



Precision Ag Trials

TRIAL TYPE Nitrogen Response
Appila SA, Upper North Farming Systems

Overview:

Precision Agriculture tools have been available to Australian grain growers for many years with the benefits well documented, however for various reasons different barriers have prevented growers from adopting some fairly simple technology.

The objective of this GRDC / SPAA funded project is to increase the level of adoption of PA 'beyond guidance' by broadacre farmers. The project specifically aims to increase the level of adoption of variable rate (VR) by growers in the project to 30% by 2013. This goal will be achieved by demonstrating how to use PA tools to growers at a regional level and by increasing the skills of growers and industry in PA to a level where they can then use PA tools in their farming systems to achieve economic, environmental and social benefits.

Background:

In 2010 a trial was established in a paddock at Appila to test if the paddock was responsive to nitrogen. Results indicated the paddock was responsive, so in 2011 a similar trial was designed (in a different paddock) to test if this paddock was also responsive to nitrogen.

Aims:

- To compare the effect of in-crop nitrogen on grain yield of wheat
- To test if areas of a paddock are responsive to nitrogen

About the trial:

The trial was located about 10 km south west of the Appila township. A wheat crop was sown at the site in late May 2010. A different paddock (paddock LN65) was chosen to the year before.

Assessments:

In 2009 the paddock had a high rate of fertiliser applied in a strip to test the responsiveness of the crop to additional nitrogen.

On 10 October a nitrogen sensor unit was used at the site when the crop was at Zadoks growth stage 71 (GS71). This is when the crop is at milky dough stage. N sensor and normalised differential vegetation index (NDVI) maps were produced.

Grain yield information was gathered for the paddock at harvest.

Results:

Lange, LN65, 2011 trial

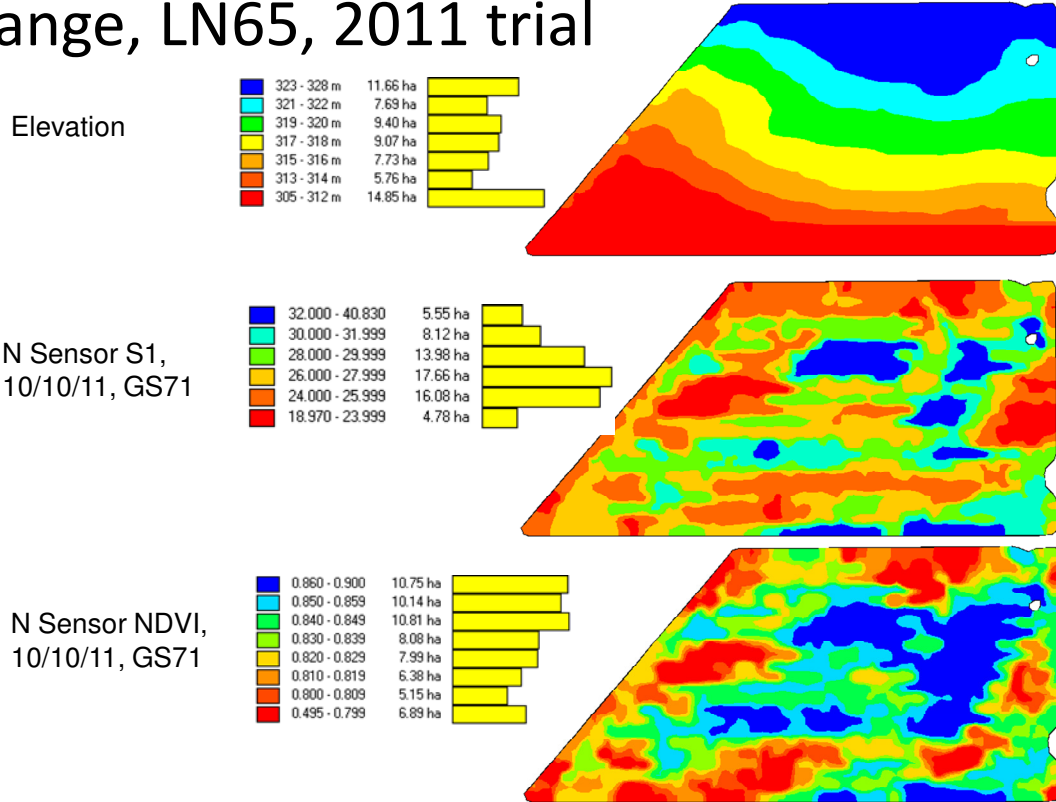


Figure 1: Comparison of N sensor data with NDVI readings for paddock LN65 at Appila in 2010. An elevation map (top) shows the paddock was approximately 20 m higher at the northern end compared with the southern end of the paddock.

