

HART BEAT

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5th October 2016

ISSUE 40



flexi/coil



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

Spring Twilight Walk – 18th October 2016

Getting The Crop In – March 2017

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Hart Beat site reports

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- Tarlee

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.

Disclaimer: *Yield Prophet®* information is used entirely at your own risk. You will accept all risks and responsibility for losses, damages, costs and other consequences of using *Yield Prophet®* information and reports. To the maximum extent permitted by law, APSRU and BCG excludes all responsibility and liability to any person arising directly or indirectly from using the information generated by *Yield Prophet®*.

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 www.hartfieldsite.org.au

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 15 April (mm) | Pre-sowing soil nitrogen (kg/ha) |
|--------------|------------------------------|-----------------|-------------------------------------|-------------------------|--|----------------------------------|
| Hart | 400 | Sandy clay loam | 206 | 150 | 18 | 105 |
| Spalding | 430 | Red brown earth | 143 | 150 | 29 | 106 |
| Condowie | 350 | Sandy loam | 115 | 150 | 4 | 78 |
| Kybunga | 428 | Clay loam | 262 | 120 | 5 | 106 |
| Farrell Flat | 474 | Light clay loam | 172 | 120 | 52 | 103 |
| Pinery | 374 | Silty clay loam | 79 | 150 | 16 | 98 |
| Eudunda | 445 | Gravelly loam | 96 | 100 | 5 | 98 |
| Tarlee | 474 | Sandy loam | 113 | 150 | 50 | 91 |

2016 site locations



SANDY CLAY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 403 mm
 GSR to date: 341 mm (144 mm since last report) GSR decile: 7
 Current predicted PAW: 112 mm (55% full) PAWC: 206 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

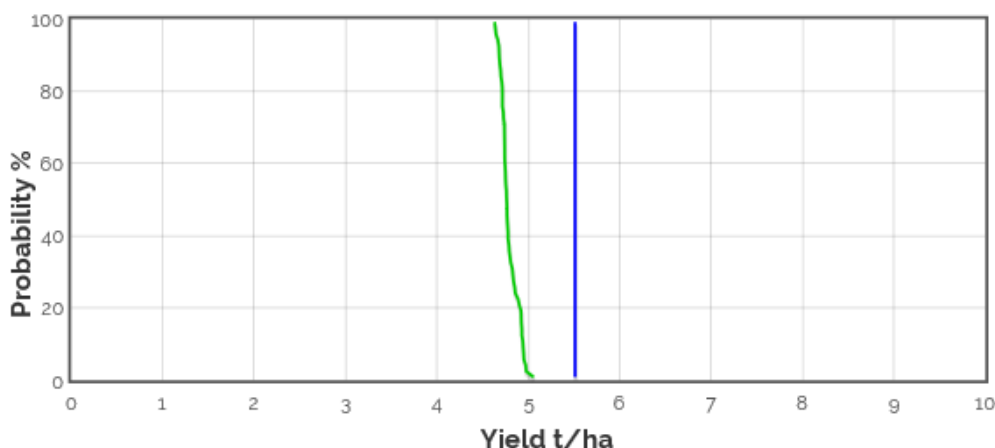
These estimates are based on a 50% probability

| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|---|--------------------------|---------------------------|--------------------------|
| Grain | 5.1 | +0.4 | 5.5 | +1.3 |

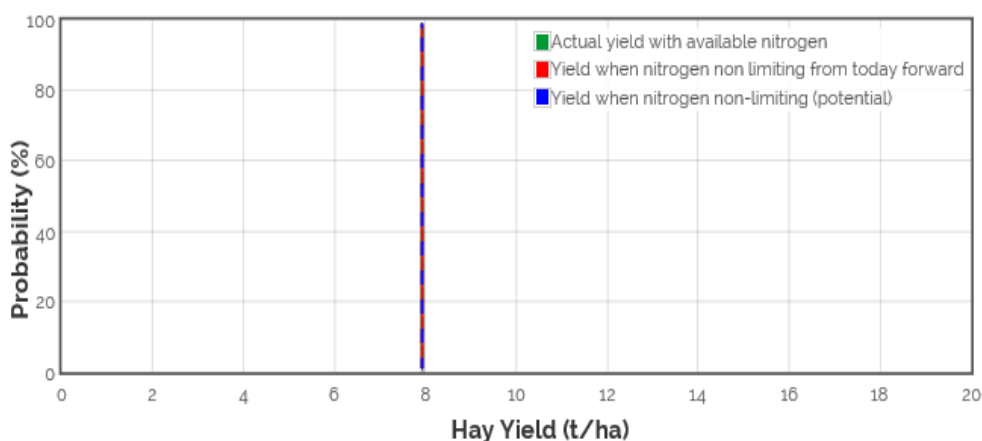
French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 5.5 t/ha |
| 80% WUE: | 4.4 t/ha |

