

# HART BEAT

19<sup>th</sup> June 2014

ISSUE 27

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CARING  
FOR  
OUR  
COUNTRY



CNH CAPITAL  
**CASE II**  
AGRICULTURE  
**flexi:coil**



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## HART BEAT

**Yield Prophet<sup>®</sup> simulations for  
10 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 - 22<sup>nd</sup> July 2014

Hart Field Day - 16<sup>th</sup> September 2014

Spring Twilight Walk - 21<sup>st</sup> October 2014

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

# From the chairman

Welcome to the first Hart Beat of the 2014 growing season.

This year it is bigger and hopefully better than ever with a brand new layout and an expansion to ten sites across even more soil types and regions.

The team at Hart hope this will increase the relevance of this publication to your farming business, especially for decision making with nitrogen, fungicide timings and yield for marketing and insurance purposes.

We trust that your seeding went smoothly and you have good subsoil moisture to help buffer against whatever the rest of the season will throw at us.

Sarah, Peter and the SARDI team have also been busy sowing trials at the Hart field site as well as a number of offsite trials in collaboration with growers.

There are a range of new trials and projects commencing this year.

One trial of particular interest at the field site is part

of the new GRDC "Optimising Canola Profitability" project.

Hart is one of just three sites in South Australia lead by Andrew Ware, SARDI. This year the trial focuses on three aspects; varieties, time of sowing and seeding rate.

Another trial at the site will cover some of the work by James Hunt looking at the fit of early sown slow-maturing varieties in the mid-north.

And of course the ever popular cereal variety trials will be back.

Hope you can make it to one of our field days this year. Good luck with the season ahead.

Cheers,



**Justin Wundke**  
HART CHAIRMAN



*Off to a great start*  
Canola agronomy (time of sowing) trial at Hart

*To find out more about HART visit our website*

[www.hartfieldsite.org.au](http://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<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	Pre-sowing soil nitrogen (0-90cm) (kg/ha)	Plant Available Water Capacity (mm)
Hart	400	Sandy clay loam	94	206
Spalding	430	Red brown earth	108	143
Crystal Brook	398	***	**	**
Jamestown	453	***	**	**
Condowie	350	Sandy loam	64	115
Kybunga	428	Friable clay loam	89	262
Farrell Flat	474	Red clay loam over clay	97	172
Pinery	374	Silty clay loam over clay	98	79
Eudunda	445	Loam over clay loam	86	96
Tarlee	474	Sandy loam over clay on rock	174	113

## 2014 site locations



## SANDY CLAY LOAM

### The season so far

Annual rain to date: 270 mm  
 GSR to date: 158 mm  
 GSR decile: 9  
 Current predicted PAW: 98 mm (48% 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 16/06/2014)

*These estimates are based on a 50% probability*

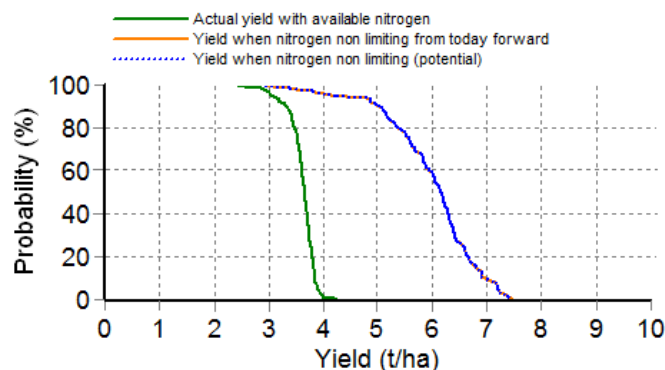
Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	4.9	0	5.0	4.6

French & Schultz grain yield estimate:

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

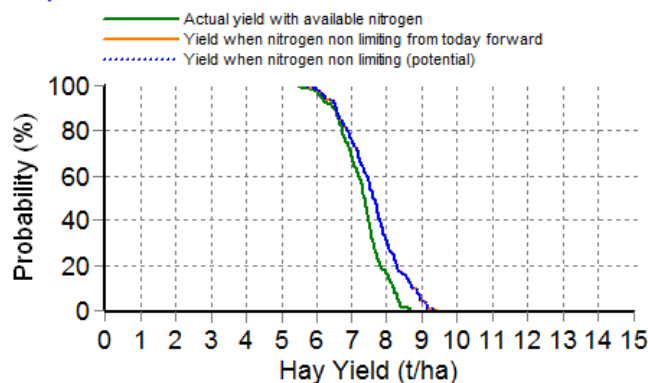
*This model assumes that there is 33 mm stored moisture, 110 mm of evaporation and decile 5 (205 mm) rainfall for the rest of the season.*

#### 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



# SPALDING

## RED BROWN EARTH

### The season so far

Annual rain to date: 242 mm

GSR to date: 160 mm

GSR decile: 9

Current predicted PAW: 64 mm (45% full)

