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Regional Cropping Solutions Network - Kwinana East Zone, Yield Prophet Project 2012, **FINAL REPORT**

INTRODUCTION

Having identified Water Use Efficiency as a key driver to cropping business in the Kwinana East Zone, a proposal was put forward to target 10 new Yield Prophet© sites that were to be sited on sandy duplex country. This was necessary as the group felt there was sufficient information from the more common 'heavier' soil types present in the zone. This was further backed up by Ms Caroline Peek, DAFWA.

OBJECTIVES

The key objective was to ascertain the major differences in soil types in the region, and provide more accurate and timely information on a broad, generic scale that would have better relevance for growers in the region. Furthermore, the project was established to gain more information about these soil types, and how closely the APSIM model could predict outcomes accurately. Yield Prophet© is the online computer interface that growers and consultants have access to, without the huge amount of information that APSIM contains.

METHODOLOGY

The 10 sites were distributed through 3 providers, being Anasazi Agronomy, DAFWA (through Ms Caroline Peek) and David Watson of AgAsset. Anasazi Agronomy was tasked with locating 6 sites targeting areas that were previously not involved in any project of this description. Sites were located at Koorda, Moningarín (labelled Cadoux Clarke), Cadoux (labelled Cadoux Inman), South Kuminin (labelled Stu Yandle), South Shackleton (labelled Mt Bebb) and South Mt Walker (labelled Federici). A Google Earth snapshot in picture 1 below shows these locations.

Soil cores were taken by Ecoprobe on 21st & 22nd April 2012, to establish the soil physical and chemical properties. 5 cores were taken at each site, with one core being left out for observation purposes during the season. This information is then fed into the Yield Prophet© computer model in the online site.

Due to the climatic conditions present in 2012, 4 sites were able to have pre-seeding reports produced, using the afore-mentioned information. Three more reports were produced



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during the growing season, at key timings for nutrient applications. A sample of the generic report produced is attached to the end of this report as Appendix 1. The un-edited, model produced Sowing Opportunity Report is attached as Appendix 2, and a Sowing x Variety Report is attached as Appendix 3.

At 3 key timings, field walks were organised inviting growers to see and understand the methodology of the Yield Prophet® model. These were held at Cadoux and South Shackleton. During these times, the model was suggesting no further application of nitrogen at any site. However, in order to ground truth and establish accuracy from the model, strips of added nitrogen were applied at all sites. These were followed for visible differences and live plant tissue samples were taken as well. All sites were then head counted at application time and again at harvest time to establish yield expectations.



Pic 1. - Google Earth snapshot of YP site locations run by Anasazi Agronomy, 2012

RESULTS

The model had predicted yield results consistently 10-25% below the actual final achieved result. Whilst this seems inaccurate, the result was a lot closer when adjudged in and around the actual site location, as opposed to a whole of paddock view. The results for the 6 locations monitored by Anasazi Agronomy are found below:



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SITE	YIELD PROFIT© PREDICTION	ACTUAL SITE RESULT	WHOLE PADDOCK RESULT	% ACCURACY
Cadoux	1.4t/ha	1.58t/ha	1,8t/ha	78%
Koorda	1t/ha	1.12t/ha	1.15t/ha	87%
Moningarín	0,95t/ha	1,05t/ha	1,45t/ha	65.5% (1)
Sth Kumminin	0,85t/ha	0,8t/ha	0,9t/ha	89%
Sth Mt Walker	1,25t/ha	1,4t/ha	1,62t/ha	77%
Sth Shackleton	2,25t/ha	1,8t/ha	2,6t/ha	86.5% (2)

(1) - the Moningarín site was very heavily infested with ryegrass. The rest of the paddock very much better as there was not the same weed burden.

(2) - the variation at the actual site versus the model was due to frost events through September. The model did record these events, but has no accurate measure of yield discount.

DISCUSSION OF RESULTS AND IMPLICATIONS

As can be seen from the results, the model was very accurate at the actual soil site location. Inaccuracies can be due to a number of reasons - namely weed burden at the site, frost, variations of soil type across the paddock and variations of rainfall received in the paddock versus the recording location. Furthermore, if the soil classification is slightly different in the model than is actually the soil physical properties, this could cause deviation as well. Lastly, as crop phenology can vary from cultivar to cultivar, this can cause discrepancy too.

All in all however, growers could easily identify crop progress during the season and adapt their logistics and applications as a result. There was one location where an application of 30kg/ha urea by the grower may have contributed to the better actual result achieved. This was at the Moningarín site, where the grower applied urea despite the model suggesting it would make no difference to his end result. There is little chance of analysing this any further however, as the grower did not leave an untreated area for comparison, and there was NO increase in yield or grain quality at the site location, where different rates of nitrogen were applied as a 'ground truthing' exercise.

When comparing the objectives of the project with the final result achieved, the overwhelming support for this extension cannot be underestimated. The vast majority of growers who not only attended the field walks, but also received the reports timeously, made the cost saving decision of reducing or completely cutting out top up nitrogen applications. Again, as the message was generic, several growers did their own ground truthing in this regard, and have developed a level of confidence in the model. Several growers will attempt their own Yield Prophet site, and some will couple this with soil



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moisture probes and other technology to assist in the accuracy of results in the following season.

The saving in reduction of post emergent nitrogen could probably be weighed as 15-25kg/ha N, or \$14-22/ha when incorporating an application fee as well. Growers can easily identify though, when this could be a gain in yield and therefore gross margin achieved in seasons where the model suggests further nitrogen could be required.

RECOMMENDATIONS

Anasazi Agronomy feels that more information is required across the soil types in this region. To this end, our recommendation is to follow up this project with a further 2 years of 'same site' calibration, based on actual historical yield data, to ensure better accuracy of soil classification. Furthermore, the addition of soil moisture probes and better on-site weather recording would go some way to identify the real fit for this model technology. At the early stages, growers could be convinced to invest in this themselves, though obviously for the production of generic information, the RCSN would be needed to invest in this as well.

A further area for improvement would be the dissemination of reports, or at least summarised data for growers to locate quickly and easier. A simple smart phone/tablet app would suffice, as growers could then locate their nearest site and perhaps plan more easily in advance to attend information days as a result. Given the fact that 35% of our private client base has taken the initiative to subscribe to having their own Yield Prophet© site, there is certainly scope for commercial viability going forward.

ACKNOWLEDGEMENTS

GRDC for funding the RCSN Kwinana East zone, who funded this program.

Grower facilitators - M Clarke, P Inman, D Nairn, S Yandle, T Federici and K Stone.

Tim McClelland, Yield Prophet© manager

Ms Caroline Peek, DAFWA for assistance and advice in establishing the classifications, and during the season.

Ecoprobe (Pty) Ltd for soil coring the sites.

APPENDIX 1.

SUMMARY MID SEASON REPORT



Anasazi Agronomy

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GRDC KWINANA PORT ZONE EAST - REGIONAL CROPPING SOLUTIONS PROJECT 2012

SUMMARISED REPORT BASED ON ALL DATA

This summary contains the rainfall received at each of the 6 sites under the management of Anasazi Agronomy for 2012, the crop and soil water summary, the nitrogen and soil water status and the projected outcome for adding nitrogen to these crops. Please be aware that these sites are pretty specific in nature, but common underlying threads can be noted as follows:-

- 1) NO SITE AT THIS TIME REQUIRES ADDITIONAL NITROGEN! Care should be noted when attempting to adopt these interpretations for your own farm, as your environment, soil type, choice of cultivar and seeding dates may all be different. Many crops may be expressing symptoms similar to nitrogen stress, but it is my opinion that these are more likely due to other factors present currently, such as frost. To verify YOUR status, please conduct Plant Tissue Analyses.
- 2) All areas are below average in terms of rainfall received this year. Furthermore, the projections are for average rainfall AT BEST for August-October inclusive. Further nitrogen applications must take this information into account.
- 3) The model does NOT account for weeds, pests, disease, sporadic germinations and other environmental stresses (frost, etc).
- 4) Top up nitrogen rates are based on district practise as well as conversing with the grower.

Please see the sites in alphabetical order below:-

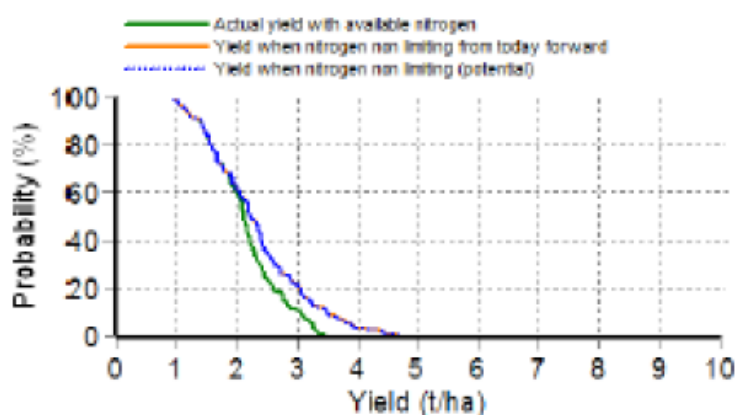
1) NE Cadoux.

The site has been classified as Duplex Sandy Gravel. The report details are as follows:

Report date: 08/07/2012
Last climate date available: 6/07/2012
Client name: David Stead
Paddock name:
Report generated by: David Stead
Date sown: 16-Jun
Crop type: Wheat
Variety sown: Mace
Sowing density: 125 plants/m²

Weather station used: Cadoux
Rainfall records used: Clarke rain gauge
Soil type: Duplex Sandy Gravel (Buntine No143)
Maximum rooting depth: 80 cm
Roots constrained by EC, Cl and ESP: Yes
Stubble type: None
Stubble amount: kg/ha
Start of growing season: 01-Apr
Initial conditions date: 05-Jun
Rainfall since 5-Jun: 62 mm
Date of last rainfall entry: 26-Jun
Expected harvest date: 11-Nov

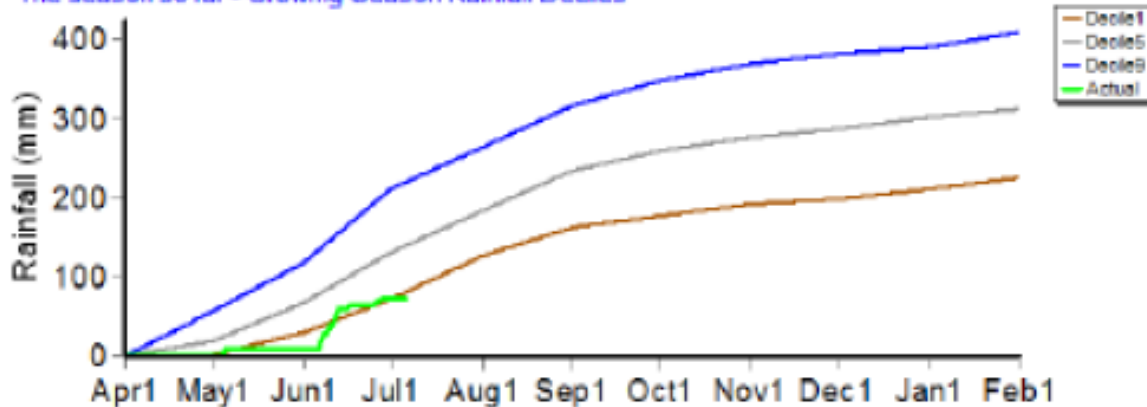
Grain Yield Outcome



This graph shows the probability of exceeding a range of yield outcomes this season. It takes into account your pre-season soil moisture; the weather conditions so far; soil N and agronomic inputs. The long term record from your nominated weather station is then used to simulate what would have happened from this date on in each of the past 100 years. The yield results are used to produce this graph.

