# HART BEAT

Yield Prophet® simulations for 8 sites across the Mid-North of SA

Definitions | Site information Hart | Spalding | Condowie Kybunga | Farrell Flat | Pinery Eudunda | Tarlee

> Plus... Hart Winter Walk July 21, 2020





**ISSUE 52** July 15, 2020

### DEFINITIONS

# HART BEAT

#### **HART BEAT definitions**

All sites have 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.

**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.

**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 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, nitrogen processes and crop growth in the paddock. Yield Prophet® calculates the amount of water and nitrogen available to the crop as well as the water and nitrogen demand of the crop.

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.

**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® 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 or www.yieldprophet.com.au.

### SITE INFORMATION

# HART BEAT

#### Rainfall and soil water characteristics for all sites

Site	Average annual rainfall (mm)	Soil type	PAWC (mm)	Soil sampling date	Profile depth (cm)	Pre-sowing nitrogen (kg/ha)
Hart	400	Sandy clay loam	206	May 7, 2020	150	63
Spalding	430	Red brown earth	143	April 24, 2020	150	69
Condowie	350	Sandy loam	115	April 24, 2020	150	67
Kybunga	428	Clay loam	262	May 7, 2020	120	70
Farrell Flat	474	Light clay loam	172	April 24, 2020	120	64
Pinery	374	Silty clay loam	79	May 7, 2020	150	60
Eudunda	445	Gravelly loam	96	April 24, 2020	100	68
Tarlee	474	Sandy loam	113	May 8, 2020	150	61

#### 2020 site locations



	Location	·· HAR	Т				4R <sup>-</sup> EA1		
G511 emergence	G512 G513 2nd leaf 3rd leaf 1st bilor	GS14 4th leaf early bliering GS15 fith leaf rrid tillering GS16 fith leaf tillering tillering	CS30 end of tillering	G532 G537 2nd node flag leaf	cs39 flag beaf fuily emerged	GS45 mid tooting	csss mid head emergence	ases mid flowering	GS75 mid dough fill
	HART Soil type:	Sandy clay loam		Date of re	<b>port: J</b> u	ly 15, 202	20		
	Crop growth Variety: Sowing date: Emergence:	Scepter wheat May 1, 2020 May 11, 2020		<b>The season</b> Annual rain GSR to date GSR decile:	fall to date	::	215 mm 117 mm 4		

30 kg N/ha @ seeding + 20 kg N on July 10

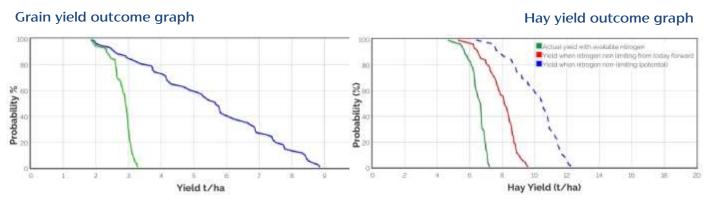
Nitrogen fertiliser:

### Current predicted PAW: 71 mm (37%) PAWC: 206 mm

### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 4.3 t/ha also see graphs below Wheat sown May 20: 3.8 t/ha



These graphs show the chance of reaching the corresponding yield given weather, soil conditions, agronomic inputs to date and historical climate data (100yrs) to simulate remainder of the season.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (147 mm) for the remainder of the growing season.

100% WUE	3.7 t/ha
80% WUE	2.9 t/ha

#### Location: HART SPALDING BEAT G512 6515 6530 G\$37 G\$45 6513 051/ 6531 **GS32** 0530 0588 5th beaf 3rd leat 4th laci end of 1st node 2nd leaf 2nd node flag lea mid booting flag teal mid tillering head 1st tillo rty tittering tillering fully

### **SPALDING**

Soil type:

GS11

Red brown earth

**Crop growth** 

Variety: Sowing date: **Emergence:** Nitrogen fertiliser: Scepter wheat May 1, 2020 May 12, 2020 40 kg N/ha @ seeding + 40 kg N/ha on July 10

Date of report: July 15, 2020

emerged

#### The season so far

Annual rainfall to date:	233 mm
GSR to date:	154 mm
GSR decile:	6
Current predicted PAW:	61 mm (43%)
PAWC:	143 mm

#### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 4.8 t/ha also see graphs below Wheat sown May 20: 4.0 t/ha

#### portin eldutava ritre biely but in infancian error ferrilate he 28 8, Probability Probability Hay Yield (t/ha) Yield t/ha

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (159 mm) for the remainder of the growing season.

