

Yield Prophet[®] Periodical

Maximising Profit — Minimising Risk

September 2008

Introduction

The 2008 season has been variable across Yield Prophet's sphere of influence, bringing significant variety to Yield Prophet predicted yield outcomes. In some fortunate regions of Australia, fertiliser spreading has been completed or has commenced. As a result, the number of reports run on Yield Prophet has increased substantially, with over 300 reports generated over the last week. We hope that these reports have provided valuable support relating to the in crop decisions being made around this time.

Yield Prophet[®] Paddock Analysis

The following discussion relates to a wheat crop planted at Murtoa in the Wimmera region of Victoria. The crop parameters outlined in Table 1 indicate that the crop was sown at an acceptable time for the region into moderate levels of Plant Available Water (PAW) and available nitrogen. A sound 165.5mm of Growing Season Rainfall (GSR) to date has ensured that the crop has a significant yield potential.

Location	Murtoa	Stubble Quantity	2,500kg/ha
Crop	Wheat	GSR	165.5mm
Variety	Derrimut	Decile	Three
Sowing Date	23/05/08	Initial N (4/4/08)	71kg/ha
Plant Density	150plants/m ²	Initial PAW (4/4/08)	27mm
Stubble Type	Canola	Growth Stage	16 (End of Tillering)
Report Date	22/08/08	Soil Type	Wimmera Clay

Table 1: Crop details for Yield Prophet Paddock Analysis

Yield Prophet estimates that given the worst season finish on record this crop would obtain a yield of 1.8t/ha (a). Given the best season finish on record the crop would achieve a yield of 3.8t/ha (b) and 8.5t/ha (c) with the current levels of nitrogen and with unlimited nitrogen respectively.

It is evident from Figure 1 that given at least a decile 2(d) (Pr 80%) finish, the crop's yield potential would be limited by nitrogen, indicating that this crop could benefit from the application of nitrogen.

In order to gauge how much to apply it is appropriate to run a nitrogen comparison report.

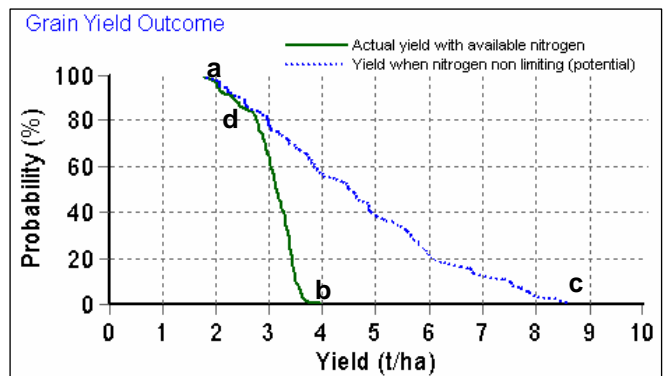


Figure 1: Probability of exceedence curves for a Derrimut wheat crop at Murtoa produced on 22/08/08.

Figure 2 shows the potential yield outcomes resulting from the application of nitrogen under three different scenarios. It is evident that this crop will have a positive yield response as more N is applied. However the amount of N to apply is relative to your expectations for the remainder of the season.

If you are anticipating a decile 2 (a)(Pr80%) season finish or below, this crop would not benefit from the extra application of nitrogen. Alternatively, if you are anticipating a season finish of between decile 2 to 5 (b)(Pr50%) 30kgN/ha would be sufficient to ensure that nitrogen was not going to limit the crop's potential. If decile 5 or above is anticipated, applying 60kgN/ha to the crop would create a yield response.



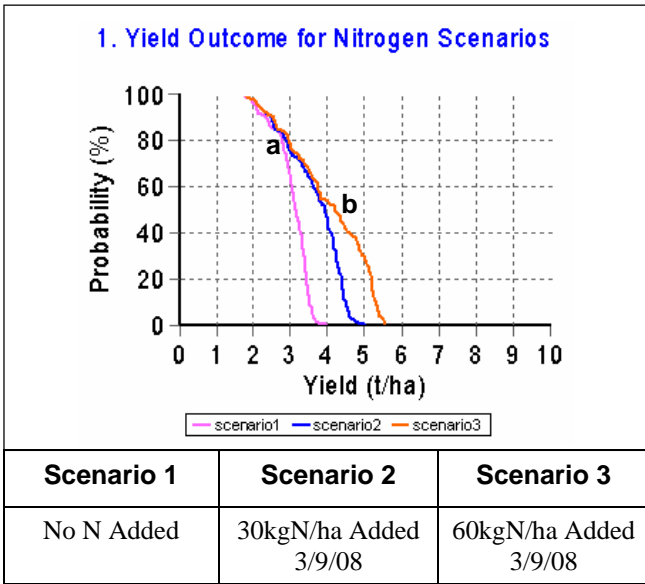


Figure 2: Probability of exceedence curves for a Derrimut wheat crop at Murtoa under three nitrogen application scenarios produced on 22/08/08.