PAWC: 143 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 16/06/2014)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	5.3	0	4.6	5.6

### French & Schultz grain yield estimate:

100% WUE: 5.9 t/ha, 80% WUE: 4.7 t/ha

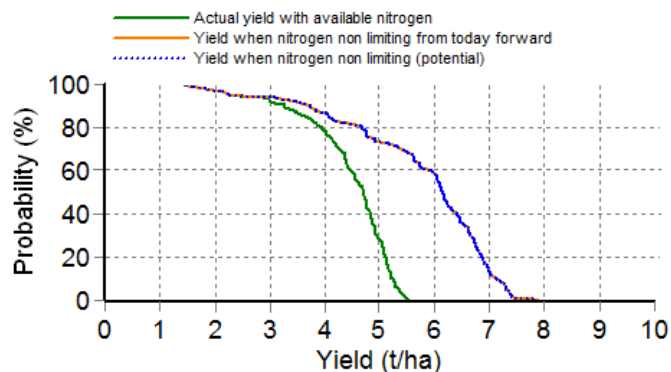
This model assumes that there is 25 mm stored moisture, 110 mm of evaporation and decile 5 (222 mm) rainfall for the rest of the season.

### 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.

# CRYSTAL BROOK

## COMING SOON!

Site confirmed,  
pending final soil analysis results

# CONDOWIE

## SANDY LOAM

### The season so far

Annual rain to date: 232 mm

GSR to date: 129 mm

GSR decile: 9

Current predicted PAW: 52 mm (45% full)

PAWC: 115 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 17/06/2014)

*These estimates are based on a 50% probability*

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	3.4	0	2.9	N/A

### French & Schultz grain yield estimate:

100% WUE: 4.1 t/ha, 80% WUE: 3.3 t/ha

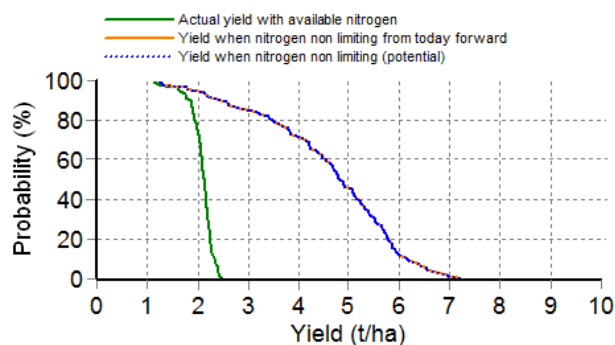
*This model assumes that there is 31 mm stored moisture, 110 mm of evaporation and decile 5 (155 mm) rainfall for the rest of the season.*

### 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.*

# JAMESTOWN

## COMING SOON!

Site confirmed,  
pending final soil analysis results

## CLAY LOAM

### The season so far

Annual rain to date: 254 mm  
 GSR to date: 160 mm  
 GSR decile: 9  
 Current predicted PAW: 77 mm (29% full)  
 PAWC: 262 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 17/06/2014)  
 These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	4.9	0	4.8	4.3

### French & Schultz grain yield estimate:

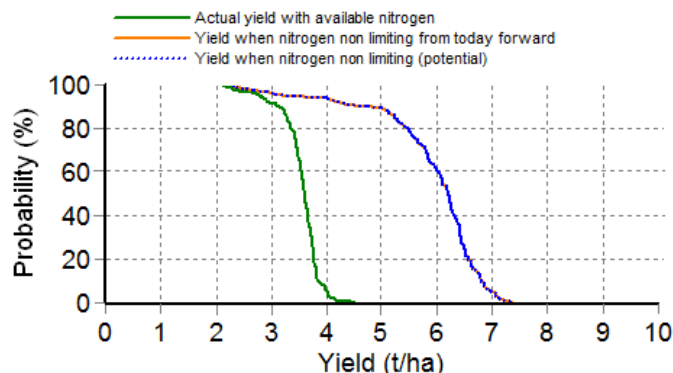
100% WUE: 6.6 t/ha, 80% WUE: 5.3 t/ha

This model assumes that there is 28 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.

