

CropScan – Ramsey Bros Precision Ag Article

More than just yield

Turning harvest into real insight by reading nitrogen through protein data.

Seeding might be top of mind right now, but the insights gathered at harvest often shape the season ahead. It's one of the best opportunities to understand how a crop really performed, and that's where CropScan grain analysis is proving its value.

Installed directly on the combine harvester, the system analyses grain in real-time as it's harvested, measuring protein, moisture and oil content while building a detailed map of how results vary across the paddock.

Ramsey Bros has worked closely with CropScan for more than a decade, bringing the technology to growers across South Australia. For CropScan Managing Director Mat Clancy, the system has been steadily refined through dealer and grower feedback since his father built the first prototype in 2006.

Real-time grain quality

At its core, CropScan is a near infrared grain analyser that mounts onto the clean grain elevator of a combine harvester.

"As the combine is travelling down the field, it sub-samples every 3 to 4 seconds and measures protein, moisture and oil values," Mat explains. "That data is tied in with GPS positioning to create a spatial layer of information across the paddock."

In practical terms, growers can see exactly how grain quality varies across their fields — while they're harvesting.

"We check our calibrations against the same grain analyser used by the main bulk handlers," Mat says. "For wheat, protein accuracy sits around 0.2 to 0.3 percent and moisture around 0.2 percent. With that level of accuracy, farmers can make confident decisions about harvesting, segregation and blending."

For many growers, the biggest benefit shows up immediately in the cab.

"The number one benefit is knowing exactly what the moisture is. That tells you whether you can start harvesting or need to wait a little longer. With the next generation of combines, they can process higher moisture grain than ever before," Mat explains. "Knowing that moisture level is critical, otherwise you can push a lot of grain through and end up with a logistics issue later on."

Beyond moisture, the system also highlights variations across the paddock.

"If there's variability in protein across the field, part of that crop might fall into a higher-grade bracket like H2 versus ASW," Mat says. "Having that information allows the farmer to start making decisions based on pricing, whether they blend the grain to meet market demands."

More than grain quality

Ed Scott, Product Manager for the N-GAUGE platform, says the spatial data captured during

harvest also provides insights into future crop performance.

"Originally the system was designed to measure protein, moisture and oil so growers could blend grain to meet delivery targets," Ed explains. "But once we started capturing that data spatially across the landscape, it became clear it was telling us something much bigger about how the plants were accessing and utilising nitrogen fertilisers."

"What we've found is that protein has a really strong correlation with residual soil nitrogen levels going into the following season," Ed adds. "And those soil nitrogen levels are one of the key pieces of information farmers and agronomists utilise when making fertiliser decisions."

That's where the CropScanAg development of the N-GAUGE platform began. Harvest data contains critical insights for assessing the performance of the season and where to improve in the following year. By capturing this information and presenting visual map data sets along with summary reporting features, assessing grain harvest for actionable insights has been a key step in the development.

"Through the N-GAUGE app we can now take yield and protein data and turn it into prescription maps to help improve the crop the following year," he says.

When protein maps are layered alongside yield maps, a clearer story about paddock performance begins to emerge.

"What we often see is that the high protein grain is coming from areas that have been over-fertilised and have higher residual soil nitrogen," Ed explains. "And the low protein areas tend to be zones where nitrogen levels weren't adequate to meet the full yield potential, highlighting where yield hasn't actually been optimised."

That insight helps growers refine their fertiliser strategies for the following season.

"Wheat has a sweet spot for economic nitrogen response around 11.5 percent protein," Ed says. "So if we're seeing protein levels below that, it's a sign the crop hasn't quite reached its yield potential."

"When we look at fields across the country, it's not unusual to see about a 5 percentage point spread in protein. That tells us we've got areas that were over-fertilised and others that were under-fertilised."

Tools within the N-GAUGE platform help visualise that variability and develop plans to mitigate it.