As shown in Figures 1 and 2, a positive yield response from the application of nitrogen is likely given the current crop status. However, will these applications produce a paying response? The nitrogen profit report outputs shown in Figures 3 and 4 are based on the gross margin assumptions displayed in Table 2.

Table 2: Assumptions for a nitrogen profit report pro-

Classification	Australian Hard
Min Protein for Classification	11.5%
On Farm Wheat Price	\$320/tonne
Cost of N Fertiliser	\$2/kgN
Cost of N Application	\$7.50/ha

duced on the 22/08/08.

As shown in Figure 3, Yield Prophet estimates that in the event of the worst season finish on record all scenarios would achieve a return of approximately \$400/ha(a). Given the best season finish on record Scenarios 1, 2 and 3 would each achieve a return of \$1,050/ha(b), \$1,350/ha(c) and \$1,500/ha(d) respectively. However, given altered conditions the three scenarios do not show such significant differences in return.

Figure 3 illustrates that Scenario 2 and 3 would achieve a paying response given at

least a decile 3(e)(Pr70%) finish with minimal return penalties up until this point. Scenario 3 will have a paying response over Scenario 2 upon achieving a decile 5(f) finish.

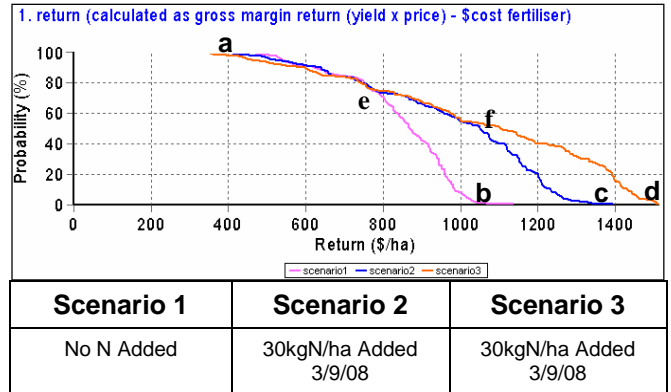


Figure 3: Probability of exceedence curves for a Derrimut wheat crop at Murtoa under three nitrogen application scenarios produced on 22/08/08.

Another output of a nitrogen profit report is shown in Figure 4. This output shows the marginal rate of return calculated as the \$ difference between scenario 2 and 1 and scenario 3 and 1. The solid vertical bars represent the 2 for 1 return on investment (ROI) for scenarios 2 and 3. A 2 for 1 ROI is a desirable situation and often provides a benchmark for investment decisions.

Yield Prophet estimates that this crop has a 70%(a)(decile 3 or above) chance of achieving a profit from the N applications proposed in scenarios 2 and 3. Scenarios 2 and 3 respectively have a 50%(b)(decile 5 or above) and 40%(c)(decile 6 or above) chance of achieving a 2 for 1 ROI.

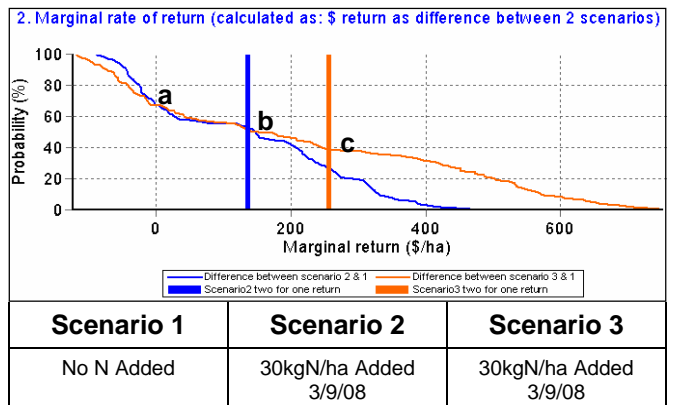


Figure 4: Marginal rate of return curve comparisons between Scenarios 2 and 1 and 3 and 1 of a Derrimut wheat crop at Murtoa produced on 22/08/08.

When analysing these outputs, different people have different tolerances to risk and expectations about a given season. Therefore, it is important that you base your decisions around parameters that you feel comfortable with. You should ask yourself questions like 'am I comfortable with a 50% chance of achieving a two for one return on my investment?' or 'am I comfortable with having a 30% chance of losing money?'

Yield Prophet® Discussion

When examining Yield Prophet reports it can be a good learning exercise to interpret the charts and try to explain why they look the way they do. The 'cliff edge' evident in Figure 5 provides a good example of this. This 'cliff edge' is usually produced as a result of nitrogen limiting the crop's potential yield in the region of the curve where rainfall is higher (i.e. below 40%). However, in this case the nitrogen limited curve and the unlimited curve do not separate at any point within the probability range.

