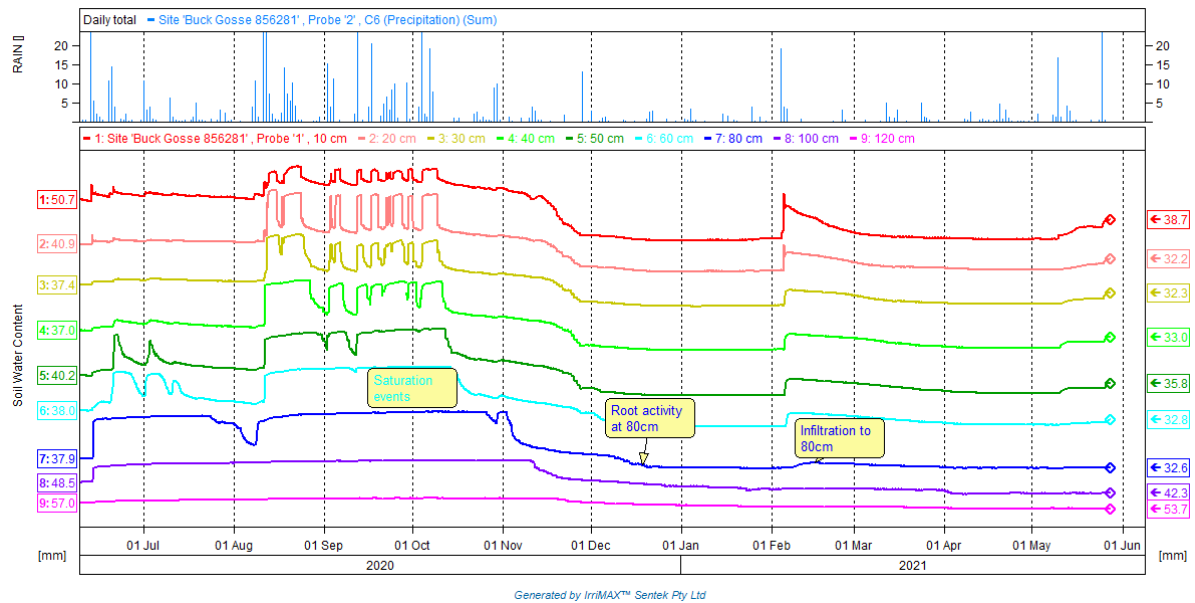


Figure 1. Buck Gosse site. Moisture sensor readings at varying depths in the soil profile.

The Heinrich Parndana site also saw saturation events during August to October (Figure 2). The nature of this soil type (more gravelly down the profile) saw more rapid infiltration than the other two sites and thus the graph appears more 'spiky' and not as smooth as others. Pasture root activity is less pronounced but is evident in the top 40cm during November.

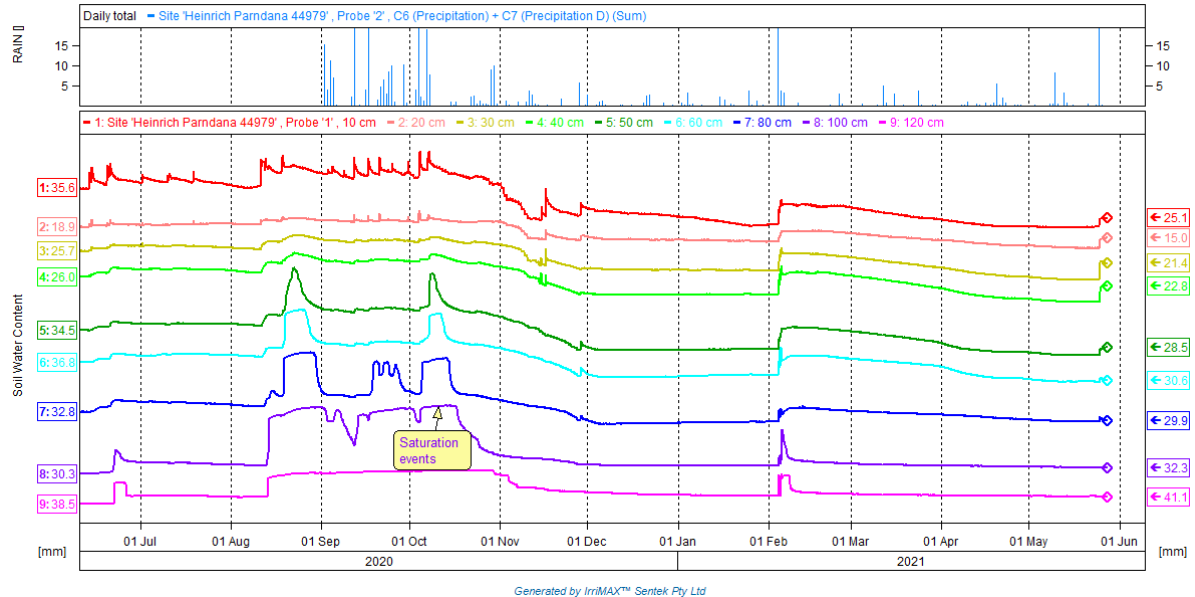


Figure 2. Heinrich Parndana site. Moisture sensor readings at varying depths in the soil profile.