"We can reallocate some of the nitrogen budget from the higher protein areas and apply that to the lower protein zones. That helps even out the response and improve yield."



Photo: Supplied

Farmers are using the data to solve more and more challenges.

"The feedback from growers has been really positive," Mat says. "Farmers are constantly coming back with features they'd like to see added, particularly around the algorithms and how they want to approach fertiliser replacement strategies."

"One of the tools growers are finding really useful is what we call field performance maps, which overlay yield and protein data," Mat says. "It quickly creates four zones across the paddock, showing where fertiliser could have lifted yield, where areas may have been over-fertilised, and where it's worth doing some ground-truthing or soil testing with the agronomist."

Even relatively small gains can translate into meaningful returns.

"At harvest, the data helps with grain logistics — growers can segregate or blend grain based on protein and moisture to target better grades," Ed says.

"But the bigger opportunity comes when you start interrogating that data. By shifting fertiliser from higher protein zones to lower protein zones, growers can even-out the paddock and lift yield. In many cases we're seeing yield responses of around 300 to 600 kilograms per hectare

for every percentage point of protein below target. With wheat around \$300 to \$350 a tonne, that can translate to roughly \$150 a hectare."

Planning your next crop

For growers heading into seeding, harvest insights can really pay off. By analysing grain quality and yield data from the previous harvest, growers and agronomists can build more targeted fertiliser plans for the crop now going into the ground and validate on-farm trials.

"Farmers have had yield monitors for many years, but yield data alone has often been underutilised," Ed says. "What we're seeing now is that once you add protein data alongside yield data, that yield map suddenly makes a lot more sense."

"You can identify areas where fertiliser investment is delivering strong returns, areas where it may be excessive, and zones that need further investigation. It helps guide those conversations with agronomists about what to do differently next season."

Adoption is accelerating

While CropScan systems can be retrofitted to existing machines, many growers are choosing to install them when purchasing a new header.



Ed Scott and Mat Cliney. Photo: Supplied



CropScan by numbers

Wheat protein
accuracy
0.2 to 0.3 percent

Wheat moisture
accuracy
0.2 percent

Data sampling
Every 3 to 4 seconds

Map processing time
(header to spreader)
3 to 5 minutes

"There's a lot of simplicity in fitting it with the original combine purchase, as it can be integrated with the machine from the start," Mat says. "It means the system is collecting harvest data from day one."

Recent developments have also made the system far easier to operate.

"One of the biggest developments has been moving the system onto the ISOBUS platform so it integrates directly with the combine," Mat says. "When you engage the rotor, the system automatically starts sampling and collecting data."

That information is sent straight to the cloud and into the N-GAUGE mobile app, where growers can quickly generate maps and analyse paddock performance.

"Tasks that once took 15 to 20 minutes now take just 3 to 5 minutes," Ed says. "Growers can turn their yield and protein data

into prescription maps directly from the tablet in the cab."

Another noticeable trend is who is driving adoption on farms.

"We're definitely seeing younger farmers pushing this technology," Mat says. "They're coming back onto the farm and are keen to use data to make decisions. Computers and data aren't a burden for them – that's just everyday life."

Ed says many younger farmers are also looking for ways to contribute to increasingly complex farm businesses.

"That next generation is really driving the adoption of things like variable rate technology," he says. "They're looking for those extra one to ten percent improvements, especially as input costs continue to rise."

The road ahead

As harvest technology evolves, both Mat and Ed believe grain analysis will eventually become

standard equipment on combines.

"Years ago, combines didn't have yield monitors," Ed says. "Now you wouldn't buy a combine without one. We see grain analysers heading the same way."

The next step is making the process even faster.

"Our aim is to generate a variable rate fertiliser map and send it to the tractor in under a minute," Mat says. "If we can simplify that process further, it will open the door for more growers to adopt variable rate practices."

"That level of automation could be available in a few years."

And for growers heading into seeding, the value is clear – the more you understand what happened at harvest, the better positioned you'll be for the next one. 🌾

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