Precision Ag Trials

Variable Rate Nitrogen using Satellite Imagery

Dookie, Victoria

Although PA tools have been available to Australian grain growers for many years, and the benefits have been well documented, it is estimated that less than 1-% of grain growers utilise PA 'beyond guidance' in any form.

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.

Trials and demonstrations are conducted on growers' properties and are visited throughout the season using farm walks and workshops to discuss the advantages and disadvantages of PA techniques with the involvement of other regional growers.

This information sheet presents the outcomes of the SPAA trial **using satellite imagery for variable rate nitrogen** from season 2011.

Aims:

- To utilise satellite imagery technology for determining variable rate nitrogen applications

Background:

Farmers who have been part of the Dookie PA discussion group have many years' experience with variable rate applications (lime, gypsum, phosphorus and nitrogen). They wanted to see how effective satellite imagery would be to assist with variable rate nitrogen.

About the trial:

The trial involved active group members, each whom received 100ha worth of satellite imagery for free. The group participated in a satellite imagery workshop where each participant received their maps and assistance was made available to convert into nitrogen prescription maps.

This report will focus on how Mark Harmer utilised this information for variable rate N on "Jacks" paddock (Espada wheat).

Assessments:

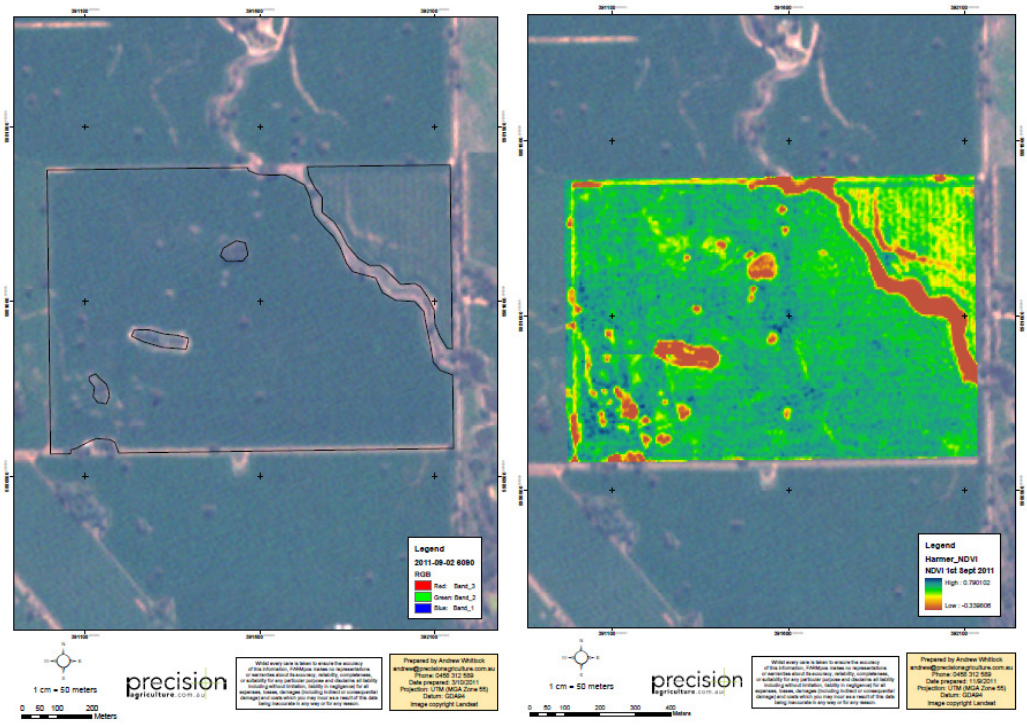
The crop assessment was delivered as an NDVI image (5m pixel) from a satellite platform, captured 2nd September 2011.

Results:

Each group member who had the ability and desire to variable apply nitrogen received 200ha of free satellite imagery. The data was delivered firstly as a group workshop and then converted into nitrogen prescription maps.