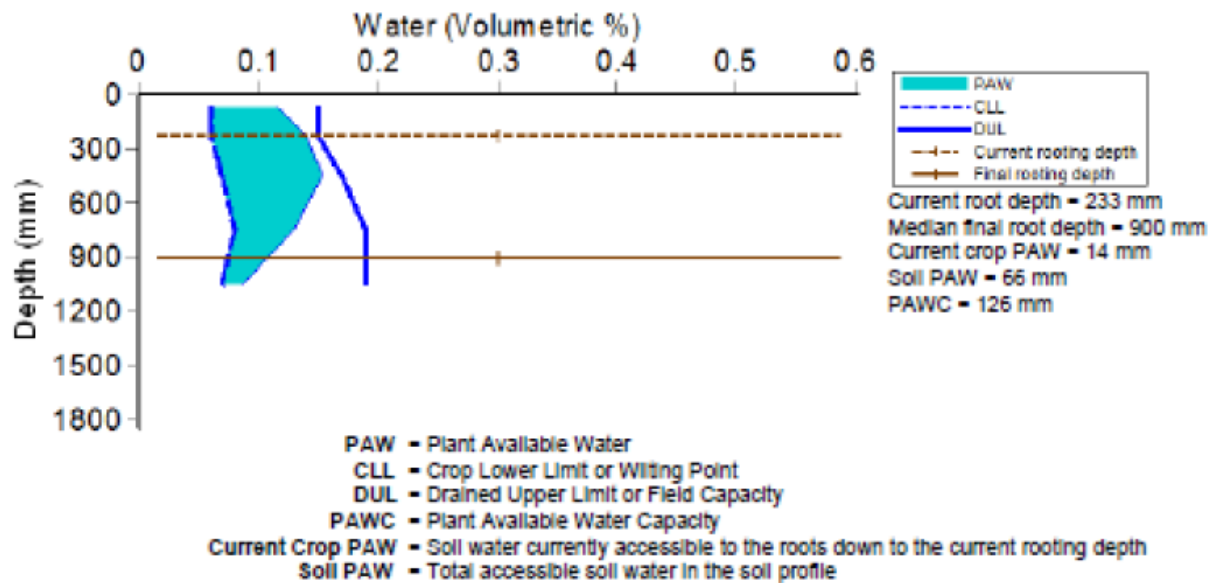
As can be seen, there is an 80% chance of the paddock yielding around 1.5t/ha - probably the expectation for a Decile 2 year. The rainfall received at this site to date is seen below:

The season so far - Growing Season Rainfall Deciles



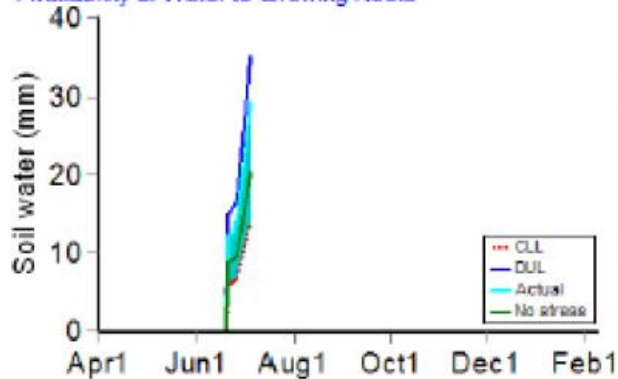
Currently the site is tracking below Decile 1, but substantial subsoil moisture was observed when coring in April. The soil moisture profile looks like this:

Current distribution of PAW

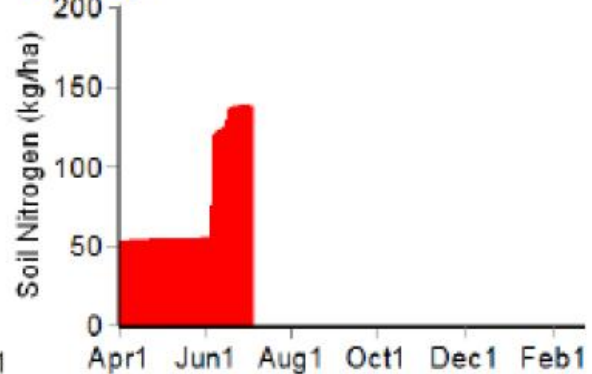


Correlating this moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard.

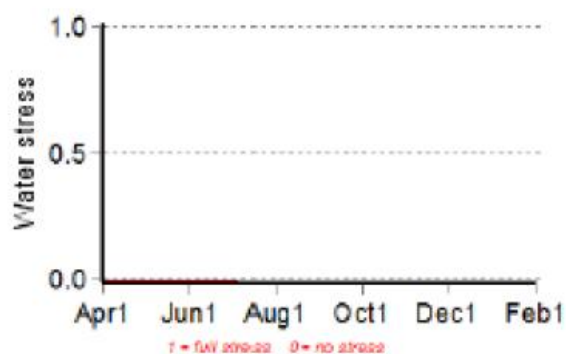
Availability of Water to Growing Roots



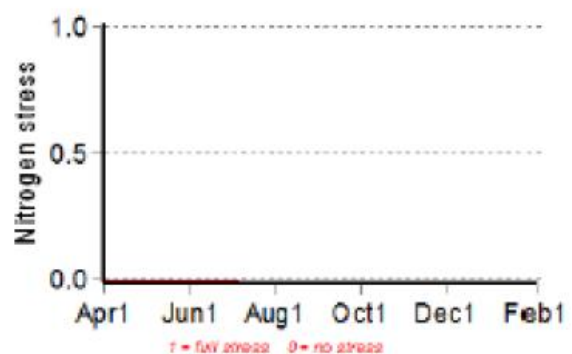
Soil Nitrogen



Water Stress



Nitrogen Stress



The report below simulates three scenarios:- 1) doing no further addition. 2) 50kg/ha urea being spread at 4 leaf, and 3) 40kg/ha at 4 leaf and 40kg/ha at second node (Z32). As there is no degree of separation of the response curves, the addition of further nitrogen is not likely to be profitable at this stage.

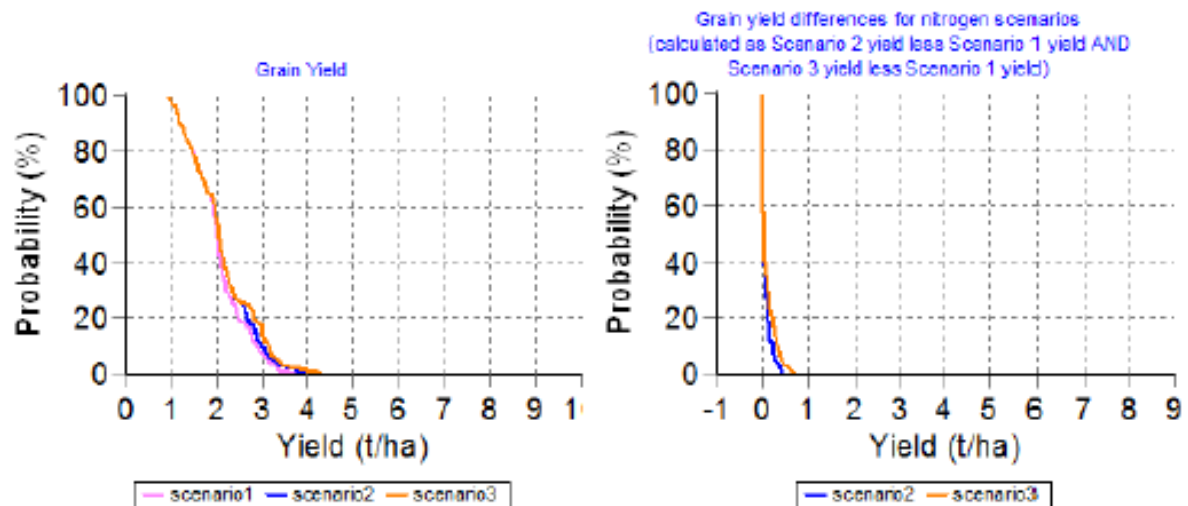
Paddock name:

Date sown: 16-Jun

Variety sown: Mace

Scenario1:		Scenario2:		Scenario3:	
Date	Amount (kg/ha)	Date	Amount (kg/ha)	Date	Amount (kg/ha)
16-Jun	10	16-Jun	10	16-Jun	10
		25-Jul	23	25-Jul	18.4
				21-Aug	18.4

1. Grain Yield Outcomes for Nitrogen Scenarios



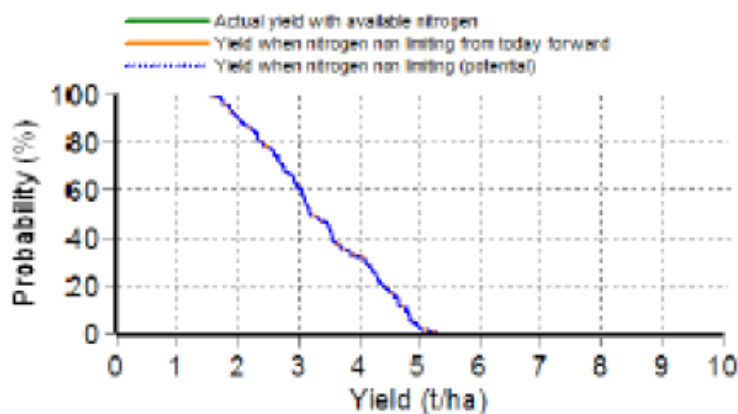
2) N Hyden/S Mt Walker.

