HART BEAT

25th July 2018

ISSUE 46

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HART BEAT

**Yield Prophet® simulations for
8 sites across the mid-north of SA**

The Yield Prophet® simulations featured are
not a crystal ball, but provide a realistic
prediction of the available soil water
and nitrogen status of your crop

HART EVENTS

Hart Field Day – September 18, 2018
Spring Twilight Walk – October 16, 2018

www.hartfieldsite.org.au

Definitions

Hart Beat definitions

Each site has been characterised for plant available water capacity (PAWC) and bulk density to determine how much of the measured water and nitrogen is available to the crop during the season.

Drained upper limit (DUL) – is the amount of water that a saturated soil holds after it has drained.

Crop lower limit (CLL) – is the amount of water remaining in the soil after crop senescence.

Plant available water capacity (PAWC) – is the difference between the drained upper limit of the soil and the lower extraction limit of a crop over the depth of rooting. It is the maximum water available to a crop from a particular soil type.

Plant available water (PAW) – is the amount of water contained in the soil at a given time minus the crop lower limit.

Bulk density (BD) – is a measure of the weight of dry soil per unit volume of soil.

Growing season rainfall (GSR) – is rainfall for the period between and including April to October.

Decile – is a measure of seasonal rainfall on a scale of 1 to 9. In a decile 7 year, 70% of previous years were dryer, in a decile 3 year 30% of previous years were dryer.

Yield probability curves - display two different nitrogen scenarios for each site. The **green dashed line** displays the actual grain yield with the current soil available nitrogen. The **blue dashed line** represents the grain yield potential with unlimited nitrogen (yield potential). A small difference between these two lines indicates the current soil N level is adequate for the crop to reach its yield potential. Conversely, a large difference between these two lines indicates additional N fertiliser is required for the crop to reach its yield potential. Both these lines also now take into account frost and heat effects on grain yield potential.

The **French & Schultz** formula estimates the rainfall limited grain yield based on the growing season rainfall (GSR). It assumes evaporation of 110mm, includes stored water at sowing (30% of Jan to Mar rainfall) and a maximum grain yield potential of 20 kg/mm/ha.

Yield Potential = GSR (Apr-Oct) – Evaporation (110mm) * 20 kg/mm/ha.

Yield Prophet® has been very accurate throughout Australia, over the past 5 seasons. At the Hart field site the *Yield Prophet*® prediction on the 15th September, using an average finish, has been only 16% above the final grain yield, averaged over the past 4 years, making wheat growth models such as APSIM highly valuable.

Yield Prophet® is an internet based service which uses the APSIM wheat prediction model.

The model relies on accurate soil, crop, historical climate data and up to date local weather information to predict plant growth rates and final hay or grain yields. These are critical measurements specific to the site being analysed and may not fit closely to individual situations. Instead the predictions will give a realistic guide to seasonal prospects based on a site with similar rainfall and / or soil type.

Using climate data for the current season, *Yield Prophet*® simulates the soil water and nitrogen processes in the paddock, and crop growth. *Yield Prophet*® calculates the amount of water and nitrogen available to the crop and the water and nitrogen demand of the crop.

Site information

Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	Plant Available Water Capacity (mm)	Soil Profile Depth (cm)	Plant Available Water at 16 April (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	17	77
Spalding	430	Red brown earth	143	150	16	68
Condowie	350	Sandy loam	115	150	0	80
Kybunga	428	Clay loam	262	120	22	72
Farrell Flat	474	Light clay loam	172	120	11	68
Pinery	374	Silty clay loam	79	150	0	59
Eudunda	445	Gravelly loam	96	100	19	67
Tarlee	474	Sandy loam	113	150	26	76

2018 site locations

SANDY CLAY LOAM

Crop growth

Variety:	Mace wheat	**Sowing date:**	1st May	**Nitrogen fertiliser:** 30 kg N/ha at seeding +
		Emergence date:	12th May	20 kg N/ha 18th July

The season so far

Annual rain to date: 120 mm
GSR to date: 96 mm *(17 mm since last report)*   **GSR decile:** 1
Current predicted PAW: 31 mm *(15 % full)*   **PAWC:** 206 mm

Grain yield predictions (Yield Prophet)

**Yield prophet estimate:**   *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	3.0	-0.7	2.6	-0.8

French & Schultz grain yield estimate:

100% WUE:	**2.5 t/ha**
80% WUE:	**2.0 t/ha**

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (131 mm) for the rest of the season.
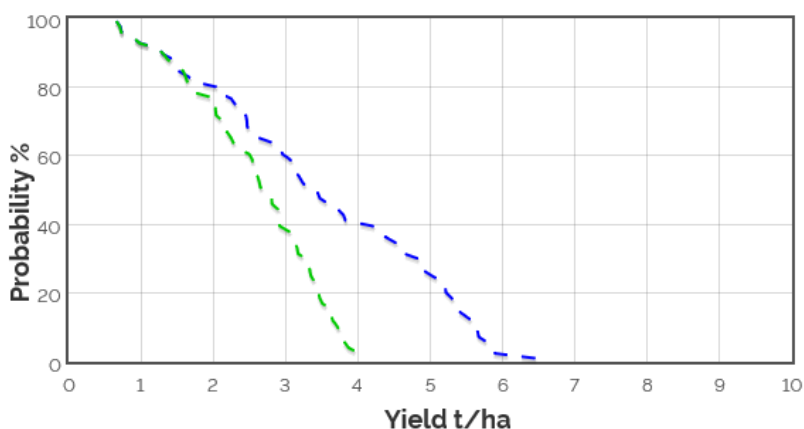
The graphs above and below show the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

SPALDING

RED BROWN EARTH

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding +
Emergence date: 11th May   20 kg N/ha 18th July

The season so far
Annual rain to date: 161 mm
GSR to date: 132 mm *(33 mm since last report)*   **GSR decile:** 4
Current predicted PAW: 54 mm *(38 % full)*   **PAWC:** 143 mm

Grain yield predictions (Yield Prophet)   ### Grain yield outcome graph

Yield prophet estimate: *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

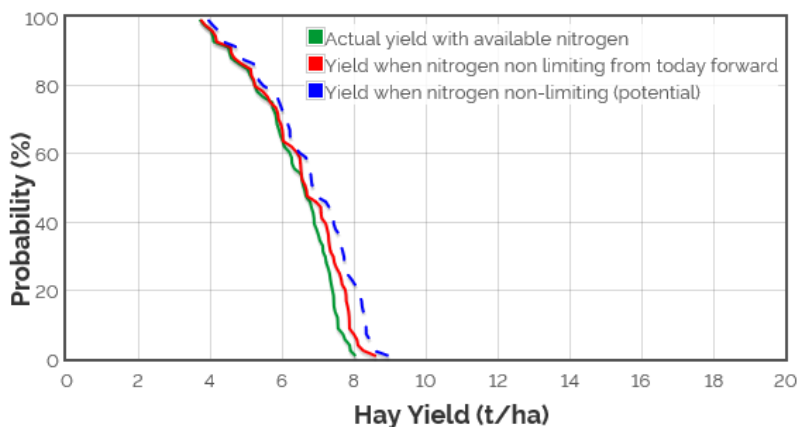| Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	3.5	-0.1	2.9	-0.4

French & Schultz grain yield estimate:

100% WUE:	3.5 t/ha
80% WUE:	2.8 t/ha

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (143 mm) for the rest of the season.
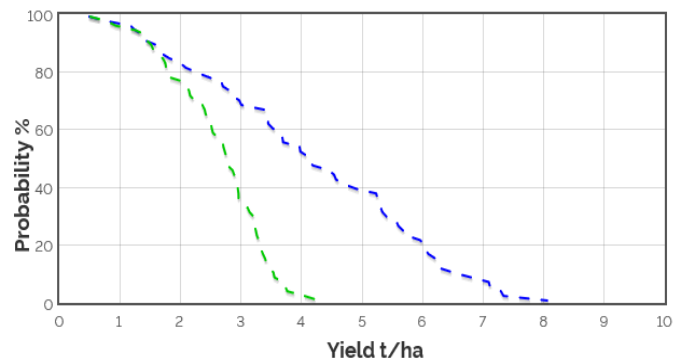
This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

CONDOWIE

SANDY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding +
Emergence date: 12th May   20 kg N/ha 18th July

The season so far
Annual rain to date: 119 mm
GSR to date: 99 mm *(21 mm since last report)*   **GSR decile:** 3
Current predicted PAW: 11 mm *(10 % full)*   **PAWC:** 115 mm

Grain yield predictions (Yield Prophet)   ### Grain yield outcome graph

Yield prophet estimate: *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	1.5	-0.3	1.0	-0.3

French & Schultz grain yield estimate:

100% WUE:	2.0 t/ha
80% WUE:	1.6 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (107 mm) for the rest of the season.
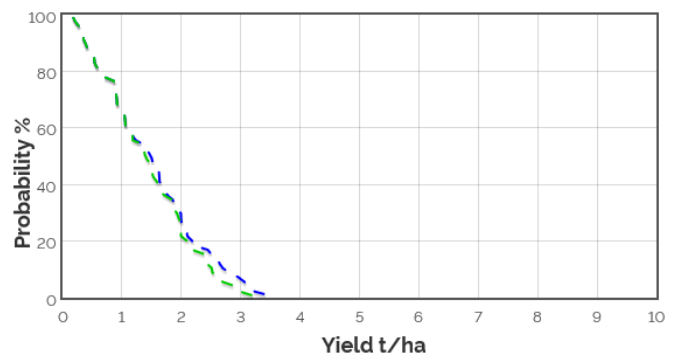
This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

KYBUNGA

CLAY LOAM

Crop growth

Variety:	Mace wheat	**Sowing date:**	1st May	**Nitrogen fertiliser:** 30 kg N/ha at seeding +
		Emergence date:	11th May	20 kg N/ha 18th July

The season so far

Annual rain to date: 159 mm
GSR to date: 138 mm *(31 mm since last report)*   **GSR decile:** 4
Current predicted PAW: 46 mm *(18 % full)*   **PAWC:** 262 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

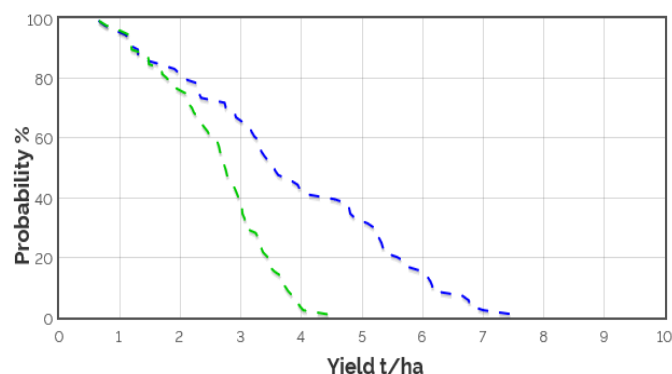| Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	3.1	-0.8	2.6	-0.6

French & Schultz grain yield estimate:

100% WUE:	**4.0 t/ha**
80% WUE:	**3.2 t/ha**

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (168 mm) for the rest of the season.

Grain yield outcome graph

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

FARRELL FLAT

LIGHT CLAY LOAM

Crop growth

Variety:	Mace wheat	**Sowing date:**	1st May	**Nitrogen fertiliser:** 30 kg N/ha at seeding +
		Emergence date:	12th May	20 kg N/ha 18th July

The season so far

Annual rain to date: 186 mm
GSR to date: 156 mm *(33 mm since last report)*   **GSR decile:** 4
Current predicted PAW: 60 mm (35*% full*)   **PAWC:** 172 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

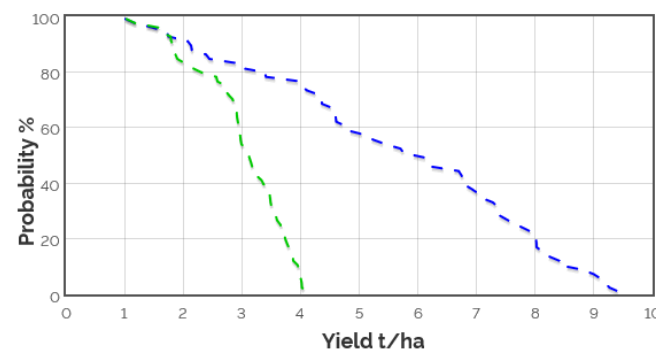| Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	4.5	-0.2	3.7	-0.5

French & Schultz grain yield estimate:

100% WUE:	**4.4 t/ha**
80% WUE:	**3.5 t/ha**

This model assumes that there is 9 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (166 mm) for the rest of the season.

