

# HART BEAT

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ISSUE 32

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CARING  
FOR  
OUR  
COUNTRY



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## 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 – 21<sup>st</sup> July 2015

Hart Field Day - 15<sup>th</sup> September 2015

Spring Twilight Walk – 20<sup>th</sup> October 2015

Getting The Crop In – 16<sup>th</sup> March 2016 (tbc)

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

# From the chairman

Welcome to the first Hart Beat for 2015.

We hope your seeding went smoothly and that crops have emerged well. While the majority of areas had timely seeding rain, the post seeding drier spell (at Hart and other sites) and the prediction of El Niño, means that the Yield Prophet data contained within Hart Beat will be vital. Major decision making in terms of nitrogen applications and grain sales can be aided by early indications of yield rather than last week's weather, be that wet or dry.

In news from the Hart board, we reluctantly accepted John Both's resignation at our recent AGM as he looks toward retirement. John has been a fantastic contributor of both skills and knowledge to the Hart trial program. We would like to thank him sincerely for his contribution and look forward to seeing him at future Hart events.

Following John's resignation, we would like to congratulate Mick Lines on being elected to the Hart board. Mick will be a familiar face to many of you in his previous role with SARDI Clare Crop Improvement Centre in which he often presented on pulse agronomy at Hart events. Mick now works with Dow AgroSciences and will bring a new set of skills to Hart. Welcome Mick!

Three year terms were up for existing board members, Matt Dare, Graham Trengove and Sandy Kimber. All re-nominated and were re-elected which gives us another solid team at Hart for 2015.

We also have some news to share in regards to an exciting new project! Hart was recently successful in securing funding for a two year SAGIT project entitled "Regional Internship in Applied Research". This project will be run in partnership with SARDI and will commence in March 2016.

The internship will allow Hart to host a recent Ag Science graduate to work alongside our Research and Extension Manager, Sarah Noack in a full time capacity. The successful applicant will be based in Clare, spending eleven months with the Hart team, and one month with researchers at SARDI in areas that are relevant to HFSG research.

This will give graduates the opportunity to learn about the fundamentals of applied research, development and extension and to interact with grain growers while focussing on field based trials.

A second internship will be offered in 2017.

We will be calling for applications for the 2016 internship in October this year. If you are aware of someone in their final year that you think would be suitable, we would like to hear from you.

Hope to see some good rains shortly.



Justin Wundke  
Chairman, Hart Field-Site Group Inc.

# 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<sup>®</sup>** has been very accurate throughout Australia, over the past 5 seasons. At the Hart field site the **Yield Prophet<sup>®</sup>** 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<sup>®</sup>** 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<sup>®</sup>** simulates the soil water and nitrogen processes in the paddock, and crop growth. **Yield Prophet<sup>®</sup>** calculates the amount of water and nitrogen available to the crop and the water and nitrogen demand of the crop.

**Disclaimer:** *Yield Prophet<sup>®</sup>* 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<sup>®</sup>* 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<sup>®</sup>*.

**Important Notice:** *Yield Prophet<sup>®</sup>* 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<sup>®</sup>* please visit or [www.yieldprophet.com.au](http://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: 151 mm  
 GSR to date: 79 mm  
 GSR decile: 3  
 Current predicted PAW: 52 mm (25% full)  
 PAWC: 206 mm

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 05/06/2015)

*These estimates are based on a 50% probability*

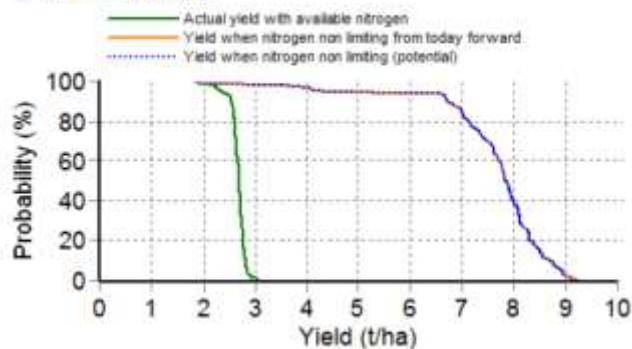
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	This time last year	Sown 20 <sup>th</sup> May	This time last year
Grain	5.2	4.9	5.3	5.0

French & Schultz grain yield estimate:

100% WUE: 5.7 t/ha, 80% WUE: 4.6 t/ha

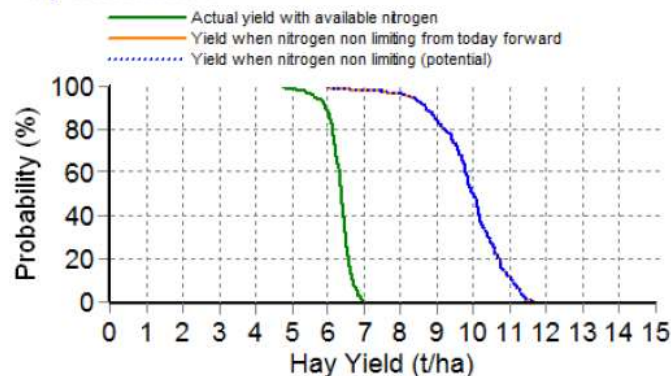
*This model assumes that there is 22 mm stored moisture, 110 mm of evaporation and decile 5 (191 mm) rainfall for the rest of the season.*

