HART BEAT

30th September 2015

ISSUE 36

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

IN THIS ISSUE

HART EVENTS

Spring Twilight Walk – 20th October 2015

Getting The Crop In – 16th March 2016 (tbc)

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 line** displays the actual grain yield with the current soil available nitrogen. The **blue 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.

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.

Important Notice: *Yield Prophet*® does not generate recommendations or advice, it is only a guide and must be combined with local paddock and district knowledge. APSIM does not take into account weed competition, pest/disease pressure, pesticide / herbicide damage, farmer error, or extreme events (such as extreme weather, flood and fire). For more information about APSIM or *Yield Prophet*® please visit or www.yieldprophet.com.au.

Site information

Rainfall and water soil characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	Plant Available Water Capacity (mm)	Soil Profile Depth (cm)	Plant Available Water at 15 April (mm)	Pre-sowing soil nitrogen (0-90cm) (kg/ha)
Hart	400	Sandy clay loam	206	150	23	73
Spalding	430	Red brown earth	143	150	0	76
Condowie	350	Sandy loam	115	150	0	78
Kybunga	428	Clay loam	262	120	29	83
Farrell Flat	474	Light clay loam	172	120	34	89
Pinery	374	Silty clay loam	79	150	11	85
Eudunda	445	Gravelly loam	96	100	0	47
Tarlee	474	Sandy loam	113	150	18	69

2015 site locations

SANDY CLAY LOAM

The season so far

Annual rain to date: 299 mm
GSR to date: 226 mm *(32 mm since last report)*
GSR decile: 3
Current predicted PAW: 32 mm (16% full)
PAWC: 206 mm

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha
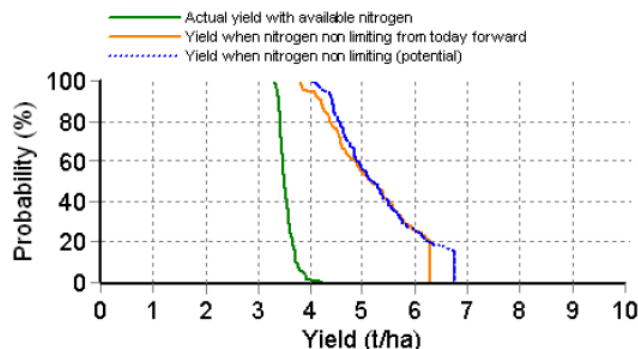
Grain & hay yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
These estimates are based on a 50% probability

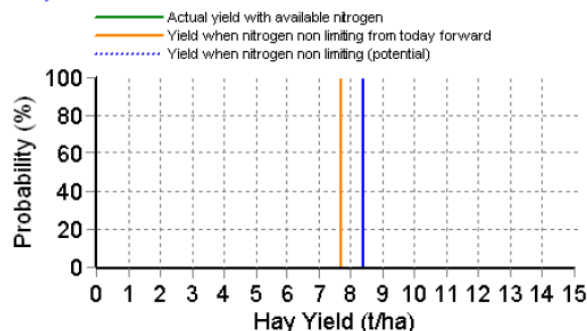| Yield t/ha	Sown 1st May (see graph)	Change since last report	Sown 20th May	Change since last report
Grain	4.2	0.0	3.4	-0.1

French & Schultz grain yield estimate:
100% WUE: 3.6 t/ha, 80% WUE: 2.8 t/ha
This model assumes that there is 22 mm stored moisture, 110 mm of evaporation and decile 5 (40 mm) rainfall 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 (100 yrs) to simulate remainder of the season.

RED BROWN EARTH

The season so far

Annual rain to date: 382 mm
GSR to date: 285 mm *(24 mm since last report)*
GSR decile: 6
Current predicted PAW: 23 mm (16% full)
PAWC: 143 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
These estimates are based on a 50% probability

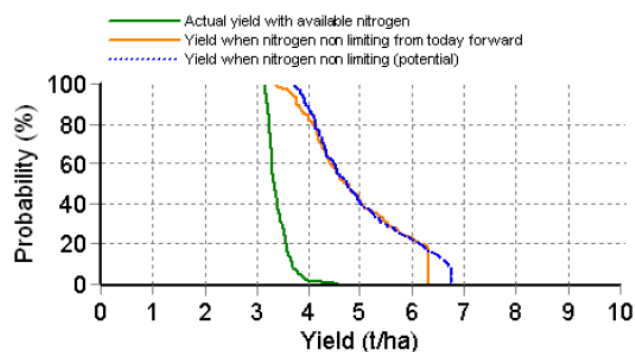| Yield t/ha	Sown 1st May (see graph)	Change since last report	Sown 20th May	Change since last report
Grain	4.0	-0.4	3.0	-0.5

French & Schultz grain yield estimate:

100% WUE: 4.8 t/ha, 80% WUE: 3.8 t/ha

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and decile 5 (34 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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.