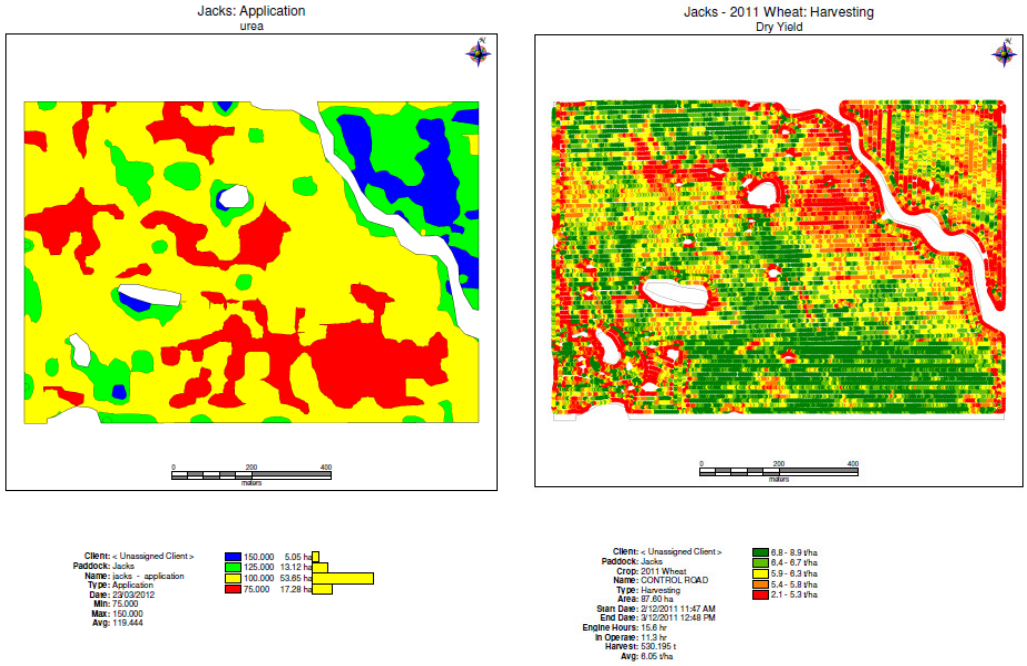
It is critical to note that using NDVI as a direct input for nitrogen prescription is not recommended, unless the crop manager understands why the NDVI readings are low. The main concern with the approach of applying higher nitrogen rates to low NDVI regions is that the key limiting factor may not be nitrogen, and that the higher N rates may prove to not be economic. The key to NDVI maps is ground-truthing the cause of the reduced crop growth!

In this case Mark was able to integrate paddock knowledge, soil test history and existing management zones to ultimately determine his nitrogen application map.



RGB (left) & NDVI (right) maps (1st Sept 2011) for the focus paddock "Jacks"

The satellite-based NDVI map was converted into a point data set and then zoned into four categories. Mark Harmer was then able to attribute nitrogen rates per zone based on paddock knowledge, seasonal outlook and the NDVI values.



"Jacks" nitrogen prescription map (left) and subsequent yield

Variable rate urea was the only application of N for the season, applied on the 18th September. The rates varied from 75 to 150kg/ha, with an overall average rate of 119kg/ha.

Mark uses the Agleader Integra display for autosteer, mapping and serial output to the Bogballe spreader.

The NDVI map has a strong correlation to the final yield, which indicates that the variable rate nitrogen did not achieve the goal of levelling out crop yield. This may be due to the dry finish to the season. This result does however confirm the concept of using in-season satellite imagery (typically late July, early August) to manage final yield through a variable rate intervention.

Who was involved?

- Mark Harmer, cooperating farmer
- Andrew Whitlock, PrecisionAgriculture.com.au
- Fiona Hart, Riverine Plains

Grower/Regional feedback:

Mark was happy with the visual correlation to the NDVI map when applying urea, however didn't see the yield benefit due to dry finish, but there may have been a protein benefit (this was not tested).

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For more information

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