Grain Yield Outcome



*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.*

Hay Yield Outcome



## RED BROWN EARTH

### The season so far

Annual rain to date: 216 mm  
 GSR to date: 118 mm  
 GSR decile: 8  
 Current predicted PAW: 41 mm (29% full)  
 PAWC: 143 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)

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	5.3	3.4	5.6

### French & Schultz grain yield estimate:

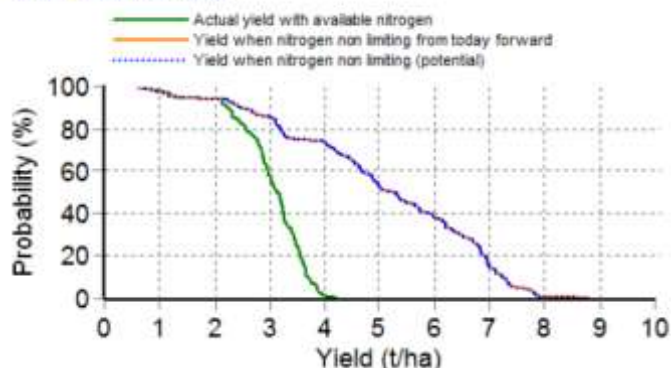
100% WUE: 5.3 t/ha, 80% WUE: 4.3 t/ha

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and decile 5 (229 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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: 117 mm  
 GSR to date: 70 mm  
 GSR decile: 7  
 Current predicted PAW: 20 mm (17% full)  
 PAWC: 115 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)

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	2.2	3.4	2.0	2.9

### French & Schultz grain yield estimate:

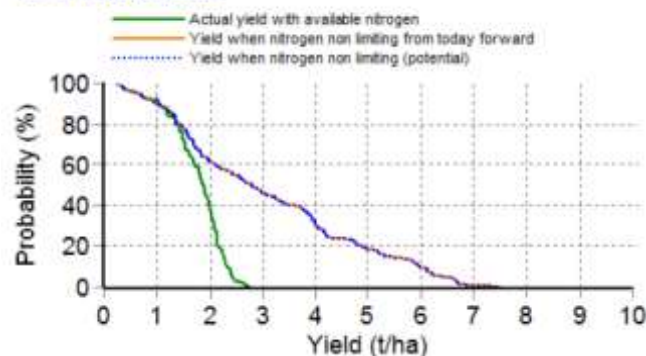
100% WUE: 2.9 t/ha, 80% WUE: 2.3 t/ha

This model assumes that there is 14 mm stored moisture, 110 mm of evaporation and decile 5 (172 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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: 247 mm  
 GSR to date: 148 mm  
 GSR decile: 9  
 Current predicted PAW: 69 mm (26% full)  
 PAWC: 262 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)  
 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	4.9	3.9	4.8

### French & Schultz grain yield estimate:

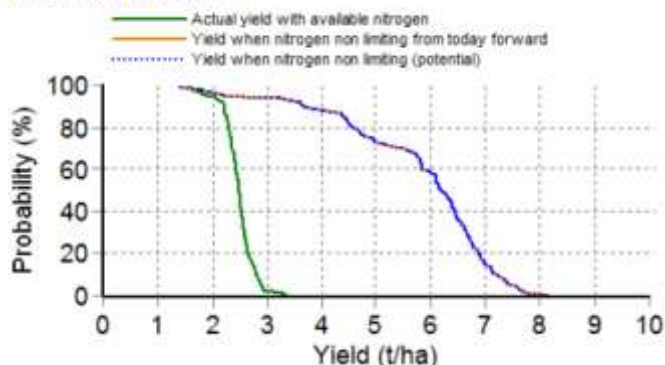
100% WUE: 6.8 t/ha, 80% WUE: 5.4 t/ha

This model assumes that there is 30 mm stored moisture, 110 mm of evaporation and decile 5 (272 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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: 185 mm  
 GSR to date: 103 mm  
 GSR decile: 6  
 Current predicted PAW: 62 mm (64% full)  
 PAWC: 172 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)  
 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	5.4	5.8	4.9	5.6