Grain yield outcome graph

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

PINERY

SILTY CLAY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding +
     Emergence date: 13th May   20 kg N/ha 18th July

The season so far
Annual rain to date: 117 mm
GSR to date: 94 mm *(19 mm since last report)*   **GSR decile:** 1
Current predicted PAW: 31 mm *(39 % full)*   **PAWC:** 79 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 25/07/2018)*
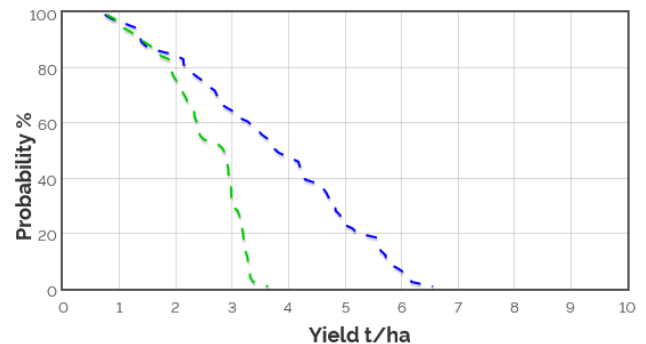
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	3.1	-0.6	2.7	-0.6

French & Schultz grain yield estimate:

100% WUE:	2.5 t/ha
80% WUE:	**2.0 t/ha**

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (134 mm) for the rest of the season.

Grain yield outcome graph

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

EUDUNDA

GRAVELLY LOAM

Crop growth
Variety: Mace wheat   **Sowing date:** 1st May   **Nitrogen fertiliser:** 30 kg N/ha at seeding +
     Emergence date: 14th May   20 kg N/ha 18th July

The season so far
Annual rain to date: 141 mm
GSR to date: 102 mm *(23 mm since last report)*   **GSR decile:** 1
Current predicted PAW: 25 mm *(26 % full)*   **PAWC:** 96 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 25/07/2018)*
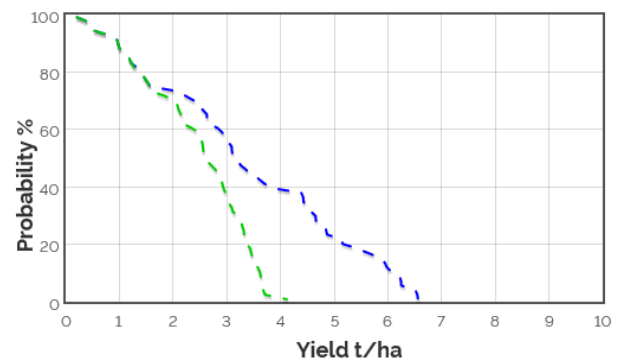
These estimates are based on a 50% probability

Yield t/ha	Sown 1st May *(see graph)*	Change since last report	Sown 20th May	Change since last report
Grain	2.9	-1.4	2.6	-1.3

French & Schultz grain yield estimate:

100% WUE:	3.2 t/ha
80% WUE:	**2.5 t/ha**

This model assumes that there is 12 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (155 mm) for the rest of the season.

Grain yield outcome graph

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

TARLEE

SANDY LOAM

Crop growth
Variety: Mace wheat **Sowing date:** 1st May **Nitrogen fertiliser:** 30 kg N/ha at seeding +
Emergence date: 10th May 20 kg N/ha 18th July

The season so far
Annual rain to date: 115 mm
GSR to date: 94 mm *(17 mm since last report)* **GSR decile:** 1
Current predicted PAW: 20 mm *(18% full)* **PAWC:** 113 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: *(Date of report 25/07/2018)*

These estimates are based on a 50% probability

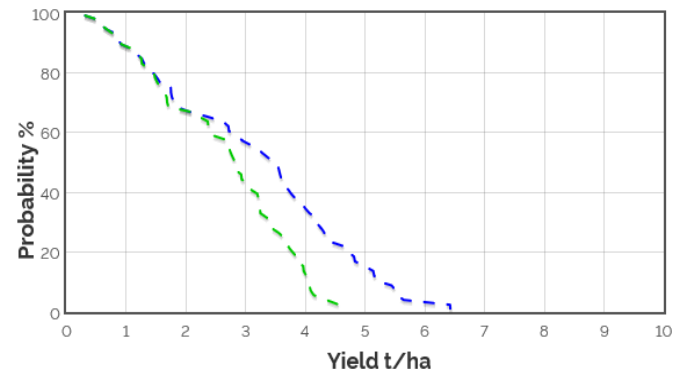| Yield t/ha	Sown 1st May *(see graph)*	Change Since last Report	Sown 20th May	Change Since Last Report
Grain	3.2	-0.7	2.7	-0.8

French & Schultz grain yield estimate:

100% WUE:	3.1 t/ha
80% WUE:	2.5 t/ha

This model assumes that there is 6 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (164 mm) for the rest of the season.

Grain yield outcome graph

This graph shows the chance of reaching the corresponding yield given weather, soil conditions and agronomic inputs to date, and historical climate data (100yrs) to simulate remainder of the season.

Winter Walk 2018