Project Catalyst Final Report

Proximal Sensing of Nitrogen

Grower Information	
Grower Name:	Wayne Dal Santo
Entity Name:	DalSanto Farming Co
Trial Farm No/Name:	BKN-00327A
Mill Area:	Invictor
Total Farm Area ha:	367ha
No. Years Farming:	
Trial Subdistrict:	Clare
Area under Cane ha:	337.4

Trial Status

- Completed

Background Information

Aim:
This project aims to investigate the use of Proximal sensors to determine crop N uptake infield.

Background: (Rationale for why this might work)

Proximal sensors have been used for many years in horticultural industries to determine crop N uptake. It is thought that this technology can be used within cane, along with satellite imagery to validate N management zones. This has the potential to facilitate structured N application across blocks for site specific management of N.

Potential Water Quality Benefit:
Once data is collected and validated it will be possible to determine high and low yielding zones to zonally apply Nitrogen which can lead to a net reduction of the amount of Nitrogen applied and therefore the amount that can potentially leave the field and enter the Great Barrier Reef

Expected Outcome of Trial:
The expected outcome of this trial is that we will be able to use proximal sensors to distinguish between high and low yielding zones and effectively manage nitrogen surrounding that.

Service provider contact: Farmacist

Where did this idea come from: Advisor

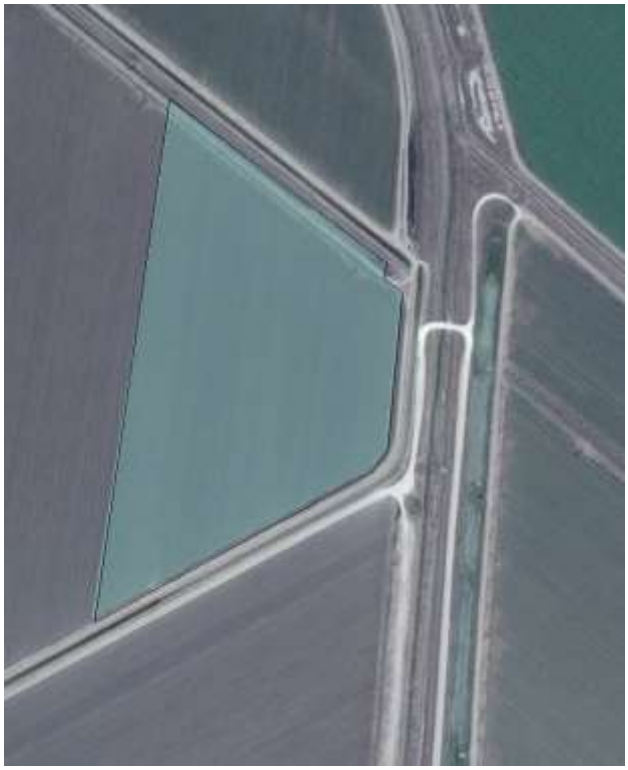
Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**September 2016**	• Trial was implemented with 4 different rates (223N, 201N, 181N, 162N) along with a 50meter strip of 100N
Stage 2	**September 2017**	• Harvest trial site • Analysis of trial data
Stage 3	**October 2017**	• Reapplication of trial for year two data
Stage 4	**October 2018**	• Harvest trial site • Analysis of trial data

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q253 1st Ratoon
Trial Block No/Name:	BKN-00327A-5-8
Trial Block Size Ha:	10.38
Trial Block Position (GPS):	147.196619 -19.825188
Soil Type:	2Ugc Bottom Half of Block, 2Uge top half of block

Block History, Trial Design:

	Rep 1				Rep 2				Rep 3			
245kg/ha 100N	Treatment 1 630 kg/ha	Treatment 2 560 kg/ha	Treatment 3 500 kg/ha	Treatment 4 440 kg/ha	Treatment 2 560 kg/ha	Treatment 3 500 kg/ha	Treatment 1 630 kg/ha	Treatment 4 440 kg/ha	Treatment 1 630 kg/ha	Treatment 4 440 kg/ha	Treatment 2 560 kg/ha	Treatment 3 500 kg/ha

