

# HART BEAT

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flexi/coil



## HART BEAT

### Yield Prophet<sup>®</sup> simulations for 8 sites across the mid-north of SA

The Yield Prophet<sup>®</sup> 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

Winter Walk – 18<sup>th</sup> July 2017

HART FIELD DAY – 19<sup>th</sup> September 2017

Spring Twilight Walk – 17<sup>th</sup> October 2017

Getting The Crop In – March 2018

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[www.hartfieldsite.org.au](http://www.hartfieldsite.org.au)

# From the chairman

Welcome to the first edition of Hart Beat for 2017.

This is our ninth year providing detailed yield prediction information for the Mid-North of South Australia through our Hart Beat newsletters. Again featuring eight sites of varying soil types and rainfall across the region, we hope this resource proves to be a valuable when making operational decisions throughout the growing season.

For most in the Hart area, last season was an absolute bumper however, it was disappointing for some who suffered quite severe frost events further the east.

It's always a mixed bag and this season is proving to be no different. For those that have received good rain, their seeding programs are well advanced if not complete. However not all growers have been so lucky, in particular there are areas of YP and Adelaide Plains struggling with dry conditions and high mice numbers.

Fortunately, Hart is off to a great start. Our seeding program is well advanced and we're very pleased with how all trials are looking.

We have another bumper trial program on offer to visitors in 2017. In addition to our own trials we will be working with SARDI, The University of Adelaide and others on some fantastic projects. A new GRDC project evaluating advanced winter wheat breeding lines meant seeding start on March 14th with the assistance of some irrigation. The vast majority of trials were sown in late April – mid May while there was still good seed bed moisture.

An exciting opportunity presented itself earlier this year which has allowed us to move to newly renovated, shared office space at 155 Main North Road, Clare. Sarah, Dylan and Sandy are now working side by side where they also share space with other government and community organisations involved in agriculture and sustainable practices. We look forward to the collaboration opportunities and links this move will provide. We're also easier to find – feel free to call in! Thank you to NRM Northern & Yorke for the opportunity.

Our website has recently undergone an upgrade too & with a fresh, new look it's now easier to navigate. We have quite a catalogue of trial results available (from 2009) so make sure you utilise the search tool if you're looking for something in particular. You might also

want to check out 'The Hart Team' page. We've now included a profile and contact details for all board members and staff.

Speaking of board members, at our AGM in April we said farewell to two valuable contributors as they completed their terms.

- Ed Hawker's knowledge of farming was invaluable and we really appreciated his perspective. He was a great contributor both in and out of the paddock.
- Stewart McIntosh is passionate about agriculture and provided some fantastic industry links. Of particular note was the commitment Stewart made to our group due to the extra travel required from his farm at Alford.

We're pleased to welcome Simon Honner and Deb Purvis who were elected to the board in April. We thank them both for nominating and look forward to working with them over the next three years.

The first year of Hart's Regional Internship programme came to an end in March as we said goodbye to Rochelle Wheaton. We're very pleased to report that she was offered several research positions at the end of her time with us and chose to return to the EP to work with SARDI at Minnipa.

Our second intern, Dylan Bruce, started at the beginning of March. Keep an eye out for 'Brucey's Banter' in our Hart News emails and on our social media where he'll share some photos and provide some insight into one of the projects he's working on.

We're very pleased to report that in a wonderful endorsement of the Regional Internship programme, SAGIT have extended project funding for a further three years which will see us offering a total of five internships by 2021.

Finally, we invite you to join us at our annual Winter Walk will be on Tuesday the 18<sup>th</sup> of July starting at 9am. We have another fantastic trial program at Hart and I hope to see many of you there to check it out.



**Damien Sommerville**

Hart Chairperson

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# 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 15<sup>th</sup> 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](http://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 10 May (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	178	90
Spalding	430	Red brown earth	143	150	57	90
Condowie	350	Sandy loam	115	150	64	90
Kybunga	428	Clay loam	262	120	191	88
Farrell Flat	474	Light clay loam	172	120	73	87
Pinery	374	Silty clay loam	79	150	69	90
Eudunda	445	Gravelly loam	96	100	0	90
Tarlee	474	Sandy loam	113	150	113	87

## 2017 site locations



## SANDY CLAY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 40 kg N/ha at seeding

### The season so far

Annual rain to date: 153 mm  
 GSR to date: 82 mm  
 Current predicted PAW: 169 mm (82% full)  
 GSR decile: 6  
 PAWC: 206 mm