### French & Schultz grain yield estimate:

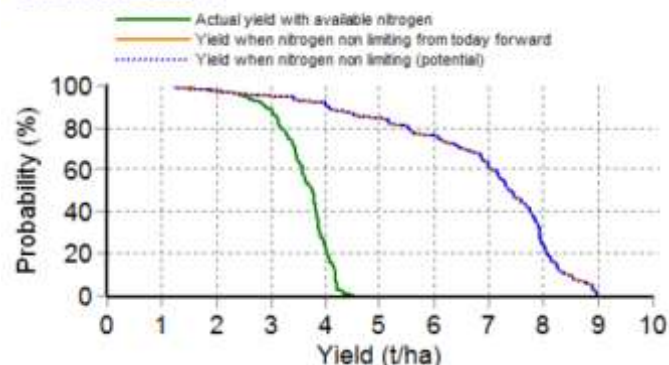
100% WUE: 5.6 t/ha, 80% WUE: 4.5 t/ha

This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (262 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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.

## SILTY CLAY LOAM

### The season so far

Annual rain to date: 161 mm  
 GSR to date: 74 mm  
 GSR decile: 8  
 Current predicted PAW: 46 mm (58% full)  
 PAWC: 79 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)  
 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	3.4	3.5	2.8	3.0

### French & Schultz grain yield estimate:

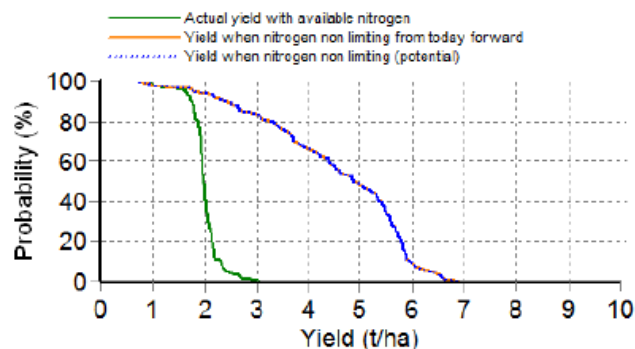
100% WUE: 3.6 t/ha, 80% WUE: 2.9 t/ha

This model assumes that there is 22 mm stored moisture, 110 mm of evaporation and decile 5 (191 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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.

## GRAVELLY LOAM

### The season so far

Annual rain to date: 206 mm  
 GSR to date: 122 mm  
 GSR decile: 8  
 Current predicted PAW: 30 mm (31% full)  
 PAWC: 96 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)  
 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	4.9	3.6	4.4

### French & Schultz grain yield estimate:

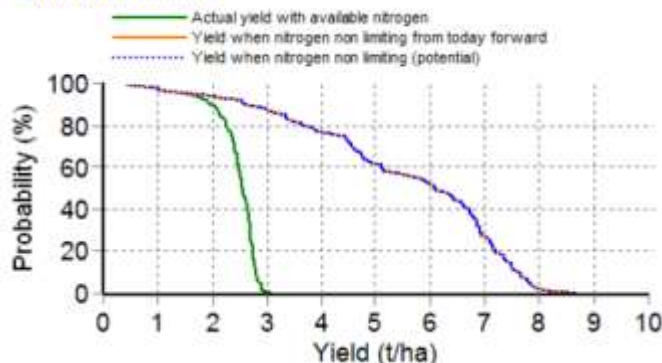
100% WUE: 5.7 t/ha, 80% WUE: 4.6 t/ha

This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (250 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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.



## SANDY LOAM



### The season so far

Annual rain to date: 153 mm  
 GSR to date: 78 mm  
 GSR decile: 6  
 Current predicted PAW: 39 mm (35% full)  
 PAWC: 113 mm

### Grain yield predictions

Yield prophet estimate: (Date of report 05/06/2015)

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	5.0	4.4	5.6

### French & Schultz grain yield estimate:

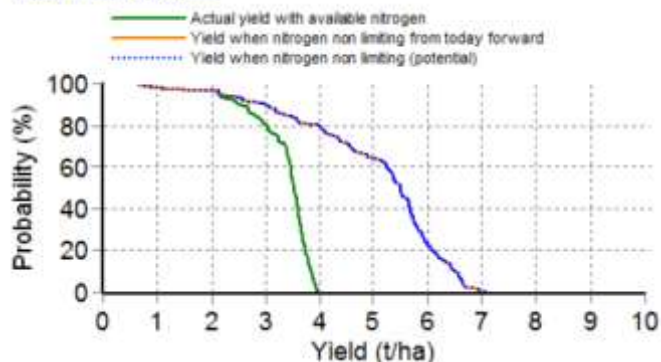
100% WUE: 5.1 t/ha, 80% WUE: 4.1 t/ha

This model assumes that there is 23 mm stored moisture, 110 mm of evaporation and decile 5 (264 mm) rainfall for the rest of the season.

### Crop growth

Variety: Mace wheat Sowing date: 1<sup>st</sup> May  
 Nitrogen fertiliser: 30 kg N/ha

### Grain Yield Outcome



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.

# Cropping Systems trial - seeding '15