# FARRELL FLAT

## LIGHT CLAY LOAM

### The season so far

Annual rain to date: 317 mm  
 GSR to date: 222 mm  
 GSR decile: 9  
 Current predicted PAW: 57 mm (33% full)  
 PAWC: 172 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 16/06/2014)  
 These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	5.8	0	5.6	5.7

### French & Schultz grain yield estimate:

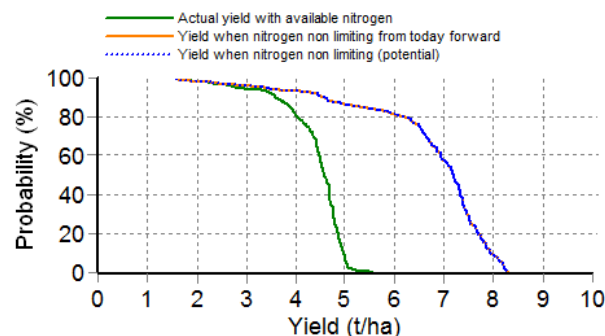
100% WUE: 8.0 t/ha, 80% WUE: 6.4 t/ha

This model assumes that there is 29 mm stored moisture, 110 mm of evaporation and decile 5 (257 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: 229 mm  
 GSR to date: 138 mm  
 GSR decile: 9  
 Current predicted PAW: 57 mm (72% full)  
 PAWC: 79 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 16/06/2014)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	3.5	0	3.0	3.8

### French & Schultz grain yield estimate:

100% WUE: 4.7 t/ha, 80% WUE: 4.0 t/ha

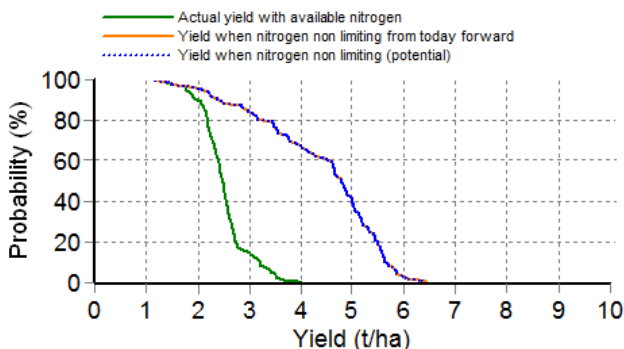
This model assumes that there is 27 mm stored moisture, 110 mm of evaporation and decile 5 (180 mm) rainfall for the rest of the season.

### 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: 326 mm  
 GSR to date: 212 mm  
 GSR decile: 9  
 Current predicted PAW: 77 mm (80% full)  
 PAWC: 96 mm

### Grain & hay yield predictions

Yield prophet estimate: (Date of report 16/06/2014)

These estimates are based on a 50% probability

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	4.9	0	4.4	Not avail

### French & Schultz grain yield estimate:

100% WUE: 6.9 t/ha, 80% WUE: 6.0 t/ha

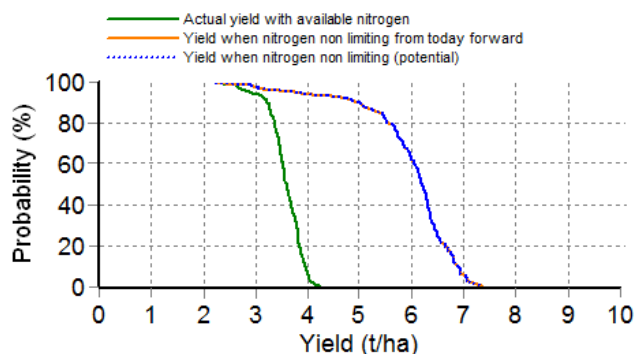
This model assumes that there is 34 mm stored moisture, 110 mm of evaporation and decile 5 (241 mm) rainfall for the rest of the season.

### 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:** 260 mm  
**GSR to date:** 170 mm  
**GSR decile:** 9  
**Current predicted PAW:** 101 mm (89% full)  
**PAWC:** 113 mm  
**Grain & hay yield predictions**

**Yield prophet estimate:** (Date of report 18/06/2014)  
*These estimates are based on a 50% probability*

Yield t/ha	Sown 1 <sup>st</sup> May (see graph)	Change since last report	Sown 20 <sup>th</sup> May	This time last year
Grain	5.0	0	5.6	4.9

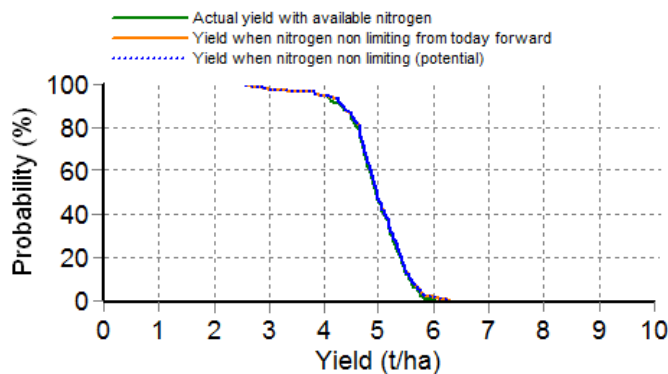
### French & Schultz grain yield estimate:

100% WUE: 6.5 t/ha, 80% WUE: 5.2 t/ha  
*This model assumes that there is 27 mm stored moisture, 110 mm of evaporation and decile 5 (240 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.*

## Seeding at Hart 2014