This model assumes that there is 19 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (24 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: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 489 mm
 GSR to date: 384 mm (162 mm since last report)
 Current predicted PAW: 143 mm (100% full)

GSR decile: 9
 PAWC: 143 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

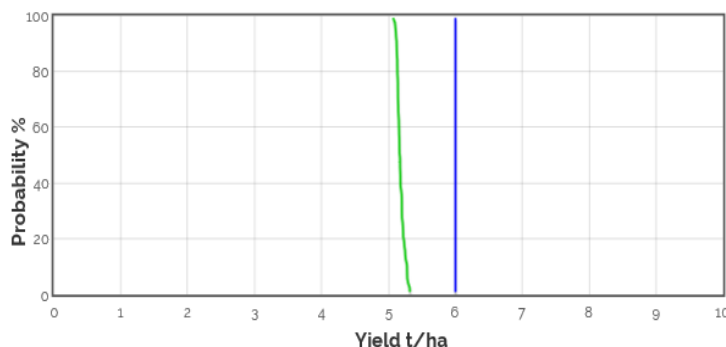
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 5.6 | +0.3 | 6.2 | +1.6 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 6.6 t/ha |
| 80% WUE: | 5.3 t/ha |

This model assumes that there is 32 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (26 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.

CONDOWIE

SANDY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 412 mm
 GSR to date: 332 mm (121 mm since last report)
 Current predicted PAW: 81 mm (70% full)

GSR decile: 10
 PAWC: 115 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

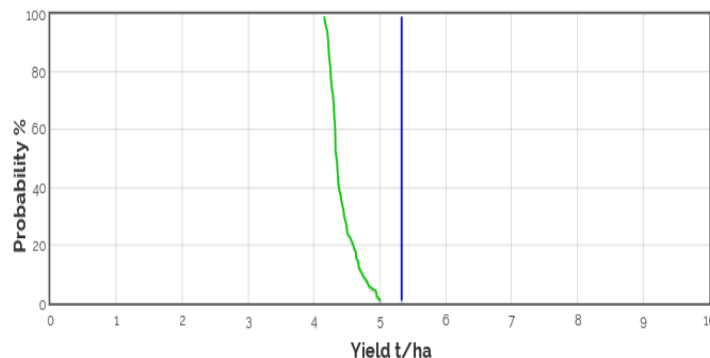
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 4.8 | +0.9 | 4.9 | +1.9 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 5.3 t/ha |
| 80% WUE: | 4.3 t/ha |

This model assumes that there is 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (21 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.

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 576 mm
 GSR to date: 478 mm (165 mm since last report)
 Current predicted PAW: 202 mm (77% full)

GSR decile: 10
 PAWC: 262 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

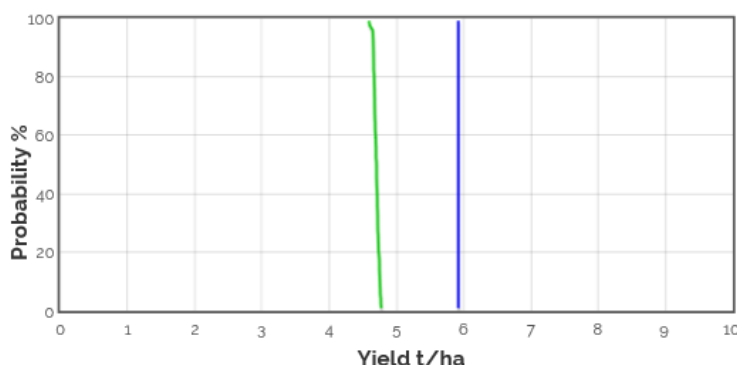
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 5.4 | 0.0 | 5.9 | +0.3 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 8.6 t/ha |
| 80% WUE: | 6.9 t/ha |

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (31 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: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 589 mm
 GSR to date: 479 mm (187 mm since last report)
 Current predicted PAW: 172 mm (100% full)

GSR decile: 10
 PAWC: 172 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

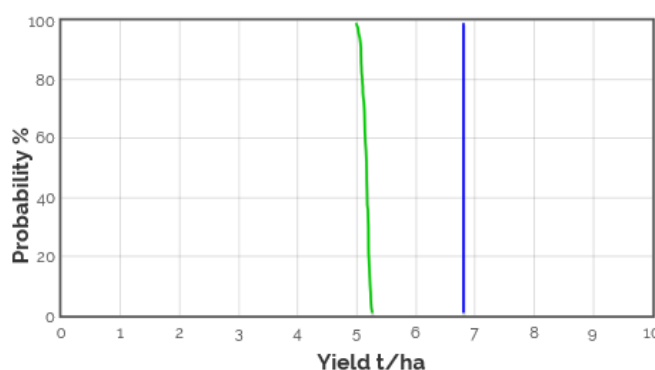
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 6.0 | 0.0 | 6.6 | +0.4 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 8.7 t/ha |
| 80% WUE: | 6.9 t/ha |

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (31 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.

