

The 2021 season at Hart; rainfall, temperature and soil analysis

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The Mid-North region had a dry start leading into the 2021 growing season. A lack of rainfall across summer months until late May meant there was very little stored soil moisture (Figure 1). Some sowing windows across the district were pushed back due to poor seasonal conditions, with delayed and patchy emergency an issue for early sown paddocks.

A late and much needed break of 19 mm of rainfall was received on May 25 (Table 1).

Seeding at Hart commenced on April 19, with early sown winter wheat and vetch trials. The majority of Hart's trials were sown by mid-May, although no significant rain had occurred. The program was slightly delayed, with all remaining trials sown by June 10. By this time, we had received 60 mm growing season rainfall (GSR).

Starting soil nitrogen on the trial site was 88.5 kg/ha (0 – 60 cm), after oaten hay was grown in 2020 (Table 2).

Trials at Hart began to emerge on May 26. Growth was slow but consistent with winter rainfall providing optimism for the remainder of the season. However, September and October saw well below average rainfall, which reduced crop yield potential across most trials at the Hart field site.

Hart received 401 mm of annual rainfall in 2021, placing it at a decile 5 rainfall year (average annual rainfall 400 mm). Growing season rainfall (April – October) of 231 mm was 70 mm below Hart's 100 year average growing season rainfall (300 mm), equivalent to a decile 3.

Large November rains increased available stored soil moisture for the 2022 season (Figure 2).

Daily minimum and maximum temperature data at Hart in 2021 is provided in Figure 3.

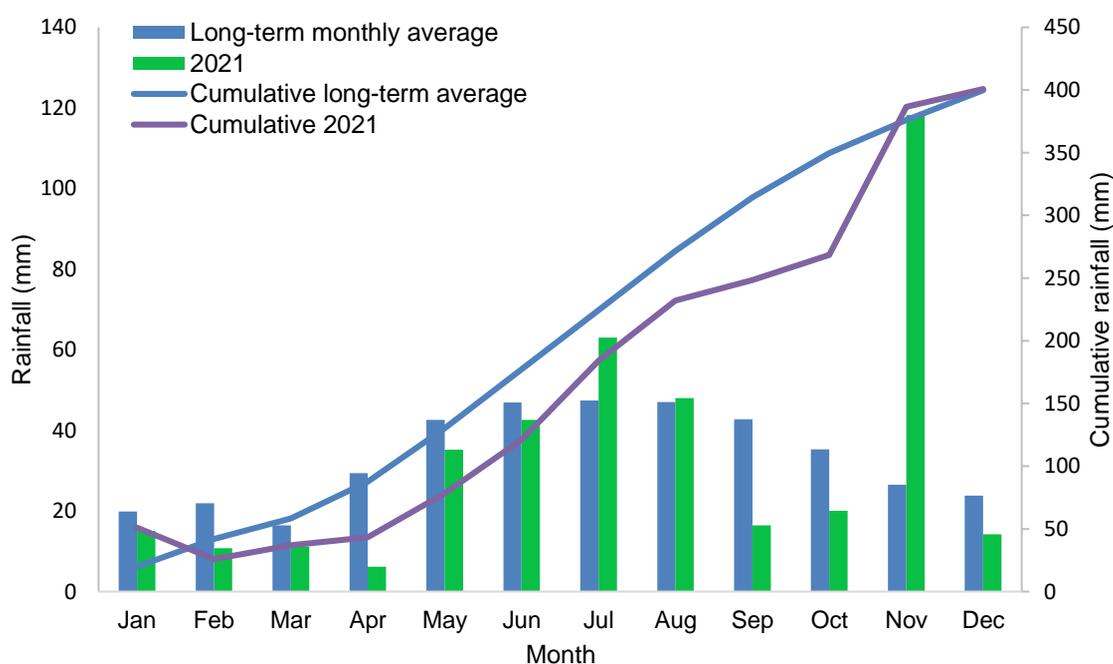


Figure 1. Hart rainfall graph for the 2021 season and long-term average. Lines are displayed to present cumulative rainfall for long-term average (blue) and 2021 (purple).

Table 1. Hart rainfall chart 2021 (Mesonet).