### Grain yield predictions (Yield Prophet)

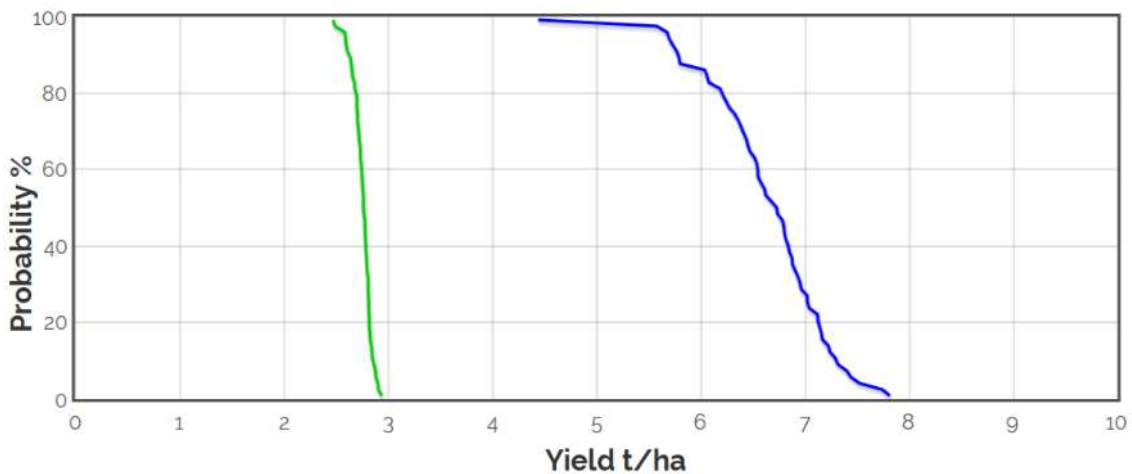
Yield prophet estimate: (Date of report 01/06/2017)  
 These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	4.8	4.5	5.1	3.9

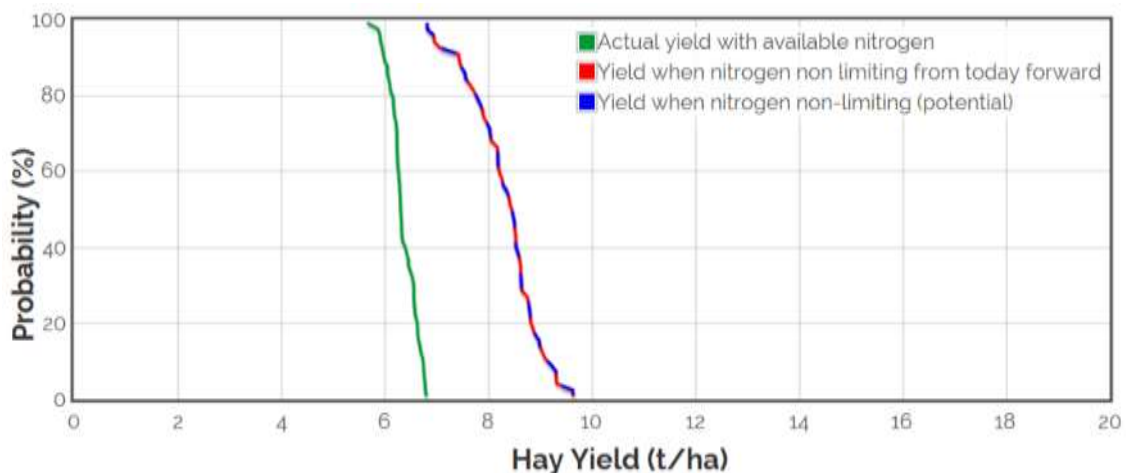
### French & Schultz grain yield estimate:

100% WUE:	4.2 t/ha
80% WUE:	3.4 t/ha

This model assumes that there is 21 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (219 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

### The season so far

Annual rain to date: 157 mm  
 GSR to date: 88 mm  
 Current predicted PAW: 62 mm (43% full)

GSR decile: 6  
 PAWC: 143 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

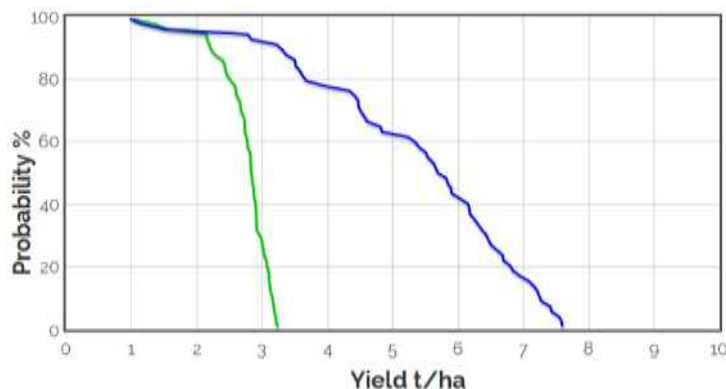
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	4.3	4.6	3.6	3.8