SILTY CLAY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 412 mm
 GSR to date: 313 mm (79 mm since last report)
 Current predicted PAW: 43 mm (54% full)

GSR decile: 7
 PAWC: 79 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

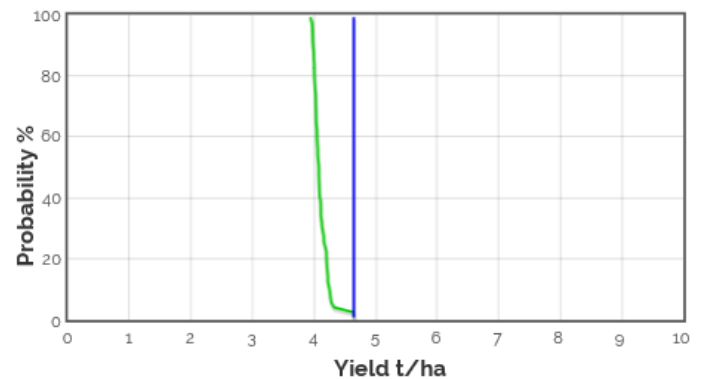
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 4.3 | +0.1 | 4.3 | +0.6 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 5.2 t/ha |
| 80% WUE: | 4.1 t/ha |

This model assumes that there is 30 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (25 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.

GRAVELLY LOAM

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 523 mm
 GSR to date: 413 mm (163 mm since last report)
 Current predicted PAW: 96 mm (100% full)

GSR decile: 9
 PAWC: 96 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

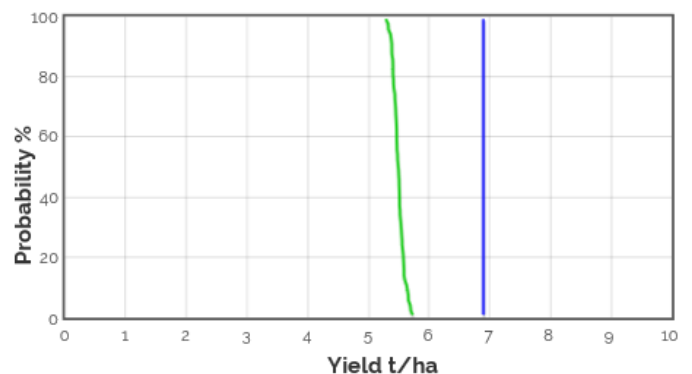
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 6.2 | +1.4 | 6.3 | +2.4 |

French & Schultz grain yield estimate:

| | |
|-----------|----------|
| 100% WUE: | 7.3 t/ha |
| 80% WUE: | 5.8 t/ha |

This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (27 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.

Crop growth

Variety: Mace wheat Sowing date: 1st May Nitrogen fertiliser: 40 kg N/ha at seeding + 30 kg N/ha 4th Jul

The season so far

Annual rain to date: 661 mm
 GSR to date: 547 mm (177 mm since last report) GSR decile: 10
 Current predicted PAW: 113 mm (100% full) PAWC: 113 mm

Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 05/10/2016)

These estimates are based on a 50% probability

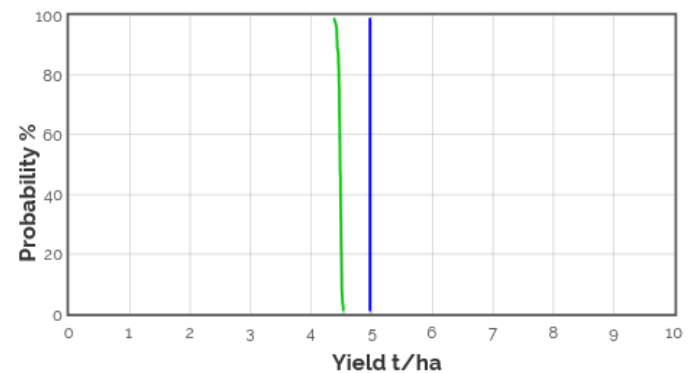
| Yield t/ha | Sown 1 st May (see graph) | Change since last report | Sown 20 th May | Change since last report |
|------------|--------------------------------------|--------------------------|---------------------------|--------------------------|
| Grain | 4.8 | -0.1 | 5.3 | +0.1 |

French & Schultz grain yield estimate:

| | |
|-----------|-----------|
| 100% WUE: | 10.1 t/ha |
| 80% WUE: | 8.1 t/ha |

This model assumes that there is 34 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (35 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.

Hart Field Day 2016