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	0	0	0	16	0	2.4	0	0
2	0	0	0	0	0	0	2.6	0	0	0.2	0	0
3	0	0	0	0	0	1.6	2.8	4	1.8	1.4	0.4	0
4	0	0	0	0	0.2	1	3.6	4.8	1.4	0.8	0.6	0
5	0	3.6	0	0	0	0	4.6	3.2	3	0	0	0
6	0	2.4	0	0	0	0	0.2	0.6	0.4	0	0	0
7	0	0.2	0	0	0	0	0	0.6	0	0	4.8	0.2
8	0	0	0.2	0	0	8.2	0	0	0.4	0	0	0
9	0	0	0	0	4	7.2	0	0	0	0	0	0
10	0	0	0.2	0	3.2	0.4	2	0	0	0	2.8	0
11	0	0	8.8	0.2	1.6	0	0	0.6	0	0	6.2	0
12	0	0	0	0	0	0.2	0	6	0.6	0	47.2	0
13	0	0	0	0	0	0	0	0.2	2.8	2.4	21.2	0
14	0	0	0.8	0.4	2.6	0	11.6	0.2	0.2	1.4	2	0.4
15	0	0	0	0	0.4	0	0	0	0	8	4.6	1.4
16	0	0	0	0	0	5.6	3.6	0	0	0.2	0.6	0
17	0	0	0	0	0	1	4.8	0	0	0	0.2	0
18	0	0	0	0	0	7.2	0.2	0.2	0	0	0	12.2
19	0	0	0	0	0	2	0	0	0	0	1.4	0
20	0	0	0	0	0	0.2	1.2	0.4	1.2	0	11	0
21	0	4.6	0	4.6	0	0	0.6	0.6	1.6	0	0.4	0
22	0	0	0	0	0	0	3.2	0.2	0	0	0	0
23	0	0	0	0.6	0	1.8	4.8	3.4	0	0.4	1.6	0
24	0	0	0	0.2	0	0.2	1	0.6	0.2	0	10.4	0
25	0	0	0.2	0.2	18.6	3.2	4.8	1.2	0	0	2.8	0
26	14.8	0	0	0	4	2.2	0.2	0.4	0	0	0	0
27	0.2	0	1	0	0.4	0.4	0	0.2	0	0	0	0
28	0	0	0	0	0.2	0.2	11	0	0	0.6	0	0
29	0		0	0	0	0	0.2	4.6	2.6	1.2	0	0
30	0		0	0	0	0	0	0	0.2	1	0	0
31	0		0	0	0	0	0	0	0	0	0	0
Montly total	15.0	10.8	11.2	6.2	35.2	42.6	63.0	48.0	16.4	20.0	118.2	14.2
GSR rainfall				6.2	41.4	84.0	147.0	195.0	211.4	231.4		
Total rainfall	15.0	25.8	37.0	43.2	78.4	121.0	184.0	232.0	248.4	268.4	386.6	400.8

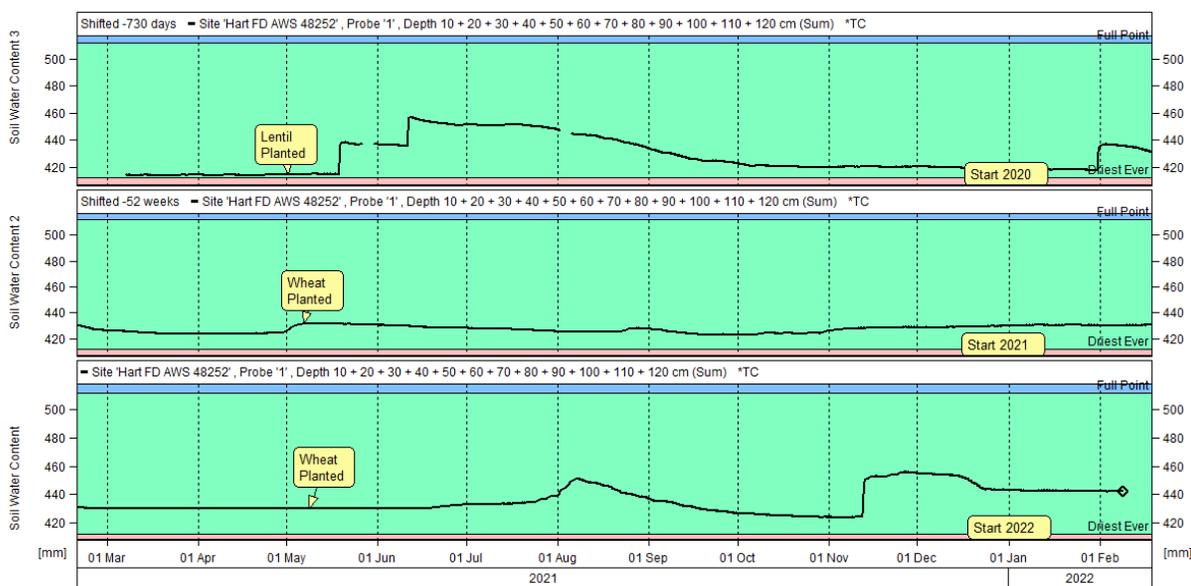


Figure 2. Soil moisture probe summed comparison (80 cm) for 2019 (top), 2020 (middle) and 2021 (bottom) at the Hart field site.

