

# HART BEAT

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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

Winter Walk – July 16, 2019

HART FIELD DAY – September 17, 2019

Spring Twilight Walk – October 15, 2019

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

# From the Chairman

Welcome to the first edition of our HART BEAT newsletter for 2019.

Heat Beat is our way of providing detailed yield prediction information across eight sites throughout the Mid-North of SA. These sites were originally selected as they provided varying soil types and rainfall across the region and hence will provide a valuable resource for many of our members when making operational decisions throughout the year.

After the dry-start to the season and the less than exciting seasonal outlook from our weather forecasters, it's fantastic to see the turnaround following last week's rain which provided most of the Mid-North region with 25 mm of rainfall, some receiving as high as 45 mm. This rainfall will have a significant influence on the 2019 season, providing some great early growth as can be seen already when driving around. Pastures and stockfeed are beginning to provide some relief to stockowners after the extended dry summer resulting in most running short of feed grain and fodder. There's definitely more optimism for the season ahead.

Our trial program for 2019 will consist of thirty trials on the Hart site, with 3 off-site locations; Booleroo Centre, Washpool and Condowie.

Seeding for Hart began on the 18<sup>th</sup> March with our early sown long season wheats project and included a little assistance via irrigation to achieve emergence. The rest of our trial program kicked off mid-May after the site received our biggest rainfall event for the year; 15 mm. Crop emergence across all trials has been good and we are well into crop and weed assessments.

Hart growing season rainfall is 93 mm to date – April 8 mm, May 40.8 mm, June 44.2 mm.

## **New trials to note in 2019:**

National Hay Agronomy trial – for the first time in many years we have a focus on oaten hay quality; looking at a range of oat varieties and how they perform across different sowing times and nitrogen management strategies. In addition to this we are hosting a small trial looking at Group B tolerant oat varieties and new awnless wheat varieties.

CRC for Soils project – looking at intercropping (sowing two crops tighter) to investigate the effect of mixing crop roots on soil water, nitrogen and biology.

Commercial Scale Seeder demonstration - this trial looks exciting as it compares four seeders; local grower tyne, local grower disc and two small precision planter seeder bars –

looking at lentils, analysing seeding rates, crop establishment, early crop growth and ultimately grain yield.

Our Regional Internship program, run with the support of SAGIT & SARDI, is now in its 4<sup>th</sup> year. Jade Rose joined our team in February and is a fantastic support for Sarah and the trial program.

Hart's AGM was held in April, with our much-valued board member Judy Wilkinson deciding not to renominate for another term. We were fortunate to have Judy's knowledge and guidance throughout her 6 years with us and we thank her for her contribution – she'll be missed but will no doubt continue to have regular contact.

With this position being open, we're excited to welcome our newest board member, Rob Dall, who farms locally at Kybunga and was already a regular at Hart events. Rob will provide extensive local and practical knowledge and we look forward to working with him.

Damien Sommerville's 3-year term as Chairman also came to an end at our AGM. He has handed over the reins but will stay on in role of Vice-Chair. Damien has led the group as a highly respected representative within the agricultural industry and I would like to take the opportunity to thank him for his valued contribution. I look forward to his support as I take on the role of Chairman for the next period.

For those that haven't met me, I've been an active member of the ag industry for the past twenty years, with agronomy and trial experience throughout South Australia having been based in Cummins, Keith and now in Clare. I believe Hart is a fantastic resource for the farming community and I hope I can uphold the current high standard set by the group. We'll continue to listen to the issues affecting our farming community and share research that helps to improve the profitability and sustainability of farm businesses.

I would like to take the opportunity to thank all our sponsors for their continued support of Hart and acknowledge the important part that they play in helping us fund a number of additional trials we provide to our growers. I believe we have shown value to our sponsors, with most being long term and several new businesses seeking sponsorship with us.

We hope to see you at Hart events throughout the year and particularly invite you to the next event on our calendar; our annual Winter Walk; July 16, 9am – 12pm Hart.

