



CASE STUDY - 30

CropScan 3300H On Combine Grain Analyser

VRF NITROGEN STRATEGY EVENS OUT PROTEIN AND INCREASES YIELD ACROSS THE FARM

Chris and Broden Holland operate a 4500ha (11000ac) farm in the Young district of New South Wales, Australia. They installed a CropScan 3000H On Combine Grain Analyser in 2016 and a second in 2018. In 2016 and 2017, they used the technology to segregate wheat and barley in the field and thereby increase their crop payments. Over the next three harvests, Broden has been collecting Protein and Yield maps across their farms and has experimented with Variable Rate Nitrogen Fertilization applications.

In 2020 the Hollands implemented a simple VRF application strategy based on the Protein data collected in previous years. The Hollands used the CropScan data to identify the low, mid and high Protein zones from the harvested 2019 fields. They then created variable rate fertilizer prescriptions and loaded them into their Amazon Spreader.

Description:

Prior to the 2020 harvest, the Hollands had used a blanket rate approach for Urea fertilisers. By collecting Protein and Yield data using the CropScan 3000H in 2016 to 2019, they developed a Variable Rate Fertilization strategy for Urea where they applied different rates from 60, 90, 120, 150, 180, 210, 240kg/ha across their fields. Their strategy was based on the understanding that Protein production in grains is a result of adding more Nitrogen. As such, if the Protein level in a zone is low (8.5%), then they added more Nitrogen (240kg/ha) and where the Protein is higher than their target, i.e., (>13.5%), then they applied a lower rate of the Nitrogen (60kg/ha)...

Results:

Yield Increase: The table shows the results of their VRF strategy. In 2020 the Hollands had progressively increased the Urea application rate from an average of 150kg/ha to 200kg/ha.

They calculated that the average Yield across their farm had increased by 1 tonne/ha. This increase generated an additional 5200 tonnes of wheat at a value of AUD\$433,800.



Yield	4.9T/ha	5.9T/ha
Urea Rate	150kg/ha	200kg/ha
Cropping Area	1800 ha	1800 ha
Wheat Price	\$270/T	\$270/T
Revenue	\$2,381,400	\$2,867,400
Urea Cost	\$156,600	\$208800
Net Revenue	\$2,224,800	\$2,658,600
Gain		\$433,800
		\$241/ha

Protein Maps:

When the Protein maps were reviewed from 2017 to 2021, the maps showed that the variability in Protein had been reduced dramatically.

The maps below show 3 fields of wheat Protein maps from 2017 to 2021. These maps show that aft er three crops where the VRF Nitrogen strategy has been adopted, the Protein levels across these fie lds are more consistent, whereby the low protein zones have been lifted and the higher zones redu ced to produce a uniform 12% Protein level.



Comment:

Broden Holland acquired their first CropScan analysers because he wanted to collect Protein maps across their farms to understand the variation in Protein. The Hollands did not expect to realise such a significant increase in income generated through the use of this technology. Nor did they expect to 'even out" the Protein and Yield across their fields so much. They had been collecting Yield maps for 20 years. Chris Holland made the comment, "2 years of Protein maps and it all makes sense."