Hart soil moisture data is free to view courtesy of [Agbyte](http://www.hartfieldsite.org.au/pages/live-weather/soil-moisture-probe.php):

<http://www.hartfieldsite.org.au/pages/live-weather/soil-moisture-probe.php>



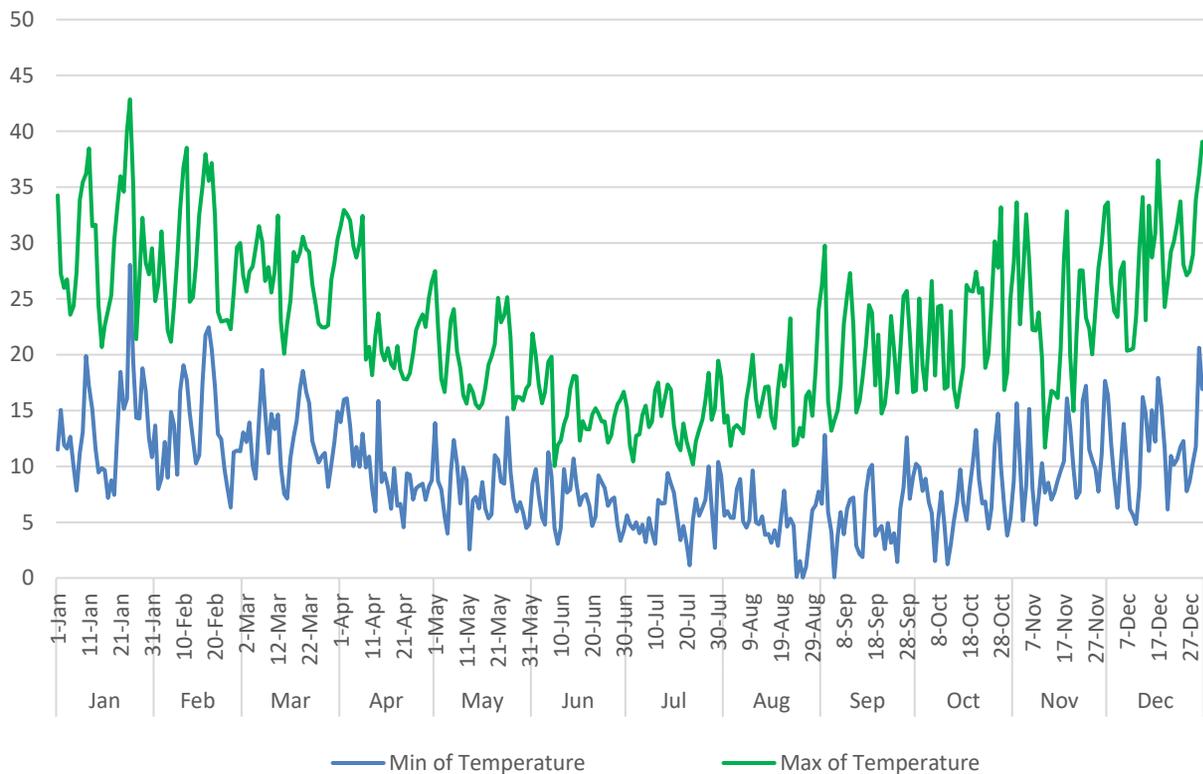


Figure 3. Daily minimum and maximum daily temperature (°C) from January 1 to December 31 at Hart in 2020 and 2021.

Table 2. Actual soil physical and chemical properties for the Hart field site, sampled April 6, 2021.

Soil property	Units	Sampling Depth (cm)					Total profile (0 – 60 cm)
		0 – 15 cm	15 – 35 cm	35 – 55 cm	55 – 75 cm	75 – 105 cm	
Texture		Loam	Loam	Loam	Loam	Loam	
Gravel	%	15 – 20	15 – 20	35 – 40	35 – 40	35 – 40	
Phosphorus Colwell	mg/kg	10	16	23	11	20	
Potassium Colwell	mg/kg	304	229	306	260	308	
Available soil N	kg/ha	23.4	28	33.6	15	18	88.5
Sulphur	mg/kg	5.2	6.2	4.8	34.5	70.2	
Organic Carbon	%	0.97	0.68	0.71	0.37	0.4	
Conductivity	dS/m	0.177	0.197	0.257	0.51	0.675	
pH (CaCl ₂)		7	7	7.4	7.4	7.9	