

CASE STUDY – 33

CropScan 3300H On Combine Grain Analyser

CROPSCAN PROTEIN MAPS IDENTIFY NITROGEN LIMITED ZONES ACROSS THE FIELD

Leon and Sarah Clarke operate a 6000ha (14,820ac) farm in the district of Lake Grace Western Australia. The Clarkes installed a CropScan 3300H On Combine Grain Analyser in 2020 and a second in 2021. From 2020 to 2023, they used the technology to collect Protein and Yield maps across their farms in order to experiment with Variable Rate Nitrogen Fertilization applications.

Description:

In 2024, the Clarkes created a replacement fertilizer application based of the collected data. The analysis identified a low-protein zone spanning 32 hectares. To address this variability, the Clarkes applied an additional 100 kg of Nitrogen per hectare in the affected area using variable rate technology. In conjunction with the N-GAUGE App to create the fertiliser prescriptions the Clarkes use a Marshall Spreader and the IM4 web portal to load and spread the maps.

Results:

As a result, the crop in the targeted zone achieved a significant Yield increase of 1 tonne per hectare, demonstrating the effectiveness of precision Nitrogen management in optimizing Protein content and overall productivity.

Calculation	Value
Additional Yield per Hectare	1 tonne
Total Additional Yield (32 ha)	32 tonnes
Grain Price per Tonne	\$380
Total Revenue Increase	32 t × \$380 = \$12,160
Extra Urea Applied per Hectare	100 kg
Total Urea Used (32 ha)	3,200 kg (3.2 tonnes)
Urea Cost per Tonne	\$750
Total Fertilizer Cost	3.2 t × \$750 = \$2,400
Net Return to Grower	\$12,160 – \$2,400 = \$9,760
Benefit per Hectare	\$9,760 ÷ 32 ha = \$305 per hectare

Table 1.1 Field Calculation

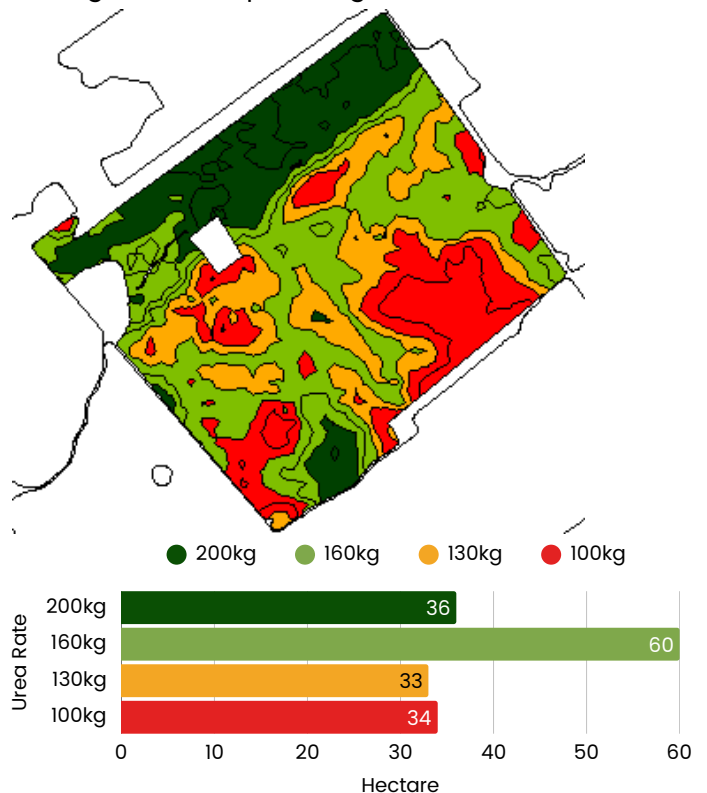


Table 1.2 Urea Application Map

Protein Maps:

Inspection of the Protein and Yield Maps from 2023 to 2024, shows the northern part of the field had low Protein and low Yield indicating that crop was limited by Nitrogen. By targeting this 32 hectares with a higher rates of Nitrogen fertilizer increased both the Yield and Protein in the following season.