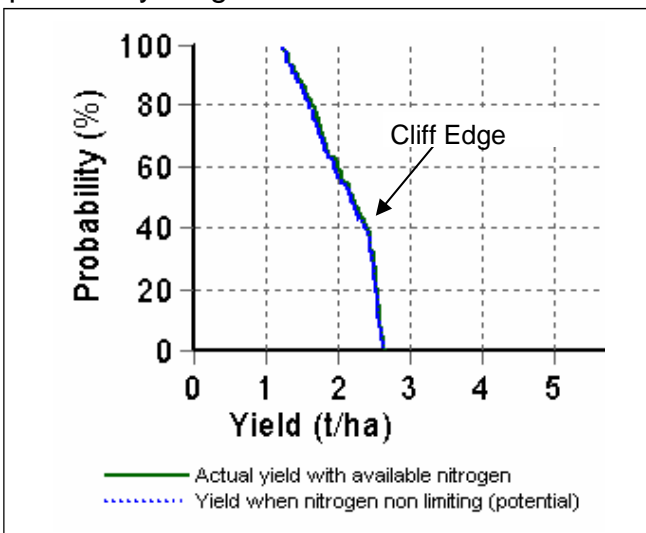


Figure 5: Yield Prophet probability of exceedence curves for a wheat crop at Manangatang produced on the 18/08/08.

Therefore some other factor is limiting the potential of this crop. In this case, the crop did not have any stored sub-soil moisture at sowing and did not receive sufficient rainfall in the early stages of the crop's growth. As a result, this crop was unable to produce a large number of tillers.

Therefore, if this crop receives rainfall above decile six for the remainder of the season, this crop's potential will be limited by the reduced number of tillers and not by limited nitrogen. If you have a different explanation for this result, let us know your thoughts.

Soil Characterisations

A key component of the accuracy of Yield Prophet reports is the soil characterisation. As a result, I have had a significant interest from some subscribers to have their soils characterised. Unfortunately, this process can be quite involved.

While we have some funding and limited human resources we cannot undertake an unlimited number characterisations. However, if you are in a region that has a limited number of characterisations and you have a soil that is reasonably representative of the soils in the region please contact us so we can endeavour to have them characterised.

In the majority of regions throughout Australia, the most important aspect of the soil characterisation is the crop lower limit. If you have had a reasonable season and your crops have the capacity to remove the moisture from the soil, with a small amount of time and effort this can be measured reasonably easily. This involves constructing a rainout shelter over the crop and taking a soil core when the crop is flowering. If you are interested in measuring your crop lower limit please contact us and we can provide you with a detailed set of instructions on how to undertake this operation.

Yield Prophet® Insight

We have had a number of requests for an instruction manual that could be used to guide subscribers through the website. This has not been developed previously due to the constant changes to the website. However, now that the format is relatively stable we will endeavour to complete an instruction manual as soon as possible. We will notify you all upon its availability. In the meantime we would like to remind you all that included in your subscription fee is access to our help line. If you are experiencing any problems with Yield Prophet or have a question or confusing report outputs please contact us. Contact details are below.

The CSIRO and their team are continually developing and refining APSIM (Agricultural Production Simulator) and consequently Yield Prophet. Currently work is being undertaken on a climate change report to be included in Yield Prophet in the future. This will enable users to assess their crop potential given user prescribed climate change parameters. We will endeavour to notify you of its availability in the future.

If there is a potential application of Yield Prophet that you would find useful and is not currently available please contact us and we will assess its feasibility within APSIM and Yield Prophet.

Those of you who have run a crop report recently may have noticed a change to the Hay Yield Outcome output. This amendment relates to a change in the hay biomass calculation. Hay biomass was previously calculated using a set 80% yield of above ground dry matter at the start of flowering, with a 13% moisture content. However, yield is now calculated at varying rates dependent on the estimated above ground dry matter content using given thresholds.

When above ground dry matter is below 2t/ha, hay yield is assumed to be 70% of dry matter, with a moisture content of 13%. When dry matter is between 2 and 12t/ha, hay yield is assumed to be between 70 and 75% of dry matter using a sliding scale. When dry matter is above 12t/ha, hay yield is assumed to be between 75 and 80% using a sliding scale.

Most Yield Prophet subscribers will be aware that Tim McClelland has taken over from James Hunt as the new Yield Prophet Coordinator. However, James will still have a involvement with Yield Prophet as he continues his employment with the BCG as a Farming Systems Scientist. As part of his role James will now be responsible for Yield Prophet development, leading the new GRDC Water Use Efficiency project, and is involved with a number of projects requiring Yield Prophet/APSIM modelling such as the new GRDC canopy management project.

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