The site has been classified as Duplex Sandy Gravel as well. The report details are as follows:

Report name:
Report date: 08/07/2012
Last climate date available: 6/07/2012
Client name: David Stead
Paddock name:
Report generated by: David Stead
Date sown: 24-May
Crop type: Wheat
Variety sown: Mace
Sowing density: 150 plants/m²

Weather station used: Narembuen
Rainfall records used: Federid rain guage
Soil type: Duplex Sandy Gravel (Buntine No143)
Maximum rooting depth: 100 cm
Roots constrained by EC, Cl and ESP: Yes
Stubble type: Wheat
Stubble amount: 1000 kg/ha
Start of growing season: 01-Apr
Initial conditions date: 18-Apr
Rainfall since 18-Apr: 84.5 mm
Date of last rainfall entry: 26-Jun
Expected harvest date: 27-Oct

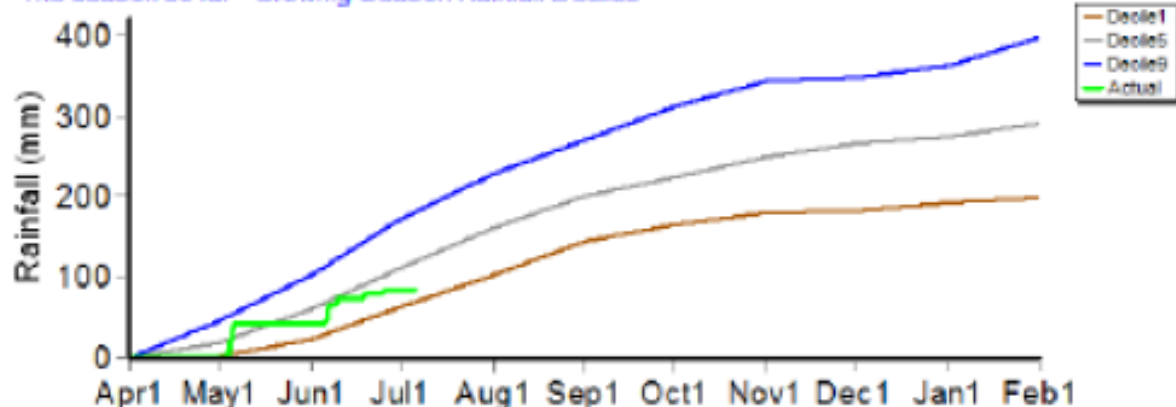
Grain Yield Outcome



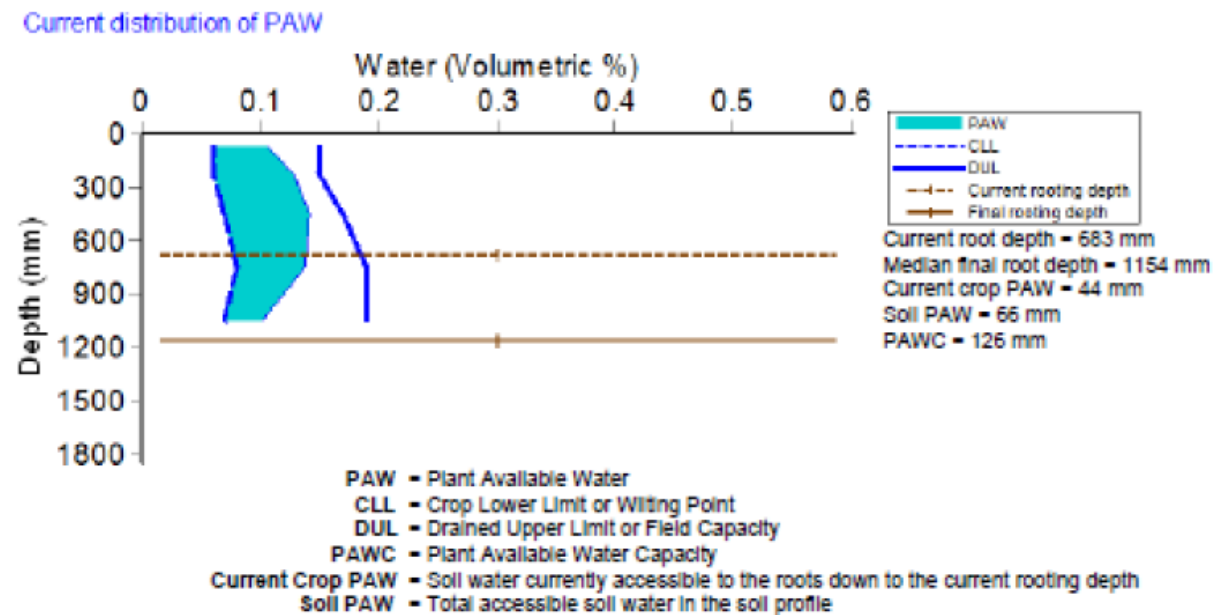
This graph shows the probability of exceeding a range of yield outcomes this season. It takes into account your pre-season soil moisture; the weather conditions so far; soil N and agronomic inputs. The long term record from your nominated weather station is then used to simulate what would have happened from this date on in each of the past 100 years. The yield results are used to produce this graph.

As can be seen, there is an 80% chance of the paddock yielding around 2,5t/ha - probably generous for a Decile 2 year. The difference between this site and the above site is largely no subsoil constraints - so the entire 'bucket' is plant available. Rainfall received at this site to date is seen below:

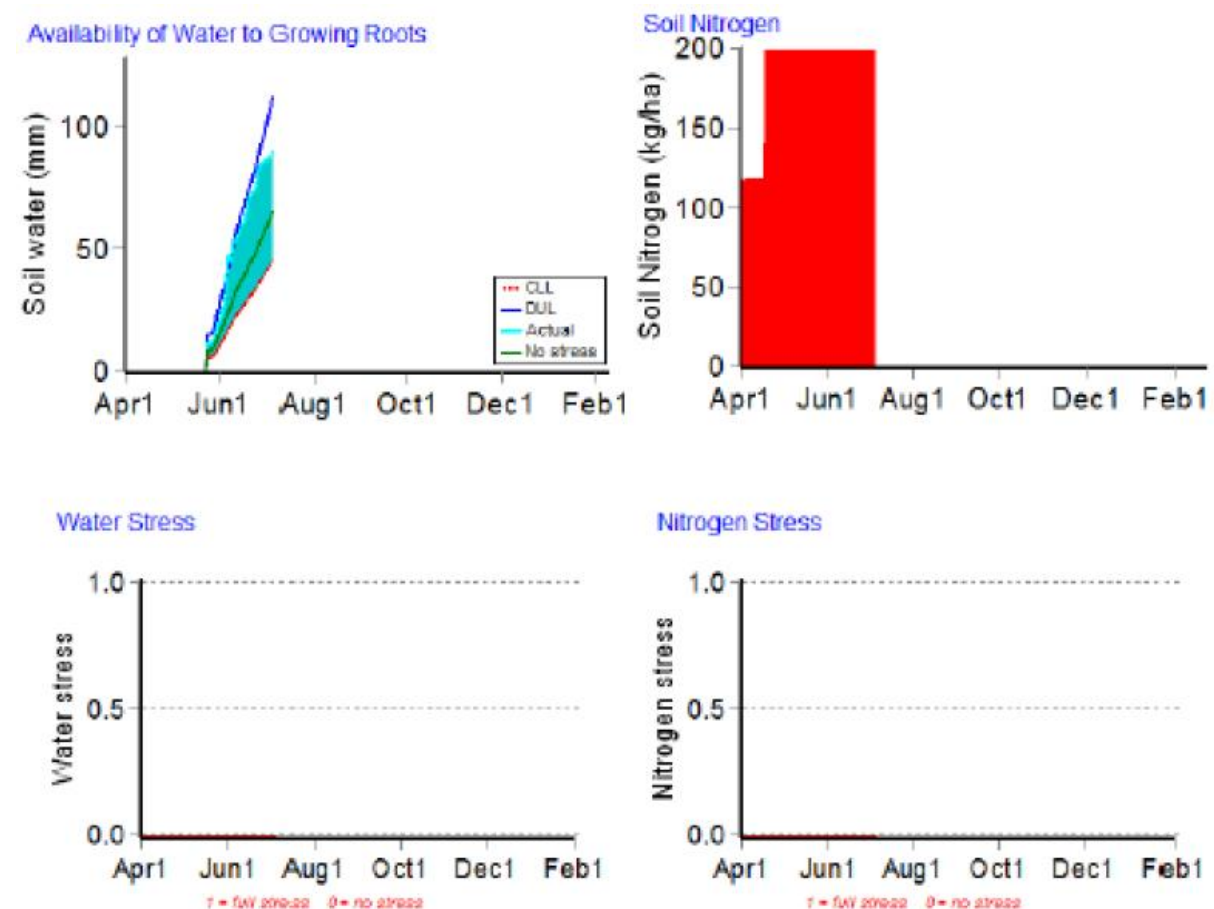
The season so far - Growing Season Rainfall Deciles



Currently the site is tracking around Decile 3, and substantial subsoil moisture was observed when coring in April. The soil moisture profile looks like this:



Correlating this moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard.



The report below simulates three scenarios:- 1) doing no further addition. 2) 50lt/ha UAN being sprayed at 6 leaf, and 3) 50lt/ha at 6 leaf and 50lt/ha at second node (Z32). As the lines for each scenario cannot be separated, further nitrogen is not likely to be profitable at this stage.