Lange, LN65, 2011 trial

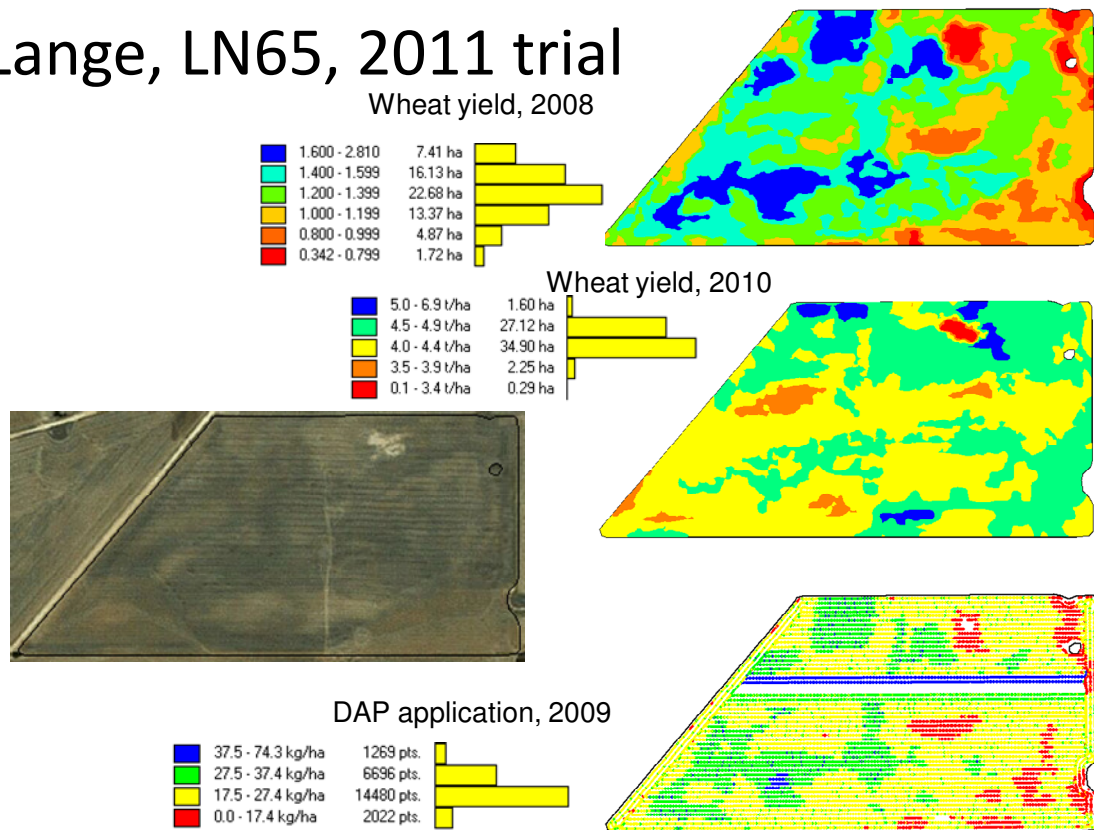


Figure 2: A yield map for paddock LN65 at harvest in 2010 (centre) contrasts with a yield map for the same paddock in 2008 (top). Both maps can be compared to the aerial photograph of this paddock showing variation in stubble colour and soil type. The bottom map shows different rates of Diammonium phosphate (DAP) applied to the paddock in 2009 including a strip (east-west) where a high amount was applied.

What does this mean?

The N sensor map (S1) and the N sensor NDVI maps correlate well (figure 1) highlighting similar areas of the paddock with high biomass (high green area) versus low biomass (low green area).

In this instance, elevation had no impact on production. Low yielding areas were present in both low and high areas of the paddock.

Farmers in this situation can be confident that since the NDVI and the N sensor measurements complement one another, the low producing areas can be farmed differently to the high producing areas. In order to maximise profits on farm, growers ought to consider varying inputs according to productive potential of their paddocks. Soil types vary considerably throughout the Upper North and can also be quite variable within paddocks.

Considerable cost benefits can be made over time by using variable rate technology in paddocks with high variability. While the upfront costs might be large, the investment quickly pays itself off, giving farmers increased confidence in using the technology. Some training is often required when using new monitors and equipment however regular use and familiarity of products improves ease of operation.

Who was involved?

- Property owner: Roger Lange
- Data collection: Sam Trengove
- Analysis: Sam Trengove, Sean Mason
- Trials coordinator: Charlton Jeisman
- FSG contact: Charlton Jeisman

Grower/Regional feedback:

Growers involved in the SPAA workshops and paddock research have shown a keen interest to develop maps for their own paddocks and identify the causes of yield limitations on their farm. In some situations these limitations can be overcome to make crop growth and maturity across a paddock more even while in other cases soil variability will always remain and so varied application rates will be required in the future.

The next steps for some growers are how to implement variable rate technology, what equipment and technology is required and how will the farmers monitor their paddocks to see if they are on the right track? The Upper North Farming Systems is keen to work with growers to encourage them to explore these options for their own farm.

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For more information

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