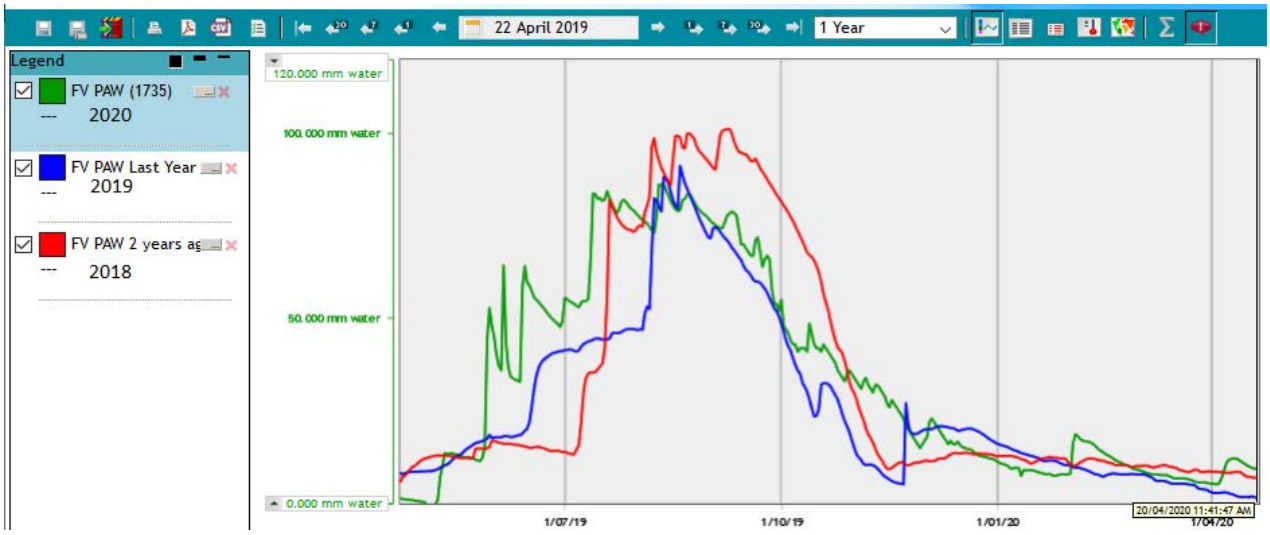
BIGG Soil Moisture and Climate Data Report – 21/4/20

Flaxman Valley, Keyneton, Koonunga, Moculta

Site Name: Flaxman Valley (Landholder: Evans)



2020 rainfall (Apr-current)	**21mm**	**Estimated soil moisture remaining in the profile**	**8%**
Soil type	Sandy loam over clay		
Pasture type	Phalaris/annual grasses/clover based pasture		
Current pasture status *(see photos below)*	Composition: Phalaris 15%, Grasses (barley grass and ryegrass) 60%, Broadleaf weeds (dock, capeweed) 5%, Clover 0%, Dry grass 15%, Bare ground 5% Estimated Feed on Offer (FOO): 600 kg DM/ha (the paddock has 'greened up' nicely after rainfall in early April)		
2020 paddock and grazing management	In 2020 the paddock has been grazed by 220 ewe hoggets (stocking rate 31 DSE/ha) between 15/3-6/4/20. The paddock will next be grazed in July when a mob of ewes will be lambing. On 8/4/20 the paddock was fertilised with 275kg/ha of 'Restorer Pasture' (3-4-0, Hi-Tech Ag Solutions).		
Narrative	Plant available water (PAW) on this site is currently 10mm compared to 2mm at the same time last year and 7mm in 2018. The site has recorded 21mm of rain so far this month but the PAW only moved up by 7mm. The reason for the difference is that the top sensor on the probe is at a depth of 15cm and the rest of the moisture is sitting in the upper 10 cm of the profile (a small amount could have also been lost to runoff but this is unlikely), which we are not measuring. By installing the probe at this depth we do lose the 'top level' data, but this sacrifice means the probe is protected against damage by machinery and stock. Also, the top 10cm is very dynamic and dries out very quickly. Later in the season when we are trying to assess what is remaining in the profile, the upper 10cm is not making any contribution – moisture use is all occurring deeper down.		