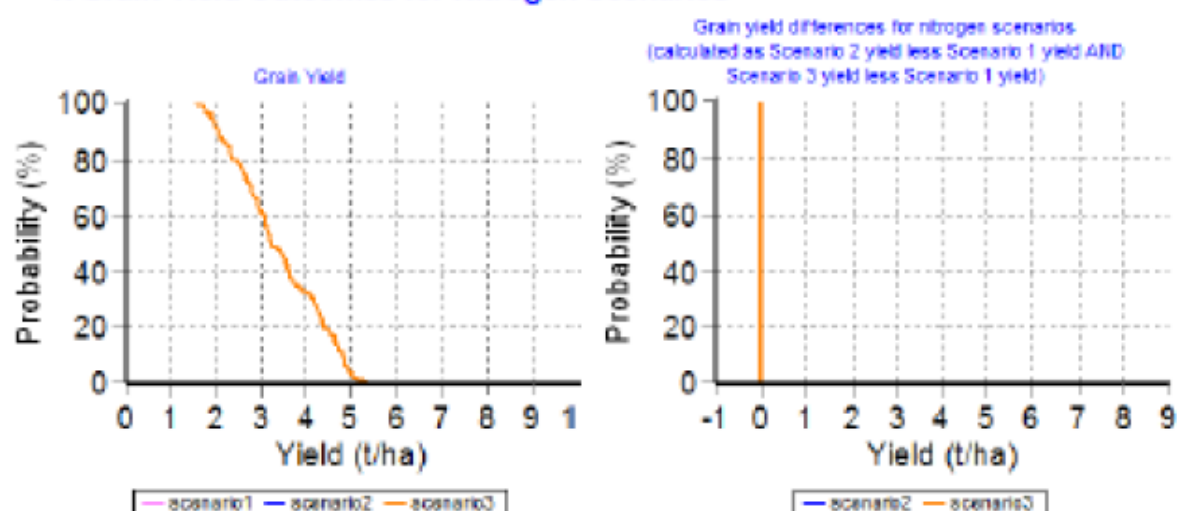
Paddock name:

Date sown: 24-May

Variety sown: Mace

Scenario1:		Scenario2:		Scenario3:	
Date	Amount (kg/ha)	Date	Amount (kg/ha)	Date	Amount (kg/ha)
24-May	5	24-May	5	24-May	5
8-Jul	0	8-Jul	0	8-Jul	0
30-Jul	0	30-Jul	21.1	30-Jul	21.1
10-Aug	0	10-Aug	0	10-Aug	21.1

1. Grain Yield Outcomes for Nitrogen Scenarios



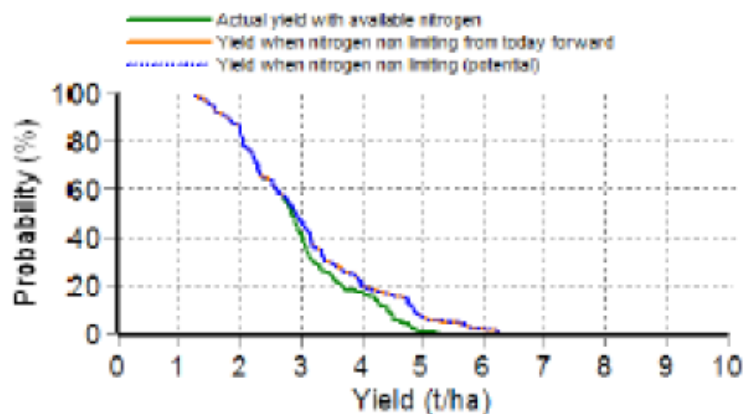
3) Cadoux.

The site has been classified as Gravelly Yellow Brown Deep Sand. The report details are as follows:

Report name:
Report date: 08/07/2012
Last climate date available: 6/07/2012
Client name: David Stead
Paddock name:
Report generated by: David Stead
Date sown: 13-Jun
Crop type: Wheat
Variety sown: Mace
Sowing density: 140 plants/m²

Weather station used: Cadoux
Rainfall records used: Weather station
Soil type: Gravelly yellow_brown deep sand (Pindar No882)
Maximum rooting depth: 150 cm
Roots constrained by EC, Cl and ESP: Yes
Stubble type: None
Stubble amount: 300 kg/ha
Start of growing season: 01-Apr
Initial conditions date: 05-Jun
Rainfall since 5-Jun: 67 mm
Date of last rainfall entry: ?
Expected harvest date: 7-Nov

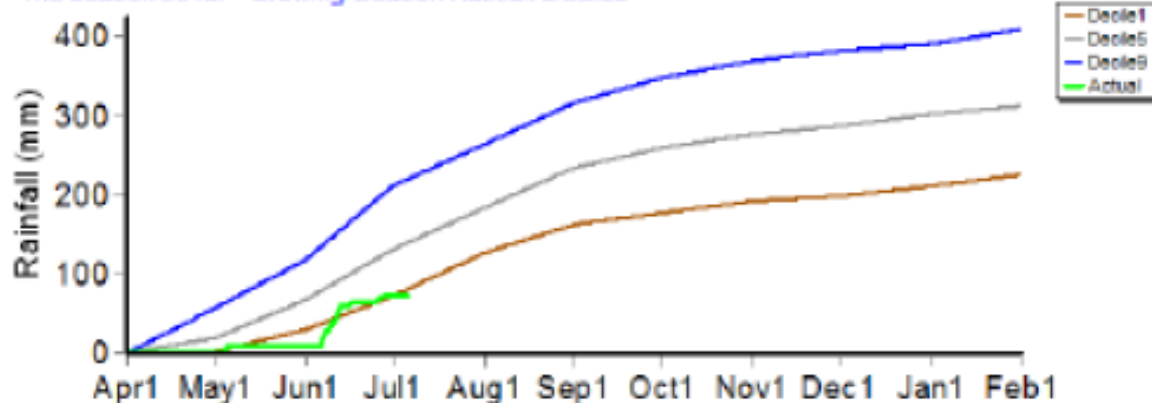
Grain Yield Outcome



This graph shows the probability of exceeding a range of yield outcomes this season. It takes into account your pre-season soil moisture; the weather conditions so far; soil N and agronomic inputs. The long term record from your nominated weather station is then used to simulate what would have happened from this date on in each of the past 100 years. The yield results are used to produce this graph.

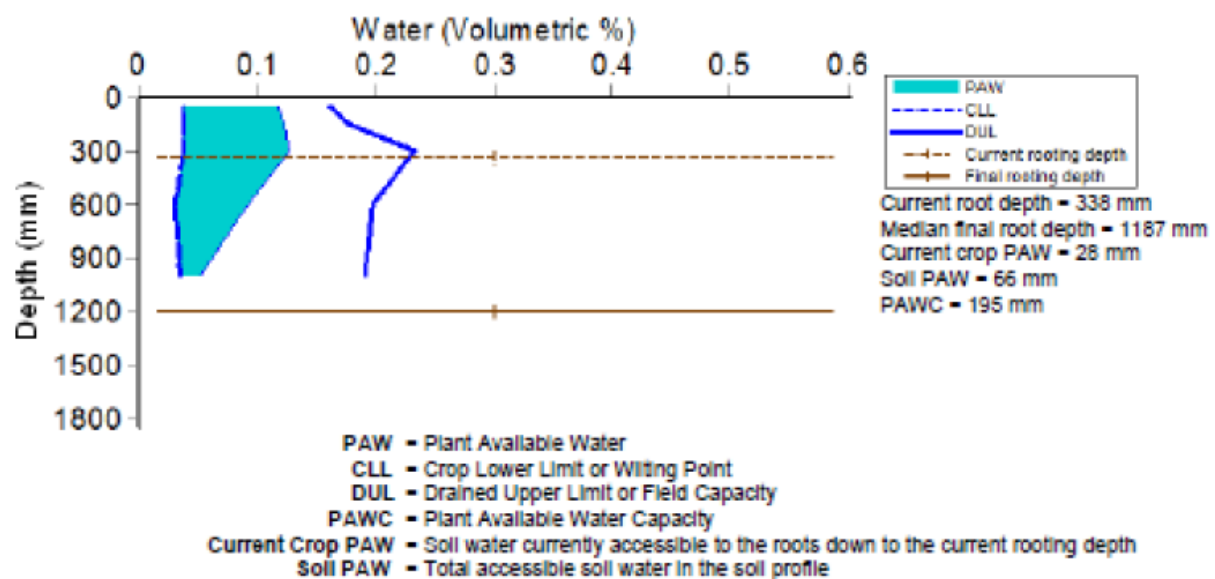
As can be seen, there is an 80% chance of the paddock yielding around 2t/ha - probably the expectation for a Decile 2 year. The rainfall produced for this report comes from the Cadoux BOM site - to date is below:

The season so far - Growing Season Rainfall Deciles



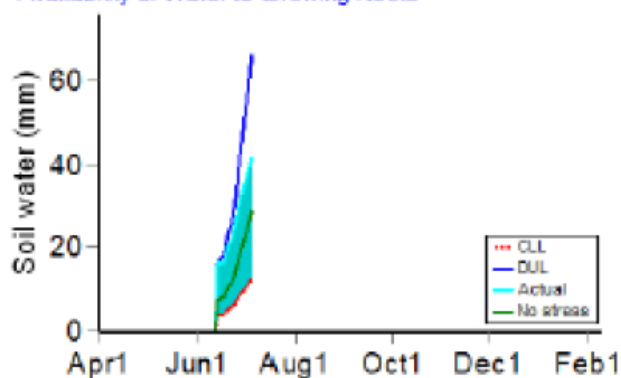
Currently the site is tracking around Decile 1, and NO subsoil moisture was observed when coring in April. The soil moisture profile looks like this:

Current distribution of PAW

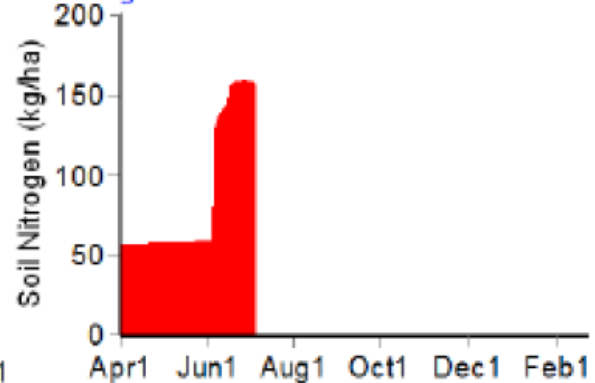


Correlating this moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard.

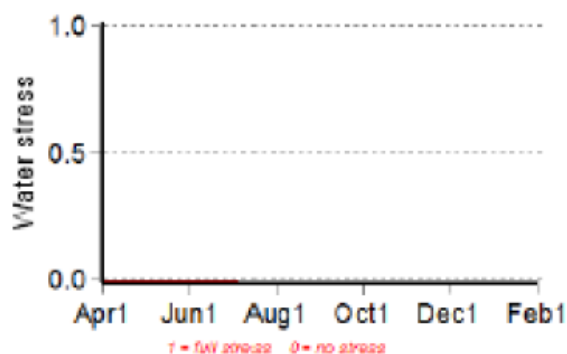
Availability of Water to Growing Roots



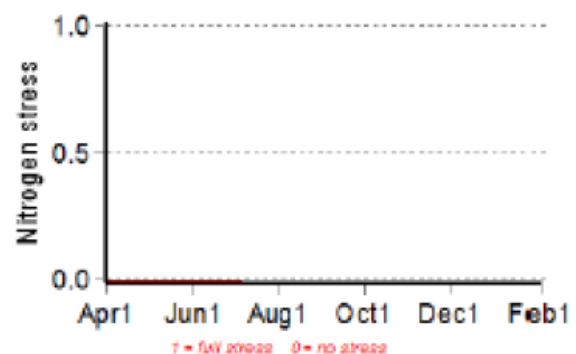
Soil Nitrogen



Water Stress



Nitrogen Stress



The report below simulates three scenarios:- 1) doing no further addition. 2) 50kg/ha urea being spread at 4 leaf, and 3) 40kg/ha at 4 leaf and 40kg/ha at second node (Z32). Therefore, the addition of further nitrogen is not likely to be profitable at this stage.