## **Ryan Wood**

Chairman, Hart Field-Site Group

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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.yieldprophet.com.au](http://www.yieldprophet.com.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 March (mm)	Pre-sowing soil nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	150	0	67
Spalding	430	Red brown earth	143	150	0	63
Condowie	350	Sandy loam	115	150	0	65
Kybunga	428	Clay loam	262	120	0	64
Farrell Flat	474	Light clay loam	172	120	0	71
Pinery	374	Silty clay loam	112	150	0	70
Eudunda	445	Gravelly loam	96	100	0	63
Tarlee	474	Sandy loam	113	150	0	67

## 2019 site locations



## SANDY CLAY LOAM

### Crop growth

**Variety:** Scepter wheat    **Sowing date:** 1st May    **Nitrogen fertiliser:** 30 kg N/ha at seeding  
**Emergence date:** 19<sup>th</sup> May

### The season so far

**Annual rain to date:** 103 mm    **GSR decile:** 4  
**GSR to date:** 93 mm    **PAWC:** 206 mm  
**Current predicted PAW:** 56 mm (27 % full)

### Grain yield predictions (Yield Prophet)

**Yield prophet estimate:** (Date of report 20/06/2019)

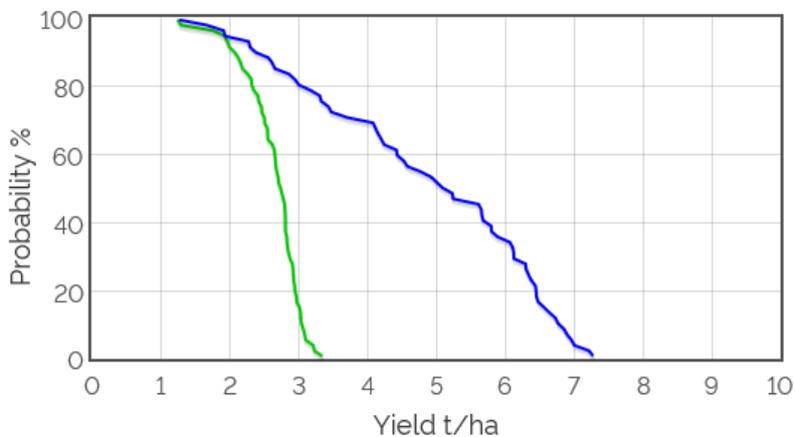
*These estimates are based on a 50% probability*

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	3.9	3.7	3.9	3.4

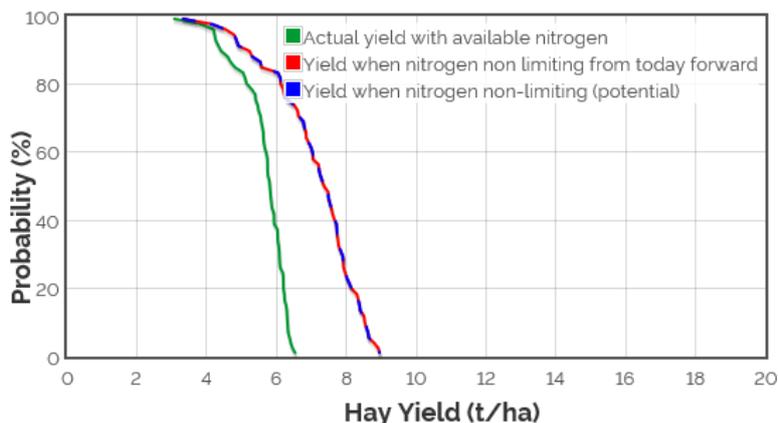
### French & Schultz grain yield estimate:

<b>100% WUE:</b>	<b>3.5 t/ha</b>
<b>80% WUE:</b>	<b>2.8 t/ha</b>

*This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (190 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: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 13<sup>th</sup> May

### The season so far

Annual rain to date: 133 mm  
 GSR to date: 111 mm  
 Current predicted PAW: 63 mm (44 % full)

GSR decile: 5  
 PAWC: 143 mm

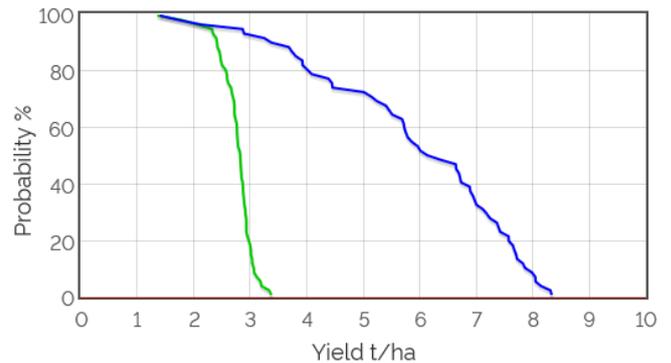
### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