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

#### Grain yield outcome graph

#### Hay yield outcome graph

entecoer



Sowing date: **Emergence:** Nitrogen fertiliser:

**GS11** 

May 1, 2020 May 11, 2020 30 kg N/ha @ seeding + 20 kg N/ha on July 10

Yield t/ha

Annual rainfall to date:	159 mm
GSR to date:	84 mm
GSR decile:	3
Current predicted PAW:	5 mm (4%)
PAWC:	115 mm

#### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 0.5 t/ha also see graphs below Wheat sown May 20: 0.7 t/ha

#### Grain yield outcome graph ctual yield with available mirrogen 6 22 Probability % Probability

#### Hay yield outcome graph

en altrativa non landars for

Hay Yield (t/ha)

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (113 mm) for the remainder of the growing season.

100% WUE	2.2 t/ha
80% WUE	1.8 t/ha

#### HART Location: **KYBUNGA** BEAT 6515 6530 G\$37 G\$45 6531 6539 G\$55 **Ġ**\$32 CSEA

#### **KYBUNGA**

Soil type:

G512

2nd lea

GS11

early filtering

3rd tec

1st tillor

**Crop growth** Variety: Sowing date: **Emergence:** Nitrogen fertiliser: Scepter wheat May 1, 2020 May 12, 2020 30 kg N/ha @ seeding + 40 kg N/ha on July 10

5th beaf

mid tillering

Clay loam

Date of report: July 15, 2020

Rag leai

futh

emerged

#### The season so far

flag le

Annual rainfall to date:	224 mm
GSR to date:	158 mm
GSR decile:	6
Current predicted PAW:	73 mm (28%)
PAWC:	262 mm

mid booting

head

emerge

#### Yield Prophet<sup>®</sup> predictions

end of

titering

(based on a 50% probability)

Wheat sown May 1: 4.7 t/ha also see graphs below

Wheat sown May 20: 4.1 t/ha

#### chual yield with mediatile nit-8 38 Probability Probability Hay Yield (t/ha) Yield t/ha

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (187 mm) for the remainder of the growing season.

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

#### Grain yield outcome graph

#### Hay yield outcome graph

# Location: **FARRELL FLAT**





**GS32** 



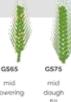
HART

BEAT

G\$55

head

emerge



#### FARRELL FLAT

3rd te

1st tillor

arty titterir

Soil type:

Variety: Sowing date:

**Crop growth** 

**Emergence:** 

Nitrogen fertiliser:

G512

**GS11** 

Light clay loam

6515

5th boat

mid tillering

Scepter wheat May 1, 2020 May 13, 2020 30 kg N/ha @ seeding + 40 kg N on July 10

Date of report: July 15, 2020

#### The season so far

G\$37

flagi

Annual rainfall to date:	219 mm
GSR to date:	147 mm
GSR decile:	4
Current predicted PAW:	37 mm (22%)
PAWC:	172 mm

#### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 4.8 t/ha also see graphs below Wheat sown May 20: 4.1 t/ha

#### Hay yield outcome graph ctual yield with available introca in more limiting from bodily 2 38 Probability Probability Yield t/ha Hay Yield (t/ha)

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (183 mm) for the remainder of the growing season.

> 4.8 t/ha 100% WUE

3.9 t/ha 80% WUE

### ww.hartfieldsite.org.au

#### Grain yield outcome graph

#### HART Location: PINERY BEAT **GS11** G512 6515 G\$37 G\$45 GS14 6530 6531 6539 G\$55 **Ġ**\$32 CSEA 3rd bea 4th la 5th boat end of mid booting 2nd lea flagi Rag leai tilering 1st tillor early titlering mid tilloring fully head iato titierino emerge emerged PINERY Date of report: July 15, 2020

#### Soil type:

Silty clay loam

**Crop growth** Variety: Sowing date: **Emergence:** Nitrogen fertiliser:

Scepter wheat May 1, 2020 May 11, 2020 40 kg N/ha @ seeding + 20 kg N/ha on July 10

#### The season so far

Annual rainfall to date:	209 mm
GSR to date:	165 mm
GSR decile:	5
Current predicted PAW:	54 mm (68%)
PAWC:	79 mm

#### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 4.0 t/ha also see graphs below Wheat sown May 20: 4.0 t/ha

#### Grain yield outcome graph Hay yield outcome graph Actual yield with mail/pole retrote sen nitragen non limiting fro al when nitraget non-limiting (pr 14 8 38 Probability Probability Yield t/ha Hay Yield (t/ha)

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (151 mm) for the remainder of the growing season.