### French & Schultz grain yield estimate:

100% WUE: 4.6 t/ha  
 80% WUE: 3.7 t/ha

This model assumes that there is 21 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (233 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

### The season so far

Annual rain to date: 156 mm  
 GSR to date: 76 mm  
 Current predicted PAW: 55 mm (48% full)

GSR decile: 7  
 PAWC: 115 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 1/06/2017)

These estimates are based on a 50% probability

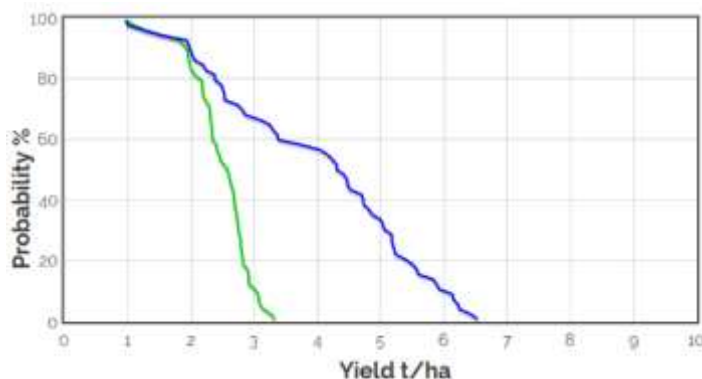
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	3.5	2.5	2.7	2.5

### French & Schultz grain yield estimate:

100% WUE: 3.4 t/ha  
 80% WUE: 2.7 t/ha

This model assumes that there is 24 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (182 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.

# KYBUNGA

## CLAY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 40 kg N/ha at seeding

### The season so far

Annual rain to date: 184 mm  
GSR to date: 66 mm  
Current predicted PAW: 187 mm (71% full)

GSR decile: 5  
PAWC: 262 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

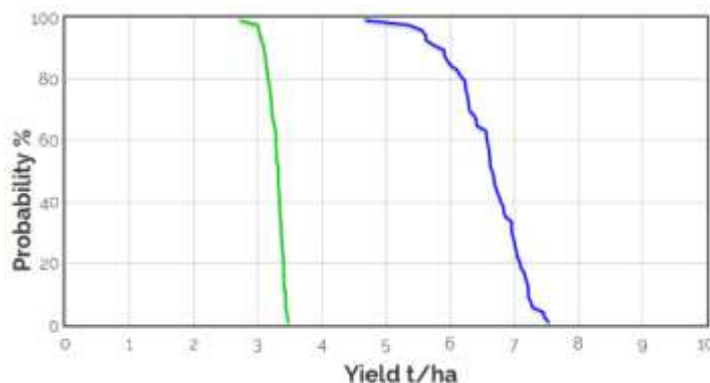
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	5.0	4.7	5.4	4.2

### French & Schultz grain yield estimate:

100% WUE: 5.6 t/ha  
80% WUE: 4.5 t/ha

This model assumes that there is 35 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (287 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

### The season so far

Annual rain to date: 146 mm  
GSR to date: 62 mm  
Current predicted PAW: 77 mm (45% full)

GSR decile: 4  
PAWC: 172 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

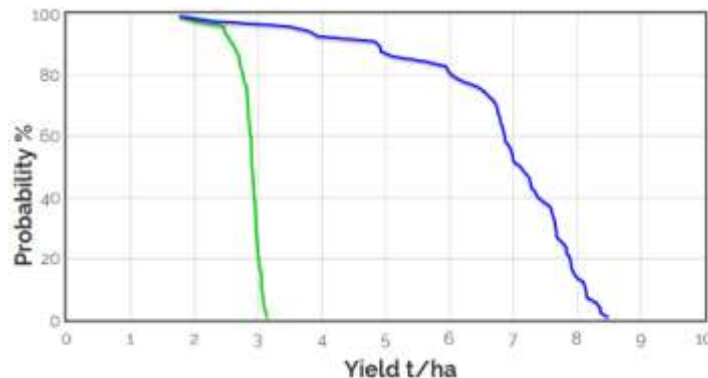
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	5.0	5.8	5.1	6.0

### French & Schultz grain yield estimate:

100% WUE: 4.9 t/ha  
80% WUE: 3.9 t/ha

This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (267 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