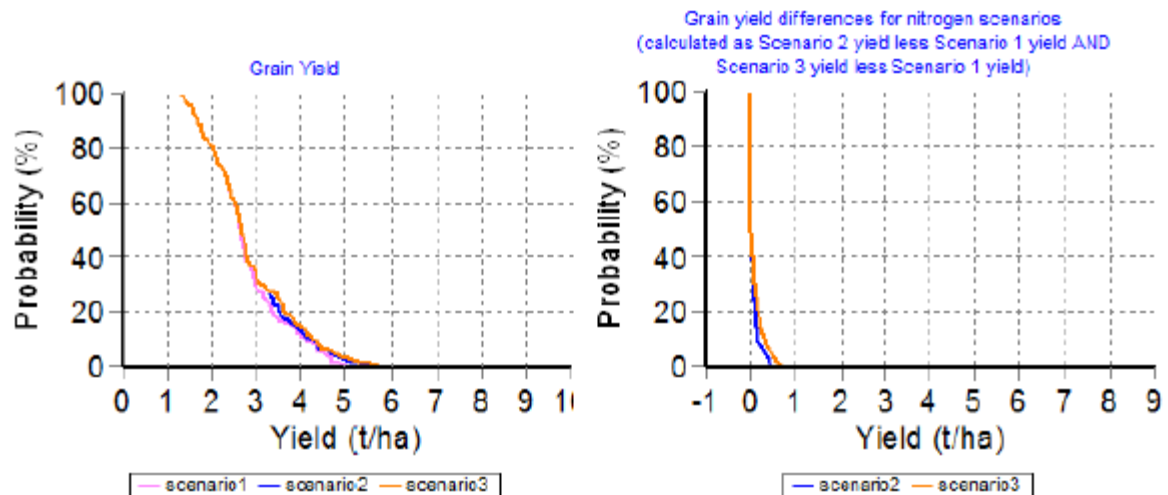
Paddock name:

Date sown: 13-Jun

Variety sown: Mace

Scenario1:		Scenario2:		Scenario3:	
Date	Amount (kg/ha)	Date	Amount (kg/ha)	Date	Amount (kg/ha)
16-Jun	10	16-Jun	10	16-Jun	10
		25-Jul	23	20-Jul	18.4
				14-Aug	18.4

1. Grain Yield Outcomes for Nitrogen Scenarios



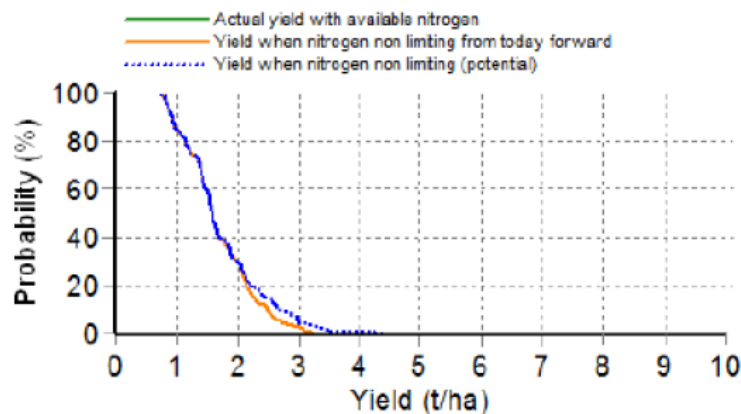
4) Koorda site, Lake Margarette.

The site has been classified as Duplex Sandy Gravel. The report details are as follows:

Report name: Koorda guess Crop report
Report date: 18/07/2012
Last climate date available: 17/07/2012
Client name: David Stead
Paddock name: Koorda
Report generated by: David Stead
Date sown: 18-Jun
Crop type: Wheat
Variety sown: Mace
Sowing density: 125 plants/m²

Weather station used: Moningarín
Rainfall records used: Weather station
Soil type: Duplex Sandy Gravel (Buntine No143)
Maximum rooting depth: 60 cm
Roots constrained by EC, Cl and ESP: Yes
Stubble type: None
Stubble amount: kg/ha
Start of growing season: 01-Apr
Initial conditions date: 05-Jun
Rainfall since 5-Jun: 64 mm
Date of last rainfall entry: 21-Jun
Expected harvest date: 10-Nov

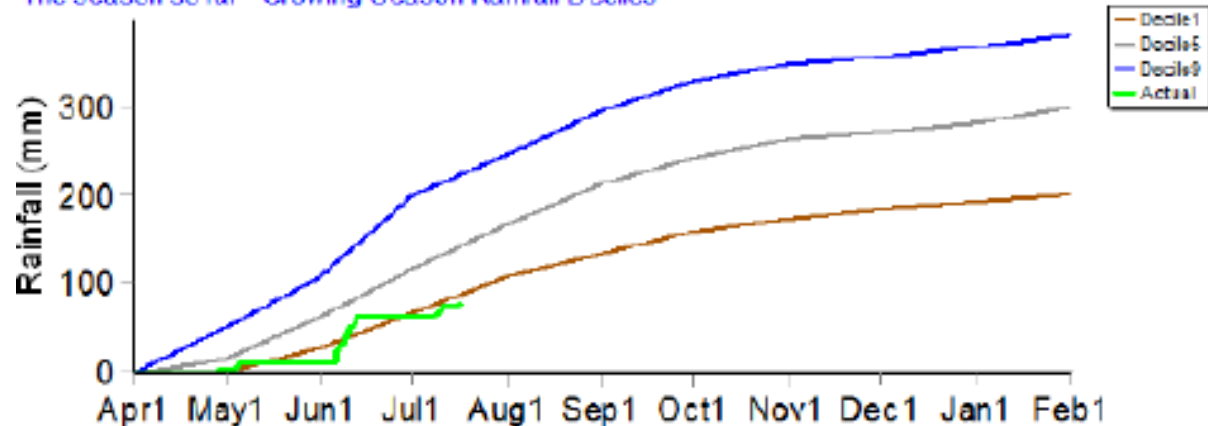
Grain Yield Outcome



This graph shows the probability of exceeding a range of yield outcomes this season. It takes into account your pre-season soil moisture; the weather conditions so far; soil N and agronomic inputs. The long term record from your nominated weather station is then used to simulate what would have happened from this date on in each of the past 100 years. The yield results are used to produce this graph.

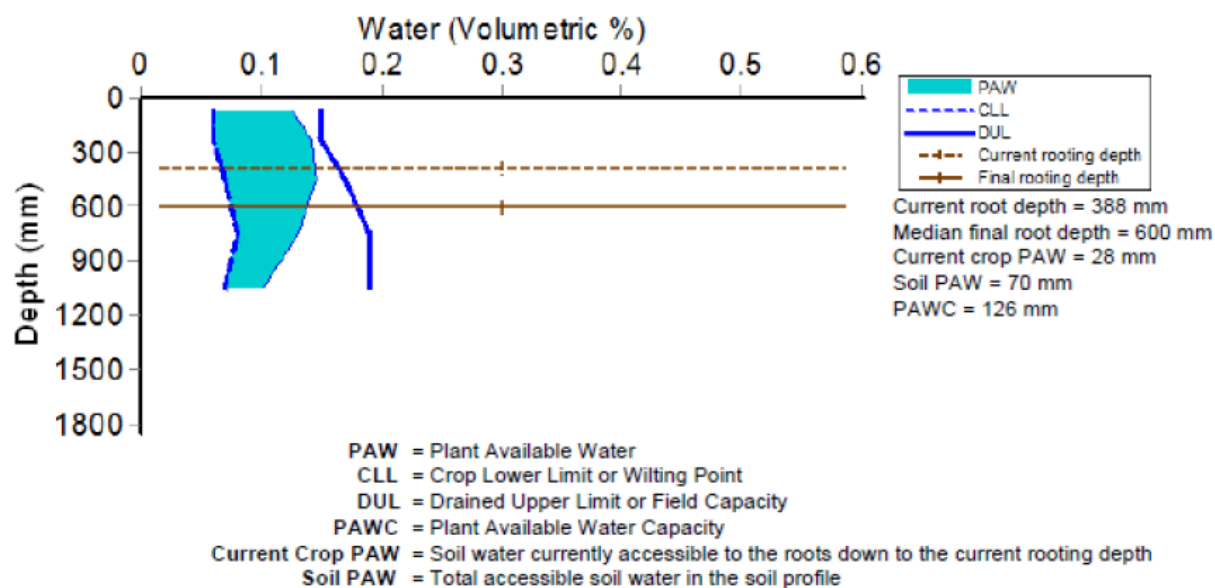
As can be seen, there is an 80% chance of the paddock yielding around 1.2t/ha - probably the expectation for a Decile 2 year. The rainfall data comes from the Moningarín BOM site, and is seen below:

The season so far - Growing Season Rainfall Deciles



Currently the site is tracking below Decile 1, and no subsoil moisture was observed when coring in April. The soil moisture profile looks like this:

Current distribution of PAW



Subsoil acidity is a real issue at this site, as it probably is in many eastern wheatbelt paddocks. The pH drops alarming to 4 (CaCl_2) in the horizon 50-85cm below surface. For this reason, I have limited the final root depth expected which will curtail major yield expectations.

Correlating this moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard. Time will be running out for this crop though, and I would not expect the yield expectation to be much greater than what is depicted at the 80% level. The report further suggests the addition of further nitrogen is not likely to be profitable at this stage.

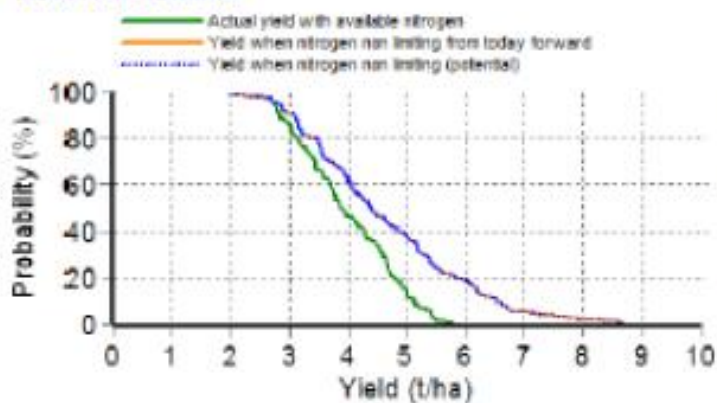
5) South Shackleton.