The Berry Birchmore site did not see any saturation events last winter and the lines therefore look quite smooth (Figure 3). Root activity was observed down to 80cm during late November and there are nice curves prior to that showing the roots progressively extracting moisture down the profile which was very clear at the 50 and 60cm sensors. Again in March 2021, the root activity was clear at these two sensor levels, which was surprising given that it is an annual pasture.

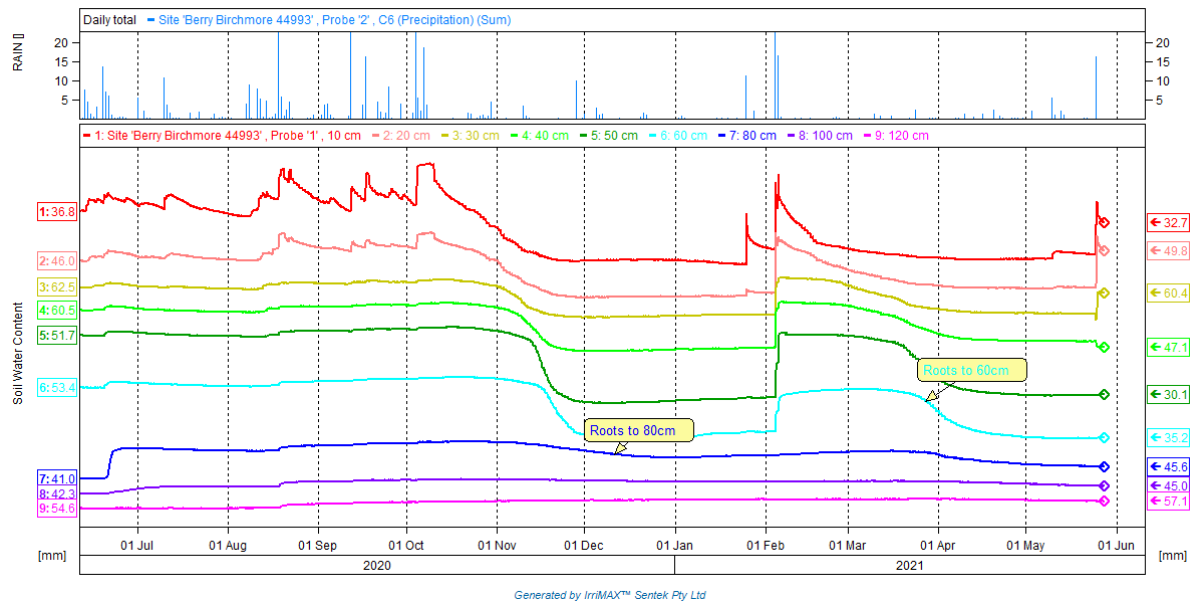


Figure 3. Berry Birchmore site. Sensor readings at varying depths in the soil profile.

And whilst not directly involved in the project, the Bell Cygnet River site is a long term site and feel it's important to publish the data. Being a long term site means the data has enabled very accurate upper and lower thresholds to be established. The site was under grain crops and had wheat in 2020. The grain fill period during November only saw roots to 100cm due to the kind finish to the season, whereas in previous seasons roots have been observed extracting deeper than that (the probe goes to 160cm). Residual moisture from 2020 means that at May 2021 the profile was 50% full with a large part of that being at the 100cm and deeper which is observed in the Deep Summed graph (Figure 4) that shows only those sensors at 100 to 160cm. This will likely lead to saturation events at this site if there is average winter rainfall.

