Case study: Applying technologies to everyday farming decisions (dryland)

Sandy paddock zone receiving higher N (20kg/ha) on right of stake compared with no post application Nitrogen on left of stake. No visual crop response, supporting NDVI scanning results which suggest additional N will not increase crop yield and quality

Background

Over time we can expect to see increasing integration of technology with on-farm management. Technology has the capacity to revolutionise agriculture as it helps to improve the efficiency of our agricultural systems, increasing farm gate profit and easing lifestyle pressures.

Understanding the best application of any one technology, or its relevance to the broad range of climates, farming systems and individual farm management requires support and extension.

Working with local farmers to investigate how technologies can best work within their own systems can promote the sustainable adoption of relevant technologies.

Support and extension

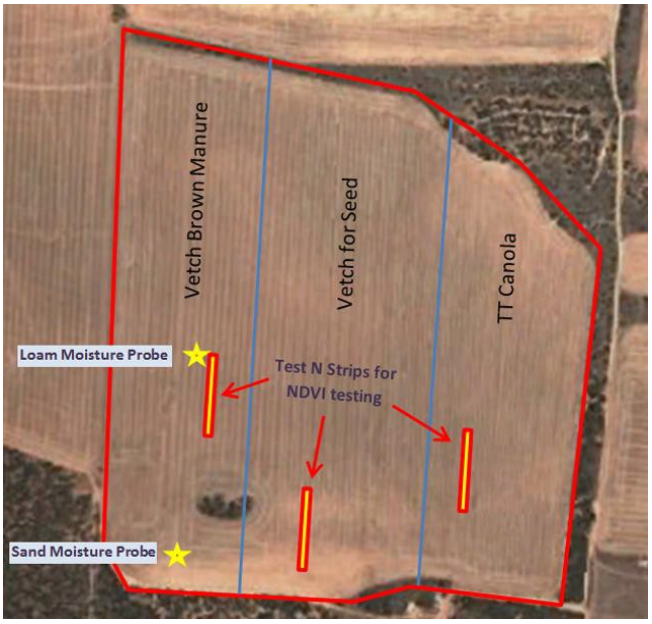
The Loxton and Browns Well Agriculture Bureaus identified increasing crop quality and yield through efficient fertiliser application as a key priority within the district. The Regional Landcare Facilitator engaged Primary Industries South Australia to form a support team for the Loxton and Browns Well Agriculture Bureaus. The support team developed a farm scale investigation into the application of Normalised Differential Vegetation Index (NDVI) scanning as a supportive tool in affective fertiliser application. Project success was determined by savings made from effective fertiliser management and increases in barley crop yield and quality.

The trial

The use of NDVI crop scanning technology was assessed as a tool for managing barley crop nitrogen requirements for optimal yield and quality, across soil types and rotation in the northern Mallee. This trial followed a simple format:

- Narrow strips of urea ammonium nitrate were applied at 200L/ha at the 2-3 leaf stage of the crop.
- A hand held "Greenseeker" device was used to compare NDVI readings between N application strips and control areas.
- The NDVI results indicated that there was adequate N available to the crop on all soil types, and therefore no chemical fertiliser application was required.

- 6 additional 20kg/ha and 50kg/ha Urea strips were applied over different soil types to test whether the predictive advice was correct
- Crop yield and quality were compared to NDVI results between fertiliser treatments
- The trial was implemented over the 2015 cropping season.
- Results were promoted through spring crop walks, Mallee Sustainable Farming Harvest Reports and local farm trial newsletters



NDVI Trial paddock showing initial 2015 test strips and 2013 break crop treatments. One Nitrogen test strip was included for each break crop treatment

Outcomes

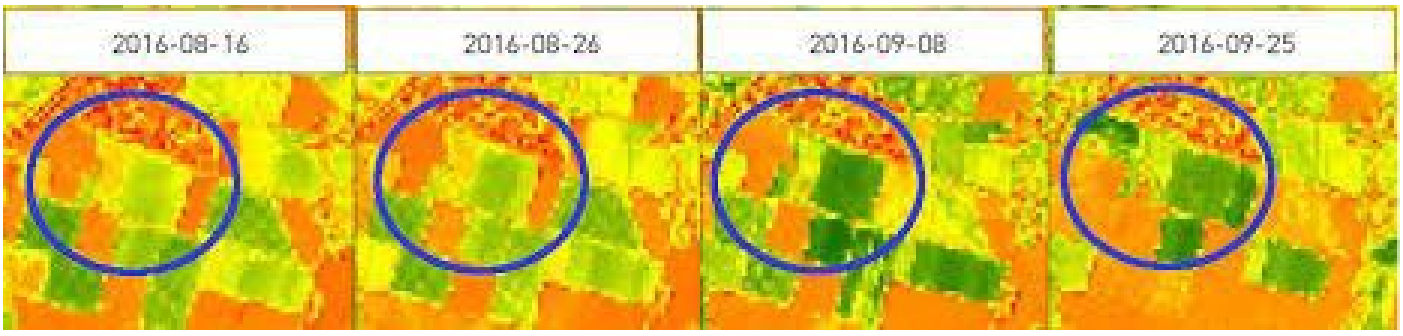
Results showed no yield advantage of higher N application at either 20 kg/ha or 50kg/ha of post urea. These results show:

- The NDVI technology accurately predicted no extra N was required to increase yield quality or quantity therefore decreasing input costs and unnecessary fertiliser application capable of forming greenhouse gases and other pollutants.
- Farm gate savings of approximately $28/ha by not applying a standard 50kg/ha urea. Technologies such as NDVI can inform decisions about fertiliser application relevant to the range of soil types and crops within one farming system.
- Approximately $28, 000 contribution to farm profitability, by not applying unnecessary urea to areas sown to barley on an average northern Mallee farm of 1000ha. This technology could potentially be used on wheat or other crops, which could also potentially increase farm profitability

The future

As satellite technologies develop, the future capacity to achieve NDVI reading from satellite imagery improves. At present this method can be unreliable due to the frequency of satellite passes and the problems of cloud cover. The development and use of NDVI cameras mounted on unmanned aerial vehicles (UAVs) has potential benefit to Mallee farmers in the near future. Refer below image.

Farmer Comment by Robin Schaefer of Bulla Burra: *"This NDVI technology is fairly simple to apply, and give us more clarity in making nitrogen decisions. This has meant a more effective use of N fertiliser across our properties, and allowed us to better manage our financial risk."*



Location:

Alawoona, South Australian Mallee

Region:

South Australian Murray-Darling Basin

Industry:

Dryland grain growing

Property size:

10800ha

Issue:

Understanding and evaluating the applications of new technologies within current farming systems for more efficient nitrogen management.

Outcomes:

Highlights the value of using technology to assist with on-farm decision making, farm gate savings, and increased environmental benefits from reducing unrequired chemical inputs

Farm gate savings:

$28/Hectare, Potentially $28000 over 1000 hectares (an average area planted to barley on northern Mallee properties)

Delivery:

The Regional Landcare Facilitator program, delivered through the Natural Resources SA Murray-Darling Basin, supported the Loxton and Browns Well Agriculture Bureaus to implement the trial, and monitor and promote the results over a two year period. Insight Extension for Agriculture were engaged for expert advice and project delivery.

Agricultural Bureau of South Australia Inc. PATHWAY TO IMPROVEMENT

Australian Government | National Landcare Program

Regional Landcare Facilitator

Government of South Australia
South Australian Murray-Darling Basin Natural Resources Management Board

Natural Resources SA Murray-Darling Basin

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