The field maps are shown below:

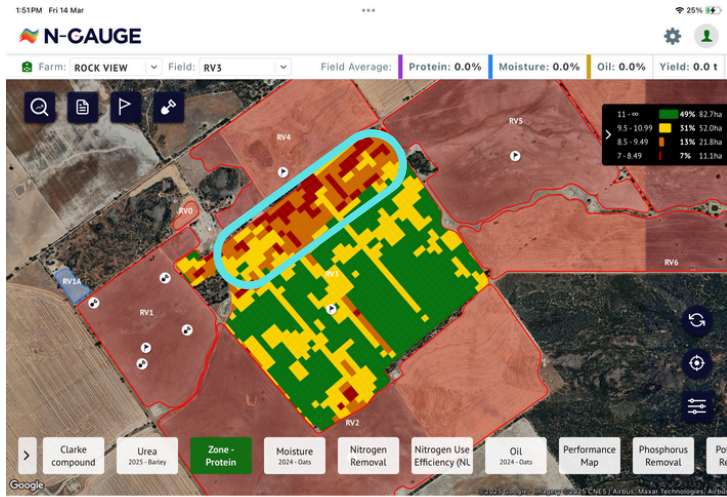


Figure 1.1 2023 Barley Protein Map



Figure 1.2 2023 Barley Yield Map

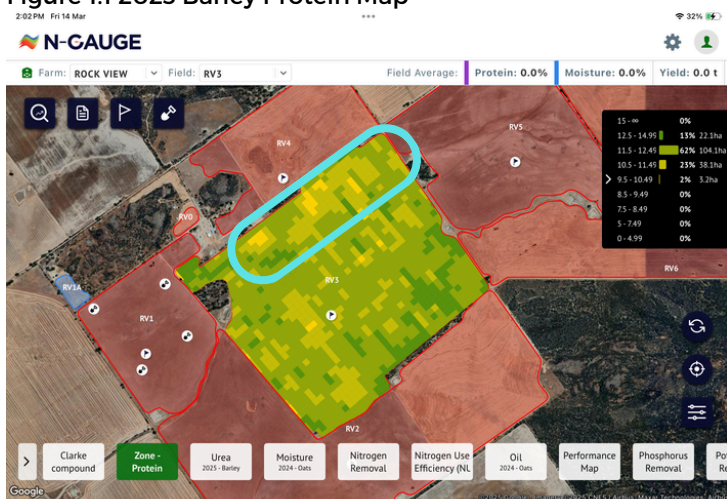


Figure 1.2 2023 Barley Protein Map

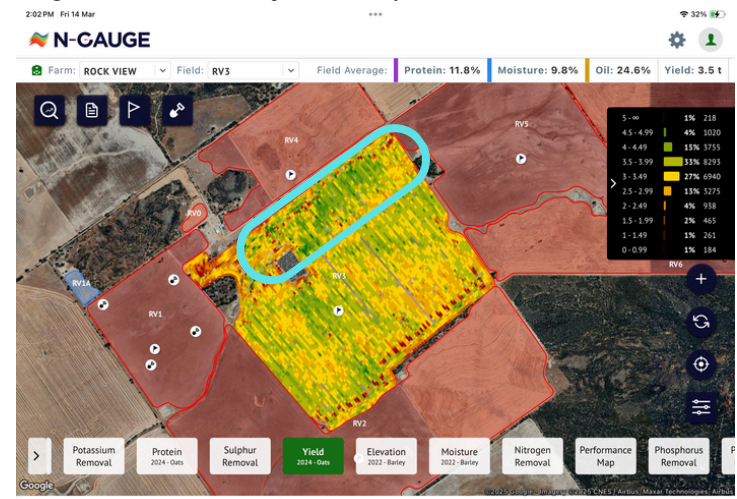


Figure 1.4 2023 Barley Yield Map

Conclusion:

By using the CropScan On Combine Grain Analyser to measure Protein in the crop, the Clarkes were able to optimize Nitrogen application and gain an additional \$9,760 in profit from the 32-hectare low-protein zone. The above maps show the before and after effect on the Yield and Protein. The data shows that both the Yield and the Protein were evened out, indicating the variable rate fertilizer strategy was key to the remediation of the field.