The site has been classified as Gravelly Yellow Brown Sand. The report details are as follows:

Report name:
Report date: 14/07/2012
Last climate date available: 12/07/2012
Client name: David Stead
Paddock name: Shackleton
Report generated by: David Stead
Date sown: 13-May
Crop type: Wheat
Variety sown: Calingiri
Sowing density: 150 plants/m²

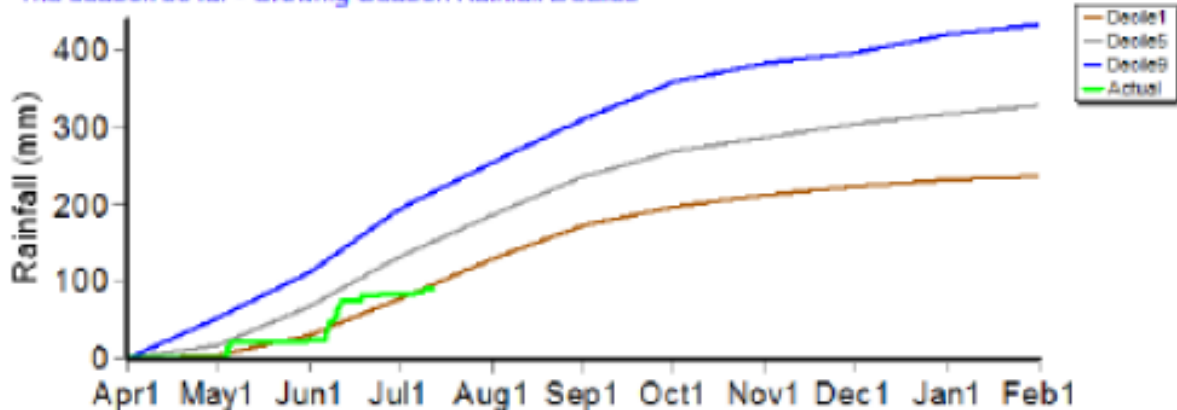
Weather station used: Corrigin
Rainfall records used: Shackleton rain guage
Soil type: Gravelly yellow_brown deep sand
(Pindar No882)
Maximum rooting depth: 50 cm
Roots constrained by EC, Cl and ESP: Yes
Stubble type: Medic
Stubble amount: 500 kg/ha
Start of growing season: 01-Apr
Initial conditions date: 18-Apr
Rainfall since 18-Apr: 89 mm
Date of last rainfall entry: 10-Jul
Expected harvest date: 12-Nov

Grain Yield Outcome

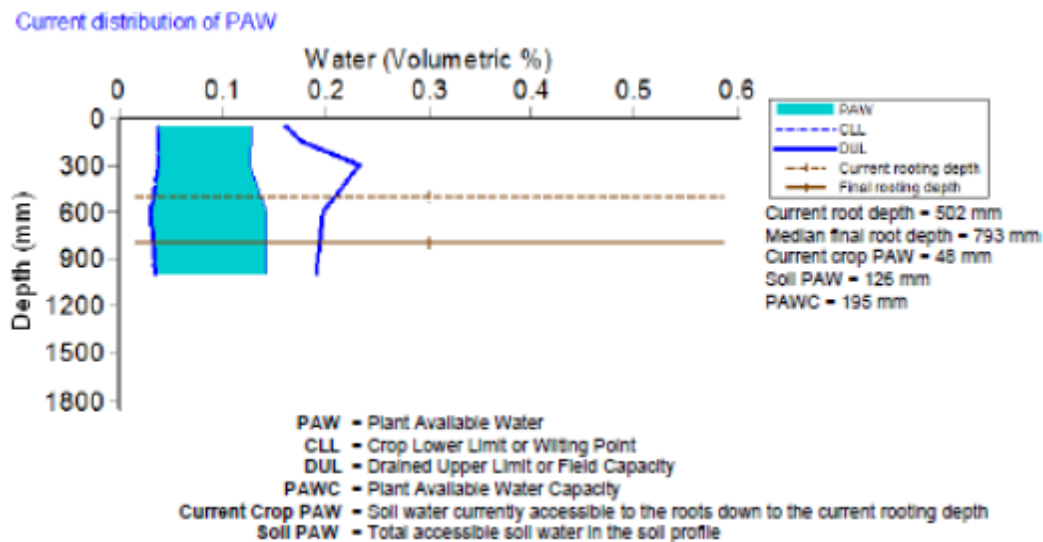


As can be seen, there is an 80% chance of the paddock yielding in the order of 3t/ha - VERY GENEROUS for a Decile 2 year. The rainfall received at this site to date is seen below:

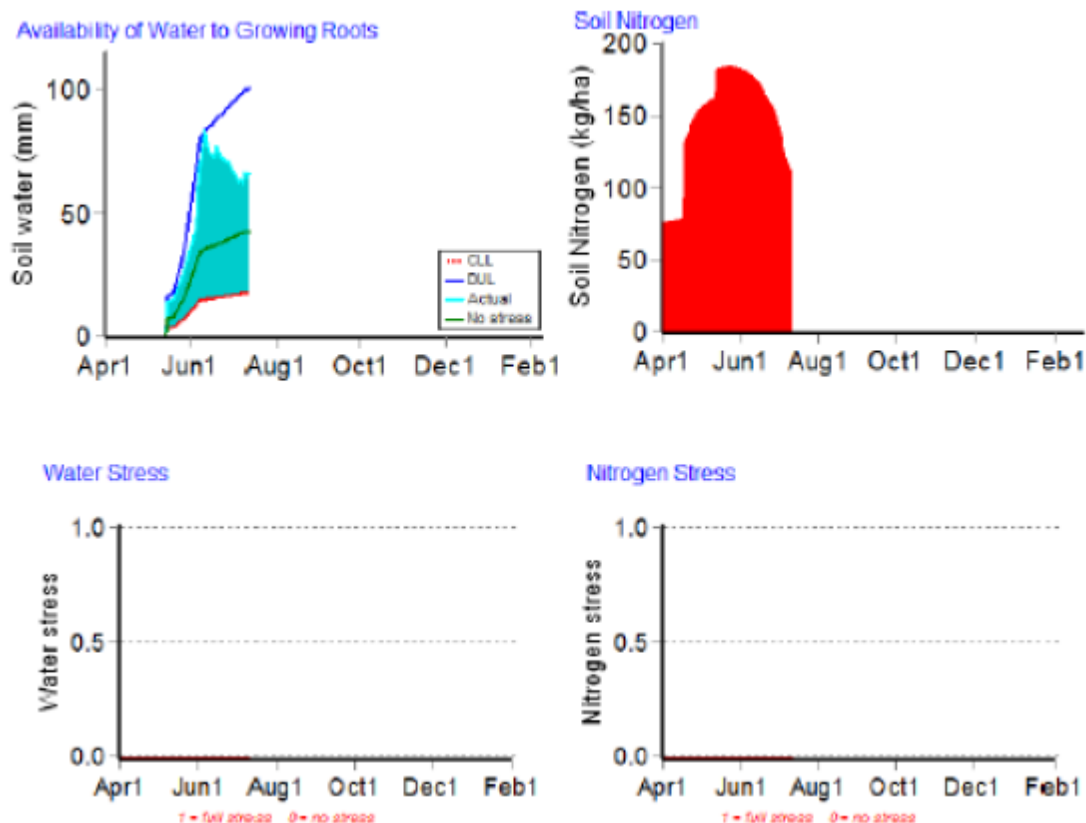
The season so far - Growing Season Rainfall Deciles



Currently the site is tracking Decile 1, but substantial subsoil moisture was observed when coring in April. However, high chloride levels were noted, and this paddock will be carefully monitored for signs of stress as the profile dries out. This will incur higher net concentrations of salts, which will induce osmotic pressure high enough to withstand crop demand for moisture - the soil may still feel wet, but this will be unavailable to the crop. The soil moisture profile currently looks like this:



Correlating this moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard.



The report below simulates three scenarios:- 1) doing no further addition. 2) 50lt/ha UAN being sprayed at 6 leaf, and 3) 40lt/ha at 4-5 leaf and further 30lt/ha at second node (Z32). Whilst there is some visible separation of the scenario lines, there is no predicted yield benefit. The addition of further nitrogen is therefore not likely to be profitable at this stage.

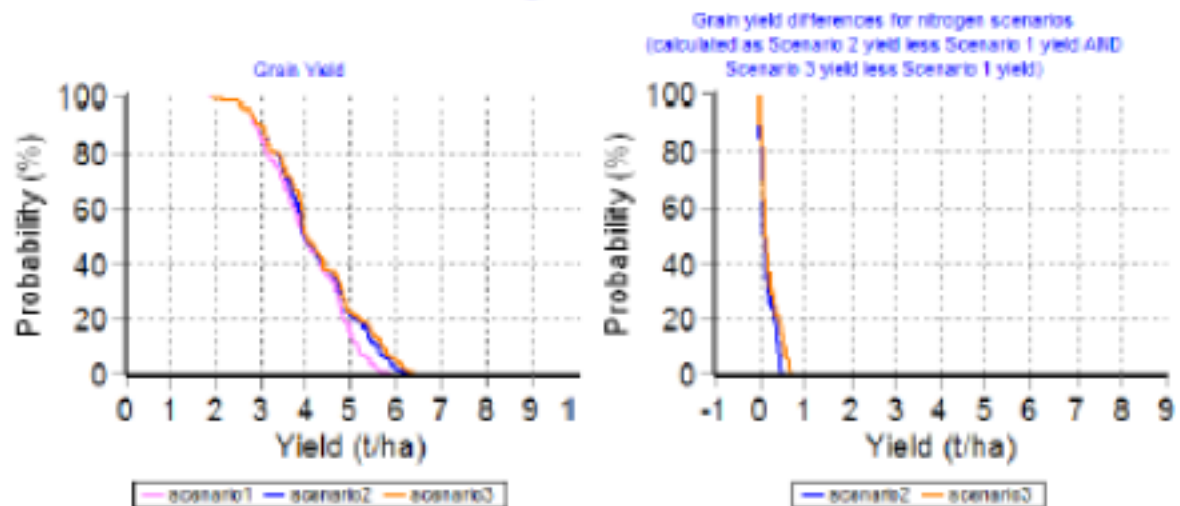
Paddock name: Shackleton

Date sown: 13-May

Variety sown: Calligiri

Scenario1:		Scenario2:		Scenario3:	
Date	Amount (kg/ha)	Date	Amount (kg/ha)	Date	Amount (kg/ha)
13-May	20	13-May	20	13-May	20
		30-Jul	21.1	25-Jul	16.9
				20-Aug	12.7