SANDY LOAM

The season so far

Annual rain to date: 225 mm
GSR to date: 178 mm *(11 mm since last report)*
GSR decile: 3
Current predicted PAW: 3 mm (3% full)
PAWC: 115 mm

Grain yield predictions

Yield prophet estimate: (Date of report 29/09/2015)
These estimates are based on a 50% probability

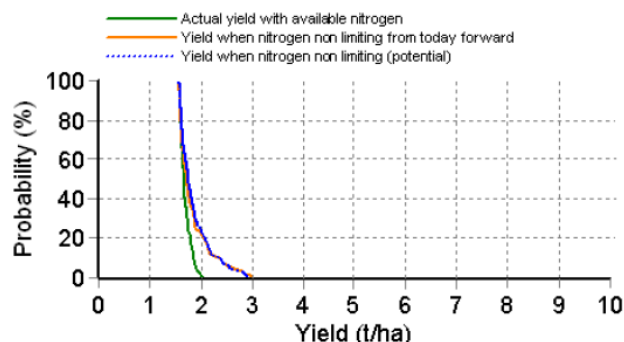| Yield t/ha	Sown 1st May (see graph)	Change since last report	Sown 20th May	Change since last report
Grain	1.7	-0.4	1.3	-0.4

French & Schultz grain yield estimate:

100% WUE: 2.2 t/ha, 80% WUE: 1.7 t/ha

This model assumes that there is 14 mm stored moisture, 110 mm of evaporation and decile 5 (26 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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

CLAY LOAM

The season so far

Annual rain to date: 385 mm
GSR to date: 287 mm *(22 mm since last report)*
GSR decile: 6
Current predicted PAW: 31 mm (12% full)
PAWC: 262 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
These estimates are based on a 50% probability

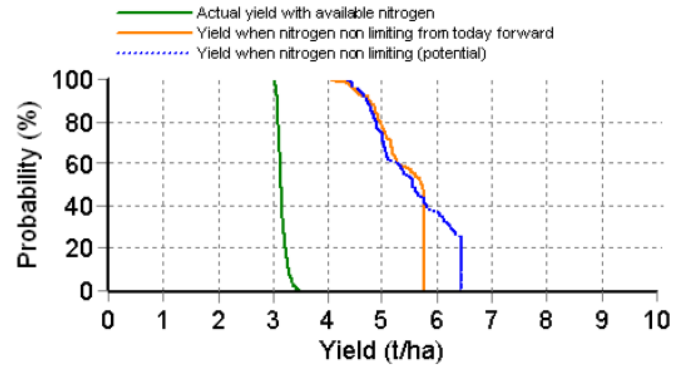| Yield t/ha	Sown 1st May (see graph)	Change since last report	Sown 20th May	Change since last report
Grain	4.3	-0.2	3.3	-0.5

French & Schultz grain yield estimate:
100% WUE: 4.9 t/ha, 80% WUE: 3.9 t/ha

This model assumes that there is 30 mm stored moisture, 110 mm of evaporation and decile 5 (40 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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

FARRELL FLAT

LIGHT CLAY LOAM

The season so far

Annual rain to date: 340 mm
GSR to date: 258 mm *(20 mm since last report)*
GSR decile: 4
Current predicted PAW: 64 mm (37% full)
PAWC: 172 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
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	5.1	-0.4	3.9	-0.7

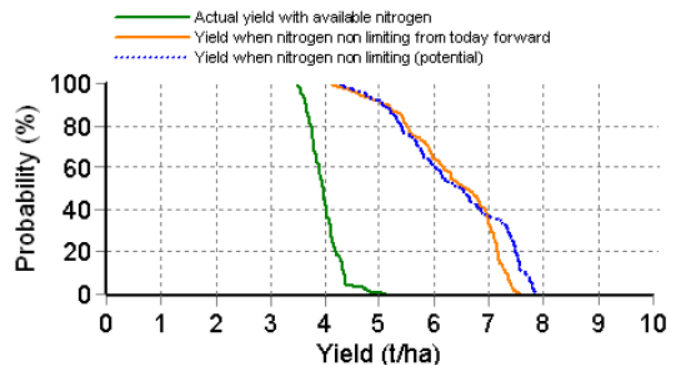**French & Schultz grain yield estimate:**
100% WUE: 4.2 t/ha, 80% WUE: 3.4 t/ha