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	4.5	3.6	4.1	3.3

### Grain yield outcome graph



### French & Schultz grain yield estimate:

100% WUE: 4.3 t/ha  
 80% WUE: 3.4 t/ha

This model assumes that there is 7 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (206 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: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 19<sup>th</sup> May

### The season so far

Annual rain to date: 96 mm  
 GSR to date: 90 mm  
 Current predicted PAW: 37 mm (32 % full)

GSR decile: 5  
 PAWC: 115 mm

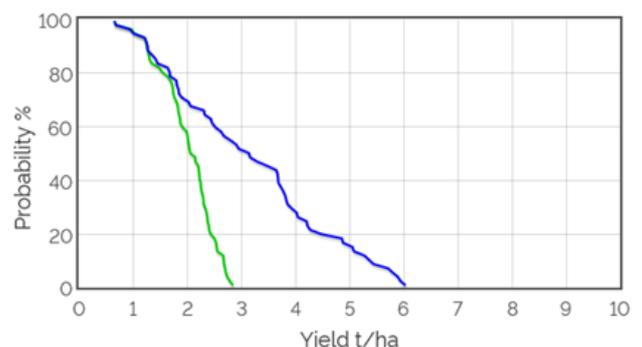
### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

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	2.6	1.8	2.5	1.3

### Grain yield outcome graph



### French & Schultz grain yield estimate:

100% WUE: 2.7 t/ha  
 80% WUE: 2.2 t/ha

This model assumes that there is 2 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (155 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.

## CLAY LOAM

### Crop growth

Variety: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 20<sup>th</sup> May

### The season so far

Annual rain to date: 150 mm  
 GSR to date: 140 mm  
 Current predicted PAW: 60 mm (23 % full)

GSR decile: 6  
 PAWC: 262 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

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	4.5	3.9	4.1	3.2

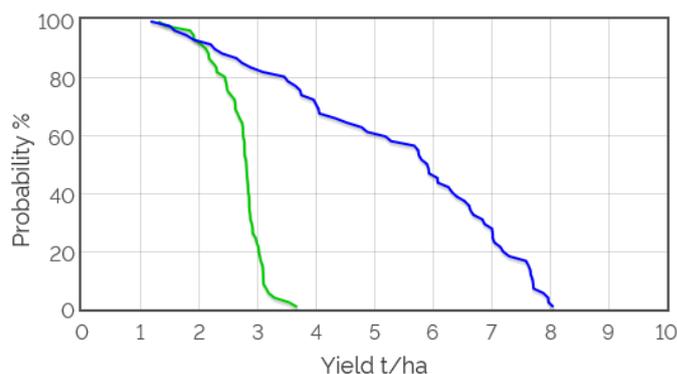
### French & Schultz grain yield estimate:

100% WUE: 5.8 t/ha

80% WUE: 4.6 t/ha

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (257 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: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 14<sup>th</sup> May

### The season so far

Annual rain to date: 126 mm  
 GSR to date: 116 mm  
 Current predicted PAW: 45 mm (26% full)

GSR decile: 5  
 PAWC: 172 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

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	5.3	4.7	4.7	4.2

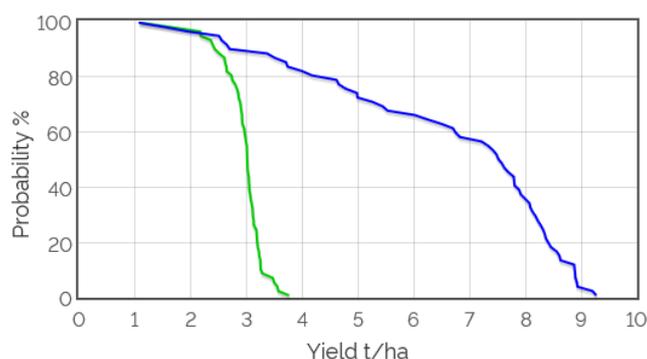
### French & Schultz grain yield estimate:

100% WUE: 4.9 t/ha

80% WUE: 4.0 t/ha

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (238 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: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 18<sup>th</sup> May