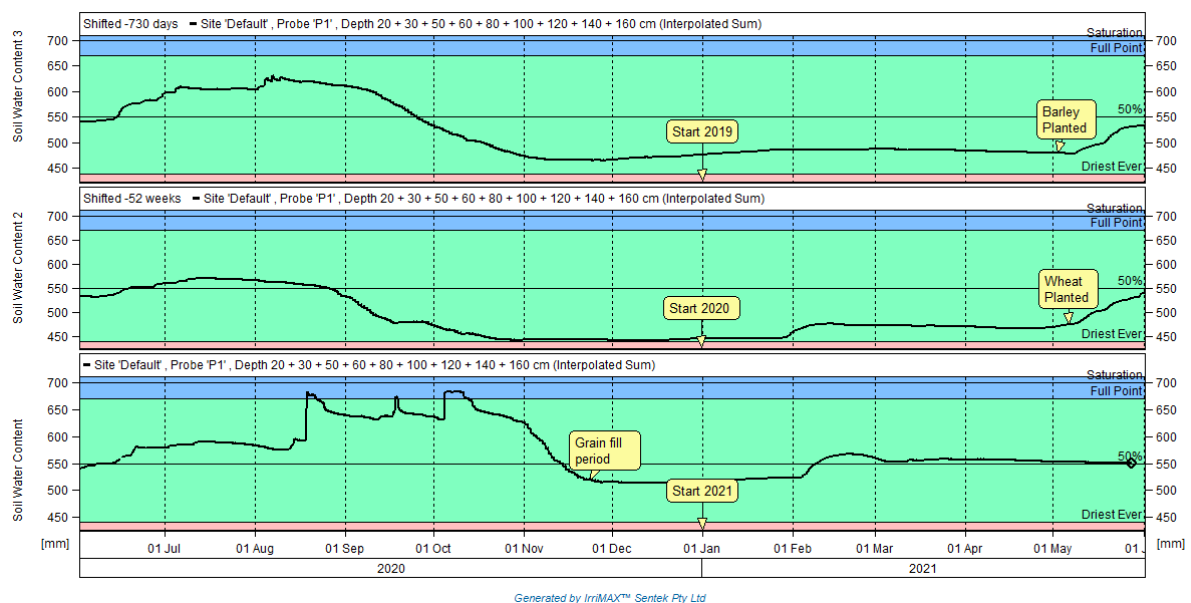
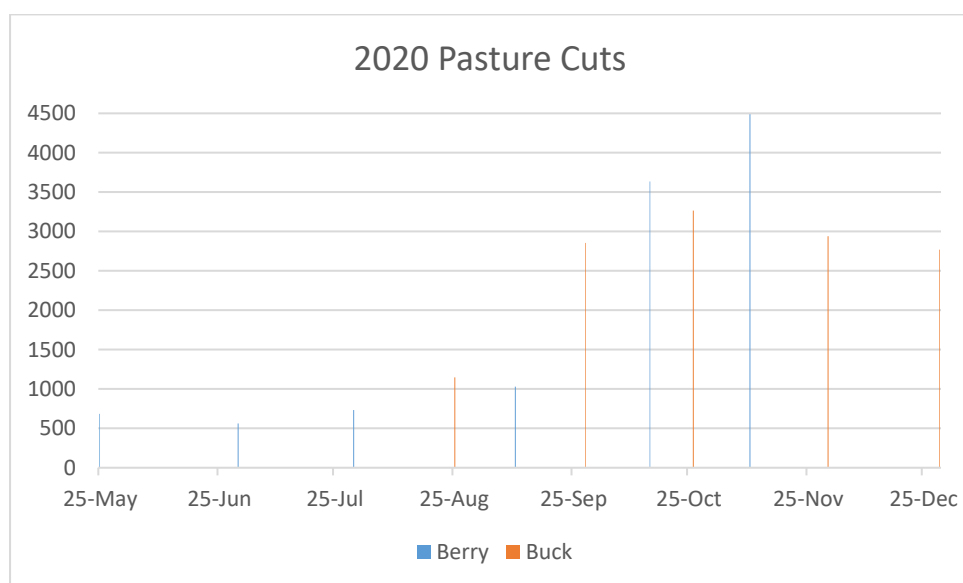


Figure 4. Bell Cygnet River site. Graph shows summed moisture levels of the sensors at varying depths over two years.

## Pasture Availability

The recalibration of the new and improved Pastures from Space commenced ground truthing in 2020. The project aims to be able to provide estimates of pasture availability from satellite images, such as growth rates and feed on offer. Another feature being worked on is estimating historic pasture growth in the paddock. There are 22 paddocks being monitored on 22 farms. The paddocks are in South Australia (7 sites – 2 on KI), South West Victoria (9 sites), Gippsland (2 sites) and Tasmania (4 sites). The resolution of the new Pastures from Space is intended to be around 10m<sup>2</sup> pixels instead of the previous 6ha pixel.

On KI, pasture calibration cuts were taken from a perennial kikuyu pasture on Bucks and an annual pasture on Berry's. Five pasture cuts were taken between August and December 20 at the Buck site with ~13tonne of dry matter recorded. The site was visited on the 25<sup>th</sup> Feb 2021, a fortnight after the February rain event but there was insufficient pasture to cut. Six pasture cuts were taken at Berry site between May and November 20 with 11.1tonne of dry matter recorded (Figure 5).



**Figure 5. Kg/ha dry matter removed at the Buck & Berry sites during 2020.**

## Acknowledgements

National Landcare Program (Smart Farming Grants)

Berry Partners

Buck Pastoral

A, T & J Heinrich

Ag KI for administering the funding

The project involves a collaboration between Southern Farming Systems, Federation University (Ballarat), Glenelg Hopkins Catchment Management Authority, MacKillop Farm Management Group and Agriculture Kangaroo Island.

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