1. Grain Yield Outcomes for Nitrogen Scenarios

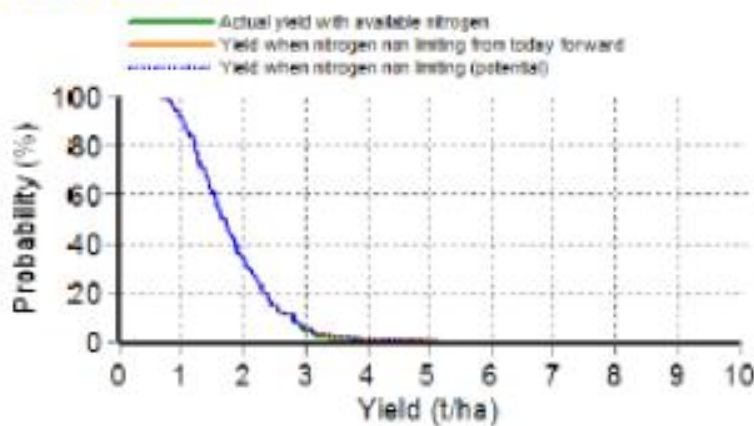


6) SE Ardath.

The site has been classified as Duplex Sandy Gravel. The report details are as follows:

Report name: [redacted]	Weather station used: Kumminin
Report date: 11/07/2012	Rainfall records used: Yandle rain guage
Last climate date available: 9/07/2012	Soil type: Duplex Sandy Gravel (Buntline No143)
Client name: David Stead	Maximum rooting depth: 65 cm
Paddock name: [redacted]	Roots constrained by EC, Cl and ESP: Yes
Report generated by: David Stead	Stubble type: None
Date sown: 12-Jun	Stubble amount: kg/ha
Crop type: Wheat	Start of growing season: 01-Apr
Variety sown: Camamah	Initial conditions date: 18-Apr
Sowing density: 150 plants/m2	Rainfall since 18-Apr: 61.5 mm
	Date of last rainfall entry: 09-Jul
	Expected harvest date: 18-Nov

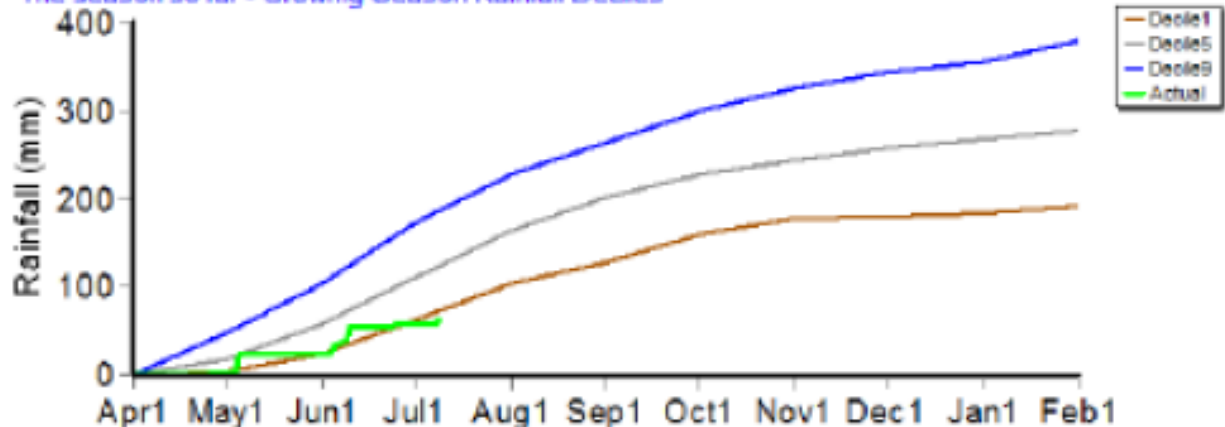
Grain Yield Outcome



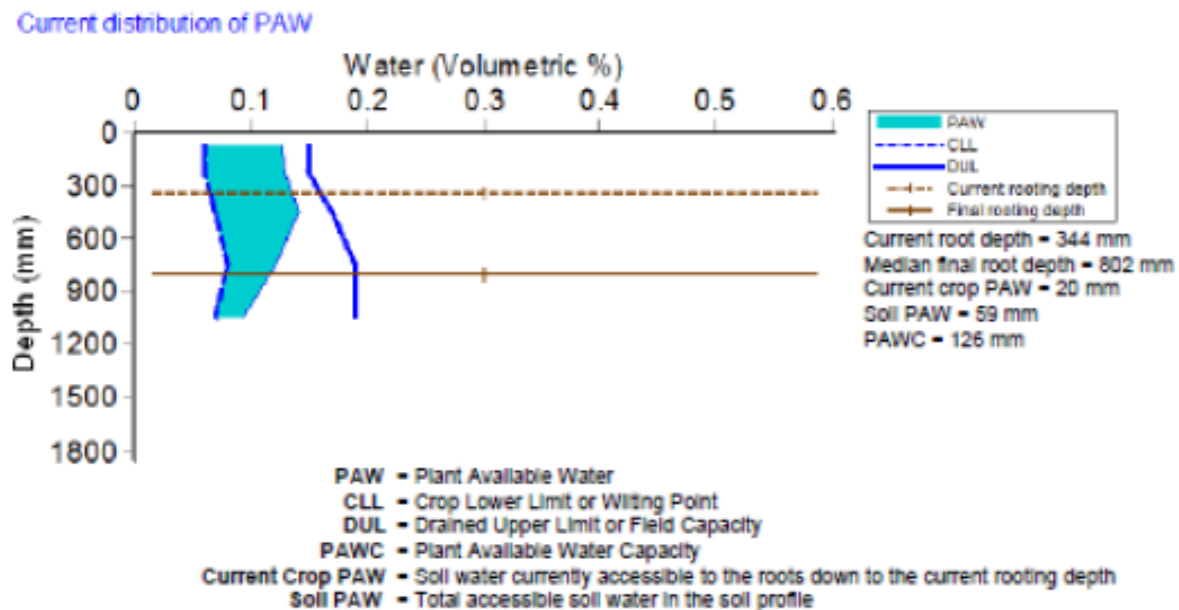
This graph shows the probability of exceeding a range of yield outcomes this season. It takes into account your pre-season soil moisture; the weather conditions so far; soil N and agronomic inputs. The long term record from your nominated weather station is then used to simulate what would have happened from this date on in each of the past 100 years. The yield results are used to produce this graph.

As can be seen, there is an 80% chance of the paddock yielding around 1,2t/ha - probably the expectation for a Decile 2 year. The rainfall received at this site to date is seen below:

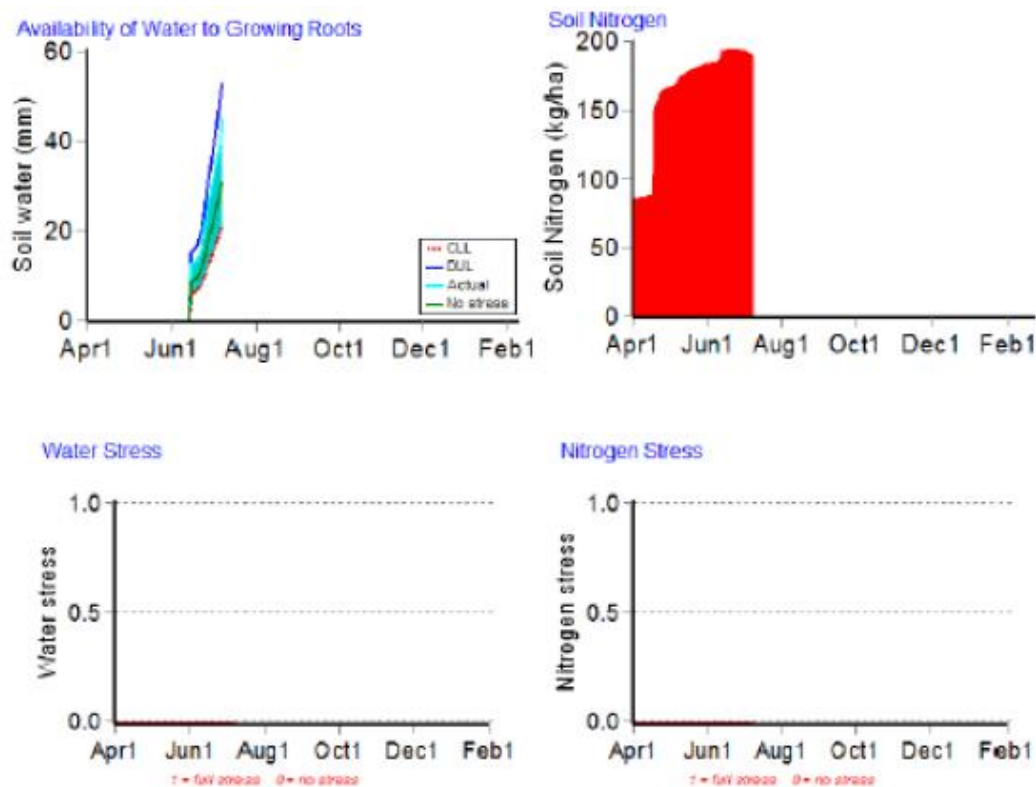
The season so far - Growing Season Rainfall Deciles



Currently the site is tracking below Decile 1, though some subsoil moisture was observed when coring in April. The soil moisture profile looks like this:



Again pH could be an issue at this site. At depth, it rises to over 8 (CaCl_2) which in itself may not seem high, but could induce nutrient deficiencies, or toxicities depending on various elements involved. This may impact root growth through the profile. However, correlating current moisture with nitrogen reserves indicates that the crop is currently not under stress in this regard.



Brief periods of mild to moderate stress do not necessarily lead to reduced yield. To see the likely impacts of additional nitrogen fertiliser rates use the Nitrogen and Nitrogen Profit reports.

The report below simulates three scenarios:- 1) doing no further addition. 2) 60kg/ha urea being spread at 4 leaf, and 3) 40kg/ha at 4 leaf and 40kg/ha at second node (Z32). As the lines for each scenario cannot be separated, further nitrogen is not likely to be profitable at this stage.