### The season so far

Annual rain to date: 103 mm  
 GSR to date: 95 mm  
 Current predicted PAW: 52 mm (46 % full)

GSR decile: 4  
 PAWC: 112 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 21/06/2019)

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	4.4	3.7	4.2	3.3

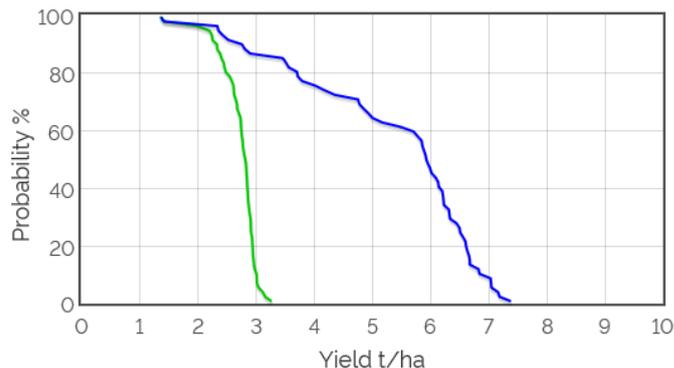
### French & Schultz grain yield estimate:

100% WUE: 3.6 t/ha

80% WUE: 2.9 t/ha

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (192 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: Scepter wheat    Sowing date: 1st May    Nitrogen fertiliser: 30 kg N/ha at seeding  
 Emergence date: 15<sup>th</sup> May

### The season so far

Annual rain to date: 93 mm  
 GSR to date: 79 mm  
 Current predicted PAW: 12 mm (13 % full)

GSR decile: 2  
 PAWC: 96 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

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	4.0	4.3	3.9	3.9

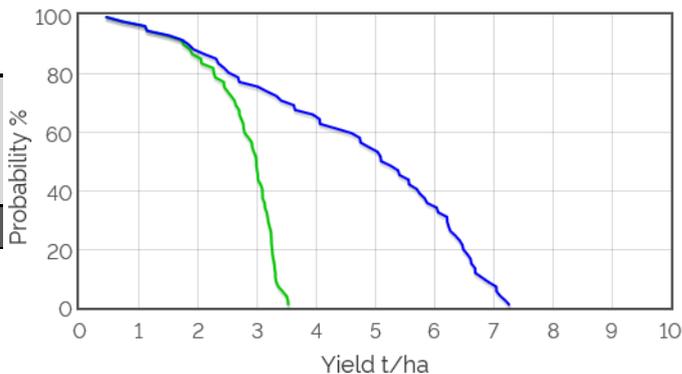
### French & Schultz grain yield estimate:

100% WUE: 3.9 t/ha

80% WUE: 3.1 t/ha

This model assumes that there is 4 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (222 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: Scepter wheat      Sowing date: 1st May      Nitrogen fertiliser: 30 kg N/ha at seeding +  
 Emergence date: 14<sup>th</sup> May

### The season so far

Annual rain to date: 115 mm  
 GSR to date: 107 mm  
 Current predicted PAW: 46 mm (41% full)

GSR decile: 4  
 PAWC: 113 mm

### Grain yield predictions (Yield Prophet)

Yield prophet estimate: (Date of report 20/06/2019)

These estimates are based on a 50% probability

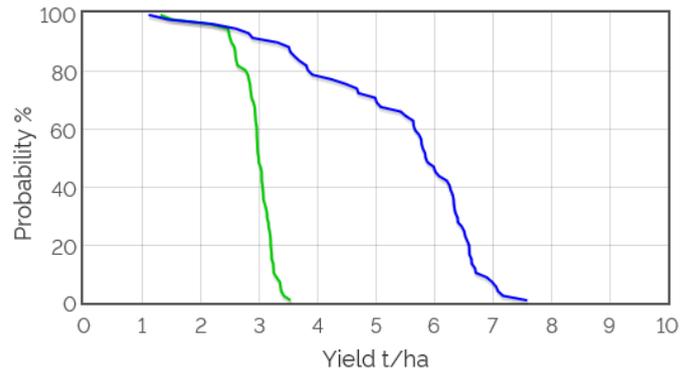
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This time last year	Sown 20 <sup>th</sup> May	This time last year
Grain	4.5	3.9	4.4	3.5

### French & Schultz grain yield estimate:

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

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (236 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.

# Seeding at Hart - 2019