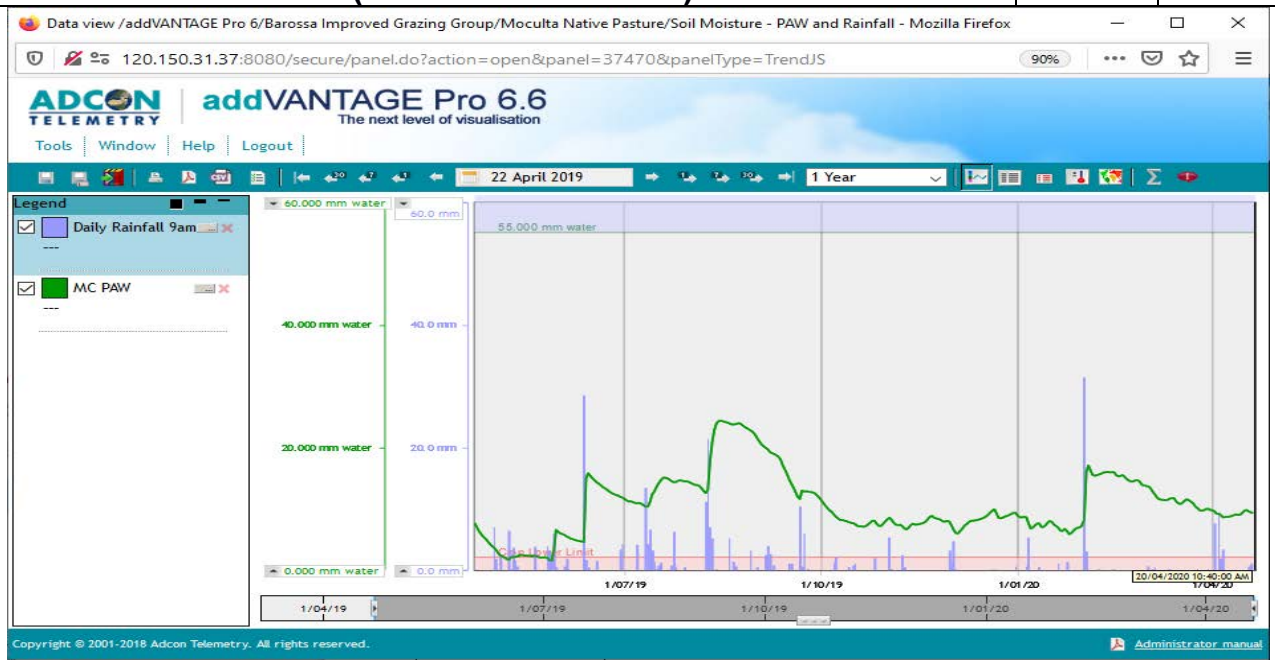
Site Name: Keyneton (Landholder: Keynes)

2020 rainfall (Apr-current)	**19mm**	**Estimated soil moisture remaining in the profile**	**6%**
Soil type	Red loam over clay		
Pasture type	Annual grass and sub-clover based pasture		
Current pasture status *(see photos below)*	Composition: Dry grass 65%, Broadleaf weeds (erodium, mintweed, salvation jane) 30%, Clover 0%, Barley Grass 0%, Bare ground 5% Estimated Feed on Offer: 750 kg DM/ha		
2020 paddock and grazing management	The paddock was last grazed from 3/12/19-8/1/20 by 450 dry ewes (stocking rate of 9 DSE/ha). It has not been grazed since, as water is unavailable in the paddock.		
Narrative	Plant available water on this site is lower than at the same time in both 2018 and 2019. Good rains were received in January and at the start of April. The January rain reached the 35cm sensor depth whereas the April rain has not gone past the 15cm mark. The graph shows the steady decline in moisture again after the January rain (*green line*), which would have been due to the activity of the remaining pasture and weeds. With moisture levels currently so low, a good season break will be needed to start the profile filling again.		