### The season so far

Annual rain to date: 174 mm  
 GSR to date: 54 mm  
 Current predicted PAW: 70 mm (89% full)

GSR decile: 4  
 PAWC: 79 mm

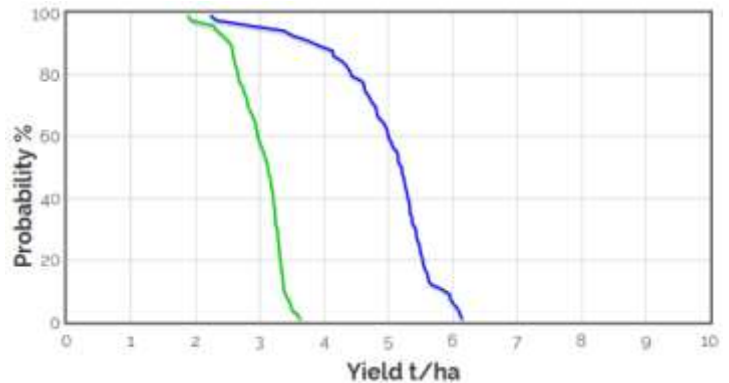
### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	4.2	4.3	4.1	3.8

### 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.

### French & Schultz grain yield estimate:

100% WUE: 4.1 t/ha  
 80% WUE: 3.9 t/ha

This model assumes that there is 36 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (227 mm) for the rest of the season.

# EUDUNDA

## GRAVELLY LOAM

### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 40 kg N/ha at seeding

### The season so far

Annual rain to date: 151 mm  
 GSR to date: 59 mm  
 Current predicted PAW: 10 mm (10% full)

GSR decile: 4  
 PAWC: 96 mm

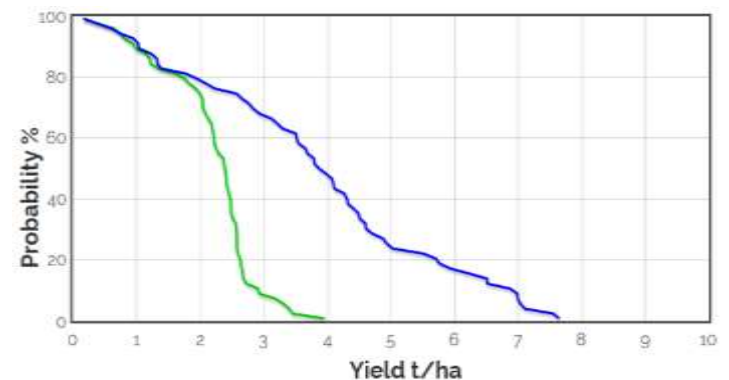
### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
rain	3.1	4.8	3.2	4.2

### 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.

### French & Schultz grain yield estimate:

100% WUE: 4.5 t/ha  
 80% WUE: 3.6 t/ha

This model assumes that there is 28 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (248 mm) for the rest of the season.



### Crop growth

Variety: Mace wheat      Sowing date: 1st May      Nitrogen fertiliser: 40 kg N/ha at seeding

### The season so far

Annual rain to date: 147 mm  
 GSR to date: 53 mm  
 Current predicted PAW: 66 mm (58% full)

GSR decile: 4  
 PAWC: 113 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 01/06/2017)

These estimates are based on a 50% probability

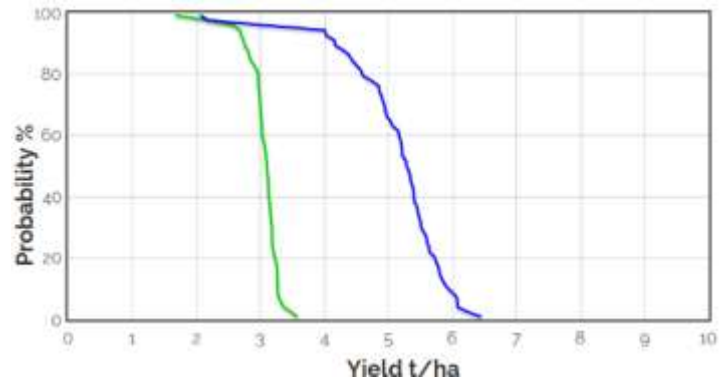
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This Time Last Year	Sown 20 <sup>th</sup> May	This Time Last Year
Grain	4.2	4.9	4.4	5.0

### French & Schultz grain yield estimate:

100% WUE:	4.7 t/ha
80% WUE:	3.8 t/ha

This model assumes that there is 28 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (266 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.

## At Hart so far...