> 4.4 t/ha 100% WUE

3.5 t/ha 80% WUE

# Location: EUDUNDA



#### **EUDUNDA**

3rd bea

1st tillo

Soil type:

6512

2nd lea

GS11

Gravelly loam

6515

5th beal

mid tillering

051/

4th lace

rty titterin

**Crop growth** Variety: Sowing date: **Emergence:** Nitrogen fertiliser:

Scepter wheat May 1, 2020 May 12, 2020 30 kg N/ha @ seeding + 20 kg N/ha on July 10

Date of report: July 15, 2020

#### The season so far

Annual rainfall to date:	174 mm
GSR to date:	131 mm
GSR decile:	4
Current predicted PAW:	29 mm (30%)
PAWC:	96 mm

#### Yield Prophet<sup>®</sup> predictions

6530

end of

tillering

6531

1st nodi

2nd not

(based on a 50% probability)

Wheat sown May 1: 4.8 t/ha also see graphs below

Wheat sown May 20: 4.2 t/ha

#### ctual vield with available estimat 20 28 Probability Probability Hay Yield (t/ha) Yield t/ha

These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (171 mm) for the remainder of the growing season.

> 4.1 t/ha 100% WUE

3.3 t/ha 80% WUE

#### Grain yield outcome graph

#### Hay yield outcome graph

### HART Location: TARLEE BEAT



#### 6513 6514 3rd leaf 4th la 1st tillor early titlering

6515 5th beaf mid tillering



late titlering

6530 end of tillering

6531 1st node

**GS32** 2nd node



G\$45 csumid booting head emerorince



mid

### TARLEE

Soil type:

Sandy loam

**Crop growth** 

Variety: Sowing date: Emergence: Nitrogen fertiliser: Scepter wheat May 1, 2020 May 11, 2020 30 kg N/ha @ seeding + 20 kg N/ha on July 10

#### Date of report: July 15, 2020

The season so far	
Annual rainfall to date:	208 mm
GSR to date:	173 mm
GSR decile:	6
Current predicted PAW:	111 mm (98%)
PAWC:	113 mm

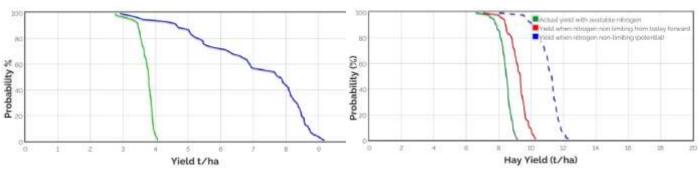
### Yield Prophet<sup>®</sup> predictions

(based on a 50% probability)

Wheat sown May 1: 5.5 t/ha also see graphs below Wheat sown May 20: 4.6 t/ha

#### Grain yield outcome graph

#### Hay yield outcome graph



These graphs 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.

Yield probability curves (left graph) - display two different nitrogen scenarios. 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.

#### French & Schultz predictions

This model assumes that there is 3 mm stored moisture, 110 mm of evaporation and Decile 5 rainfall (182 mm) for the remainder of the growing season.



5.1 t/ha 100% WUE

4.1 t/ha 80% WUE

### More from Hart

## HART BEAT

### Hart Winter Walk Tuesday, July 21



Strategic insect management – know your pests & beneficials Maarten van Helden, SARDI Entomology

Grinding gears Knowing what to do when life gets tough Anthony North, PIRSA FaBS progam

Intercropping – the what, how and why? Penny Roberts, SARDI Clare

Tank mixes – getting it right David Keetch & Andre Sabeeney; Nufarm

Pulse update – the big three Varieties, herbicides & disease Penny Roberts; SARDI Clare

Numbers are limited (due to COVID-19) so please register now: www.hartfieldsite.org.au 9am – 12pm at the Hart Field Site

Sandy Kimber, Executive Officer 0427 423 154 | admin@hartfieldsite.org.au

### Contact us

2020

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