Site Name: Koonunga (Landholder: Kleinig)

2020 rainfall (Apr-current)	**24mm**	**Estimated soil moisture remaining in the profile**	**24%**
Soil type	Red brown earth		
Pasture/crop type	Wheat		
Current pasture status *(see photos below)*	Composition: Wheat stubble 90%, bare ground 10% Estimated Feed on Offer: -		
2020 paddock and grazing management	In 2019 the paddock was sown to wheat. It was harvested in December and yielded 2.4t/ha. Post harvest the paddock has had various mobs of sheep running on it. Currently there are 135 merino wethers in the paddock (including in an adjacent paddock) that are also being supplemented with barley grain. The paddock will be sown to barley in 2020.		
Narrative	We started monitoring this site in 2013. In 2013-15, the pasture removed all of the moisture from the profile, but for 2016-19, between 6 and 14mm remained in the profile. There are two possible explanations for this: firstly, the crop/pasture has not been able to extract all the moisture; secondly, the "Crop Lower Limit" (CLL) that we use in setting the PAW has shifted. If the latter were the case we would expect to see a flattening of the PAW curve once all the moisture is used up. 2018 is the only season where we saw this (*red line*) and in that season the probe behaviour exactly mirrored what was happening on site. The agronomic explanation thus seems the most likely. In 2019, the wheat sown on the site produced a low yield with high screenings. Conditions at grain-fill were warm and windy. Our Daily Water Use estimates reinforce this, with water use falling from a peak of 2.5mm a day in September to less than 0.5mm in the second week of October. In addition, the moisture use did not extend below 45cm: although plenty of water was available at depth, the plant roots never reached it. This water can be viewed as being "in the bank" – favourable conditions early in the season will help this years barley crop to 'push' its roots down deeper, enabling it to capitalise on this extra reserve.		

Site Name: Moculta (Landholder: Koch)

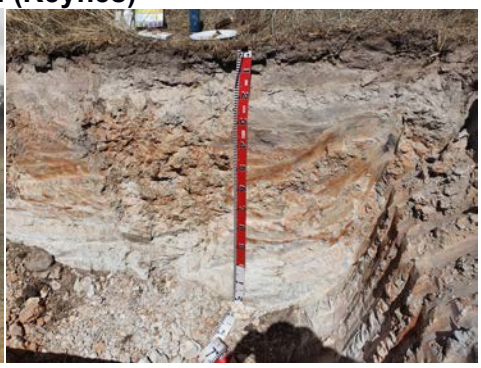


2020 rainfall (Apr-current)	**24mm**	**Estimated soil moisture remaining in the profile**	**27%**
Soil type	Shallow clayey red brown earth over lime		
Pasture type	Native pasture		
Current pasture status *(see photos below)*	Composition: Dry grass 45%, Native grasses 5%, Broadleaf weeds (capeweed, erodium) 15%, Bare ground 35% Estimated Feed on Offer: 200 kg DM/ha		
2020 paddock and grazing management	In February 2020 the paddock was grazed for 10 days by 140 ram weaners (stocking rate 3 DSE/ha). On 26/3/20, 100 ewes were moved into the paddock for lambing (which began on 5/4/20). The ewes are also being supplemented with cereal grain and hay.		
Narrative	This probe has now been installed for a full year. However, in 2019 the profile did not wet up completely at this site (or the other three), meaning we don't yet have all the information we need to determine Moculta's PAW. Looking at the rainfall and PAW from the other sites in 2019, the average was about 70% "full". Applying this to the range of values at Moculta, would give an estimated capacity of 35mm, which is still a very low figure. Applying this to the current PAW figure, we end up with an estimate that the profile is currently at 27% of capacity. What is striking at this site is the difference between the soil texture above and below 50cm: a red-brown clay loam above and lime below (see below photo). Although we observed this textural change when installing the probe, it was nowhere near as clear as it is in picture taken in the soil pit. This textural change coupled with the slope of the site may create a tendency for water to pool at the transitional layer and to then run down the slope. It may thus take longer to see evidence of water infiltration deeper into the profile, which in turn means less water available to the pasture.		

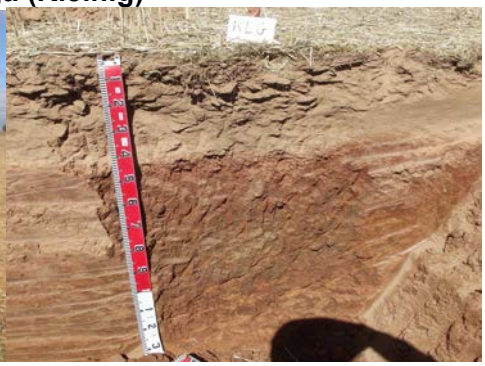
Photos of monitoring station paddocks - 17/4/20 (left) and their soil profile

Flaxman Valley (Evans)


Keyneton (Keynes)

Koonunga (Kleinig)

Moculta (Koch)