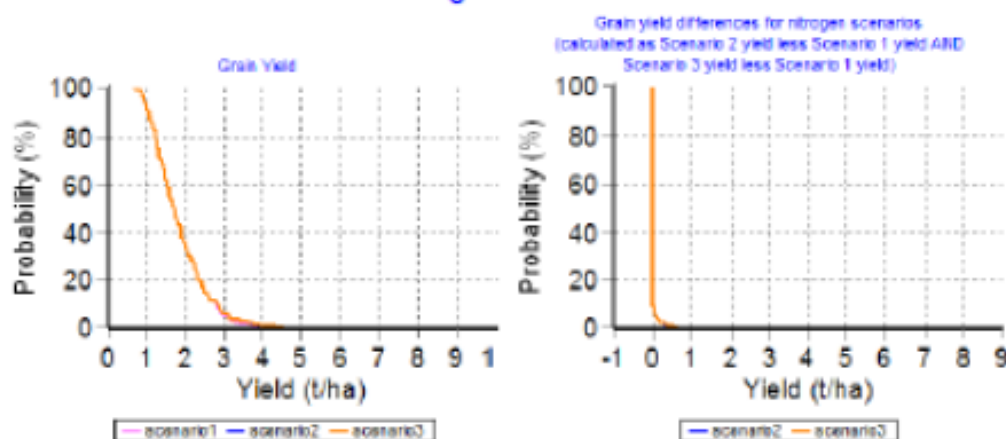
Paddock name:

Date sown: 12-Jun

Variety sown: Camamah

Scenario1:		Scenario2:		Scenario3:	
Date	Amount (kg/ha)	Date	Amount (kg/ha)	Date	Amount (kg/ha)
12-Jun	8	12-Jun	8	12-Jun	8
		31-Jul	27.6	20-Jul	18.4
				13-Aug	18.4

1. Grain Yield Outcomes for Nitrogen Scenarios



As mentioned in the full summary for each of the sites, Yield Prophet® is a tool to assist in decision making during the season. We trust these summaries are useful, and would like to suggest further reading into the individual sites reports for further detail.

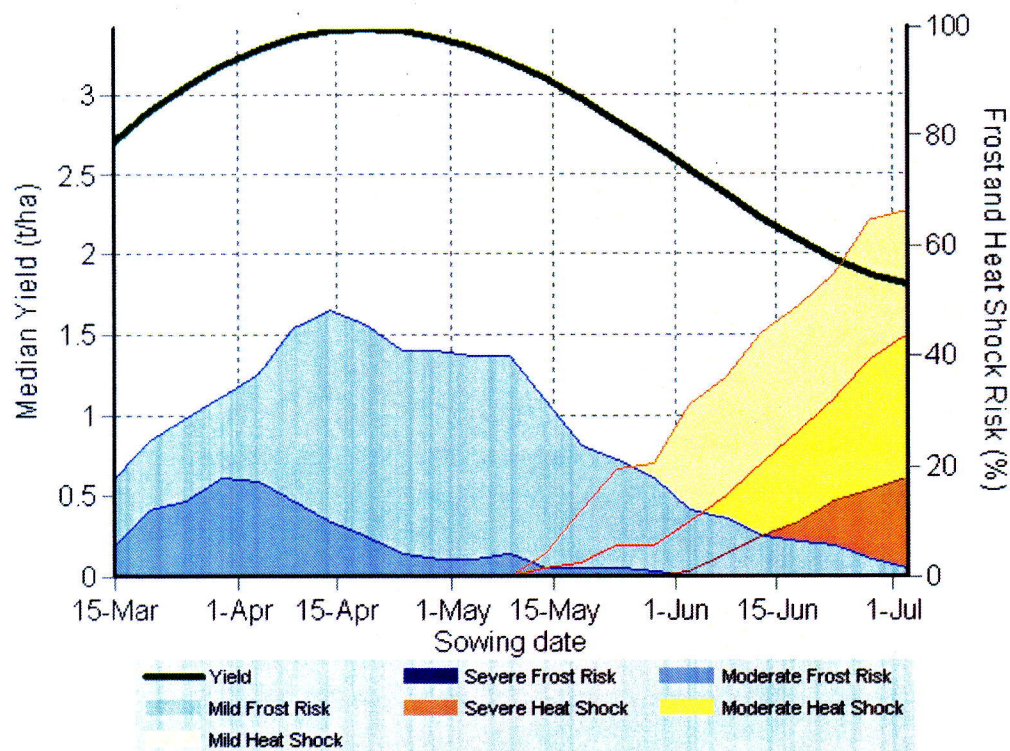
APPENDIX 2.

SOWING OPPORTUNITY REPORT

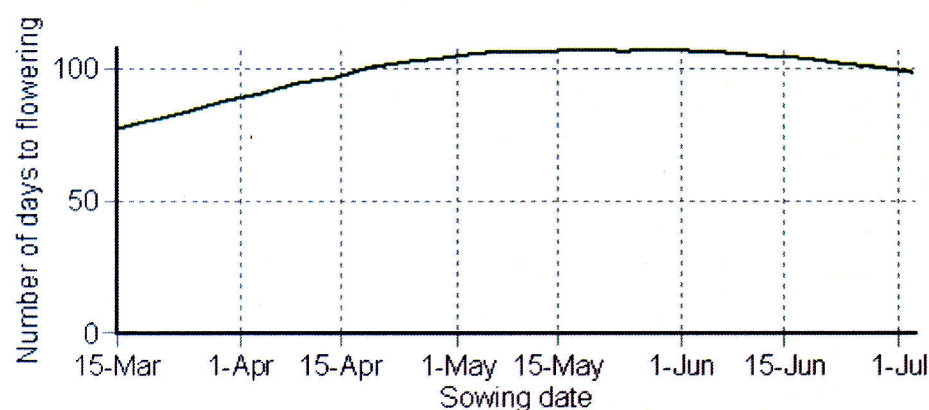
Sowing Opportunity Report

Report name: Cadoux Sowing opportunity report
 Report date: 31/05/2012
 Last climate date available: 30/05/2012
 Client name: David Stead
 Paddock name: Inman
 Report generated by: David Stead
 Variety sown: Mace
 Sowing density: 125 plants/m²
 Stubble type: None
 Stubble amount: 200 kg/ha
 Amount of water: 45 mm

Weather station used: Cadoux
 Rainfall records used: Weather station
 Soil type: Gravelly yellow_brown deep sand (Pindar No882)
 Maximum rooting depth: 180 cm
 Roots constrained by EC, Cl and ESP: Yes
 Start of growing season: 01-Apr
 Initial conditions date: 25-Jun
 Growing season rainfall to date: mm



This chart demonstrates the sowing date that will maximize crop yield potential this season and the associated frost and heat shock risk. It takes into account the variety, the specific soil type, pre-season soil moisture, the weather conditions so far and unlimited nitrogen. The long term record from you nominated weather station is then used to simulate the median yield potential and the risk of frost and heat shock for each sowing date in the sowing window.



This chart demonstrates the number of days to flowering of a crop sown on each day of the sowing window. It takes into account the variety, pre-season soil moisture, the weather conditions so far and unlimited nitrogen. The long term record from you nominated weather station is then used to simulate the median number of days to flowering for each sowing date in the sowing window.

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APPENDIX 3.

SOWING x VARIETY REPORT

Sowing x Variety Comparison Report

Report name: Cadoux Sowing X variety report

Report date: 31/05/2012

Last climate date available: 30/05/2012

Client name: David Stead

Paddock name: Inman

Report generated by: David Stead

Rainfall records used: Weather station

Soil type: Gravelly yellow_brown deep sand
(Pindar No882)

Maximum rooting depth: 180 cm

Roots constrained by EC, Cl and ESP: Yes

Start of growing season: 01-Apr

Initial conditions date: 16-Apr

Growing season rainfall to date: mm

	Scenario 1:	Scenario 2:	Scenario 3:
Sowing Date:	09/06/2012	09/06/2012	09/06/2012
Crop type:	Wheat	Wheat	Wheat
Variety:	Mace	Calingiri	Mace
Sowing density (plants/m2):	120	150	150
First commencement of flowering (Z60):	12-Sep	30-Sep	12-Sep
Median commencement of flowering (Z60):	22-Sep	7-Oct	22-Sep
Last commencement of flowering (Z60):	29-Sep	15-Oct	29-Sep

Percentage of years in which frost occurs

Mild

Minimum temperature between 2 and 0°C
during flowering (Z60-69)

19%

11%

19%

Moderate

Minimum temperature between 0 and -2°C
during flowering and early grain fill (Z60-75)

3%

0%

3%

Severe

Minimum temperature less than -2°C
during flowering and grain fill (Z60-79)

0%

0%

0%

Percentage of years in which heat shock occurs during grain fill (Z70-79)

Mild

Maximum temperature between 32 and 34°C

33%

47%

33%

Moderate

Maximum temperature between 34 and 36°C

8%

28%

8%

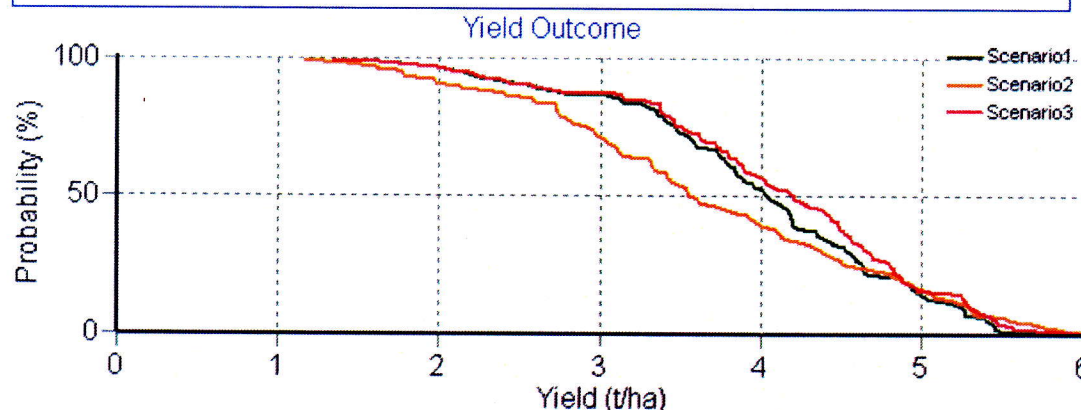
Severe

Maximum temperature above 36°

2%

17%

2%



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