This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (39 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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

PINERY

SILTY CLAY LOAM

The season so far

Annual rain to date: 318 mm
GSR to date: 231 mm *(24 mm since last report)*
GSR decile: 5
Current predicted PAW: 9 mm (11% full)
PAWC: 79 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
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	-0.4	2.3	-0.5

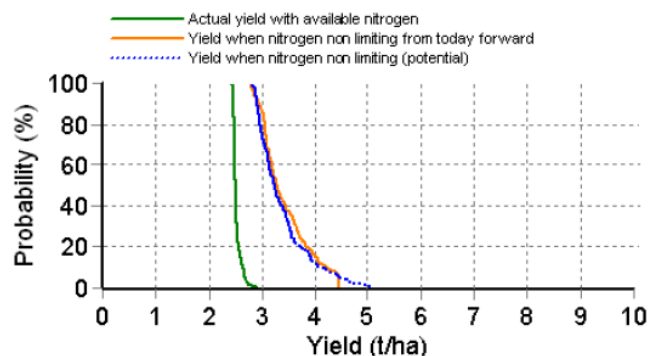**French & Schultz grain yield estimate:**
100% WUE: 3.6 t/ha, 80% WUE: 2.9 t/ha

This model assumes that there is 22 mm stored moisture, 110 mm of evaporation and decile 5 (32 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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

EUDUNDA

GRAVELLY LOAM

The season so far

Annual rain to date: 356 mm
GSR to date: 272 mm *(30 mm since last report)*
GSR decile: 5
Current predicted PAW: 28 mm (29% full)
PAWC: 96 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
These estimates are based on a 50% probability

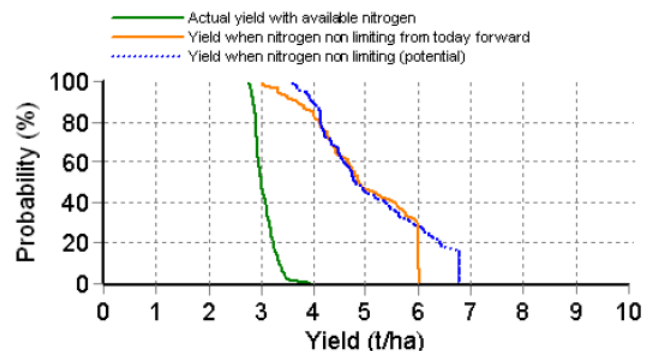| Yield t/ha	Sown 1st May (see graph)	Change since last report	Sown 20th May	Change since last report
Grain	3.9	-0.6	3.0	-0.6

French & Schultz grain yield estimate:
100% WUE: 4.6 t/ha, 80% WUE: 3.7 t/ha

This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (42 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

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

TARLEE

SANDY LOAM

The season so far

Annual rain to date: 383 mm
GSR to date: 308 mm *(40 mm since last report)*
GSR decile: 5
Current predicted PAW: 48 mm (42% full)
PAWC: 113 mm

Grain yield predictions

Yield prophet estimate: (Date of report 28/09/2015)
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	4.8	-0.1	4.5	-0.4

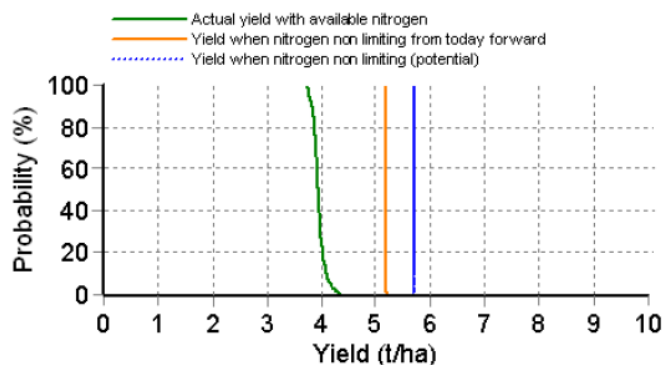**French & Schultz grain yield estimate:**
100% WUE: 5.3 t/ha, 80% WUE: 4.3 t/ha

This model assumes that there is 23 mm stored moisture, 110 mm of evaporation and decile 5 (46 mm) rainfall for the rest of the season.

Crop growth

Variety: Mace wheat   **Sowing date:** 1st May
Nitrogen fertiliser: 30 kg N/ha + 30 kg N/ha

Grain Yield Outcome

— Actual yield with available nitrogen
— Yield when nitrogen non limiting from today forward
···· Yield when nitrogen non limiting (potential)

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

HART FIELD DAY