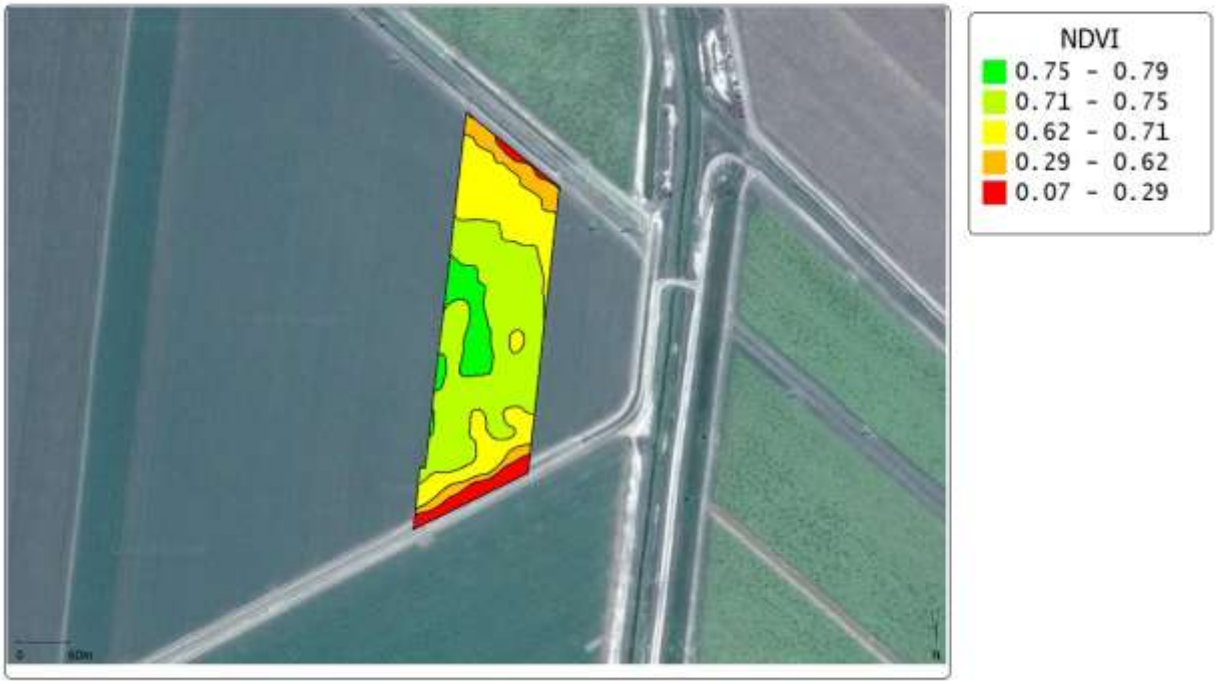


Treatments:
T1 – 220N
T2 – 200N
T3 – 180N
T4 – 160N
T0- 100N

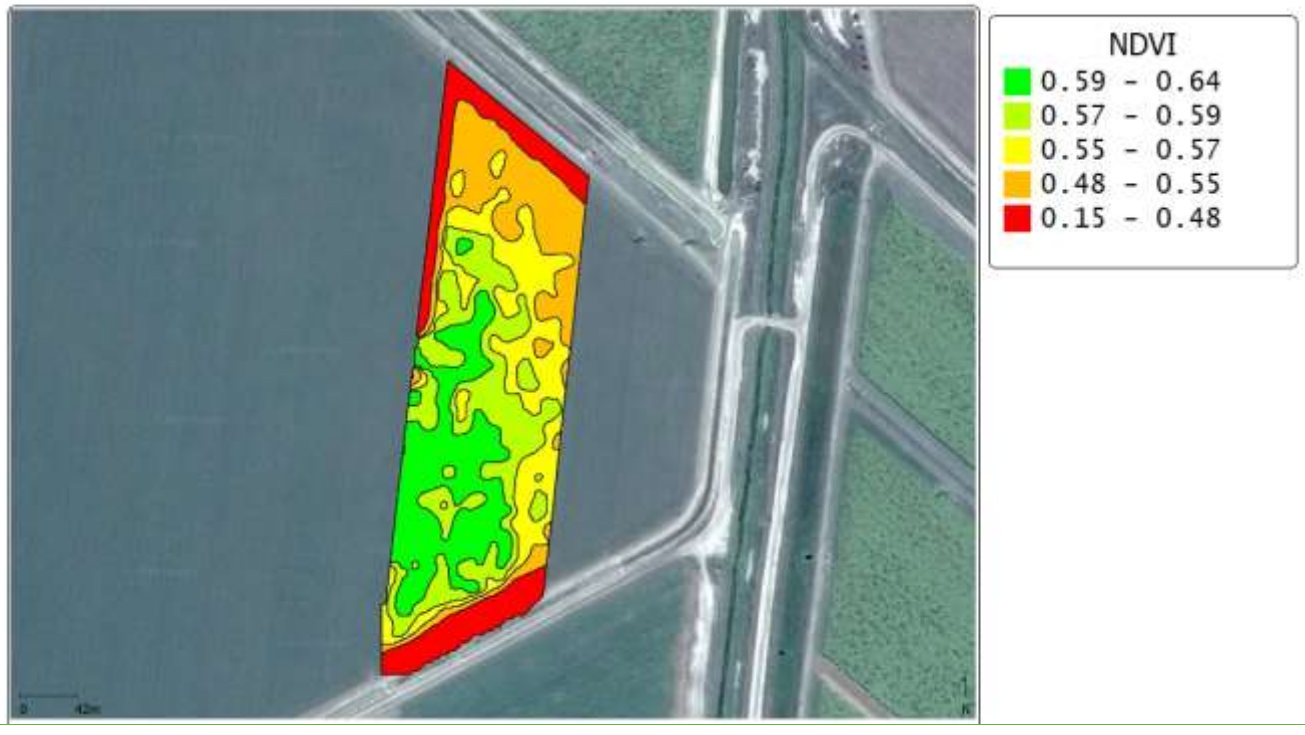
Results:

Sensing has occurred over 2017 and 2018 with numerous methods including using a parrot sequoia and ground based OptRx Sensors.

Dalsanto- Parrot Sequoia NDVI reflectance values

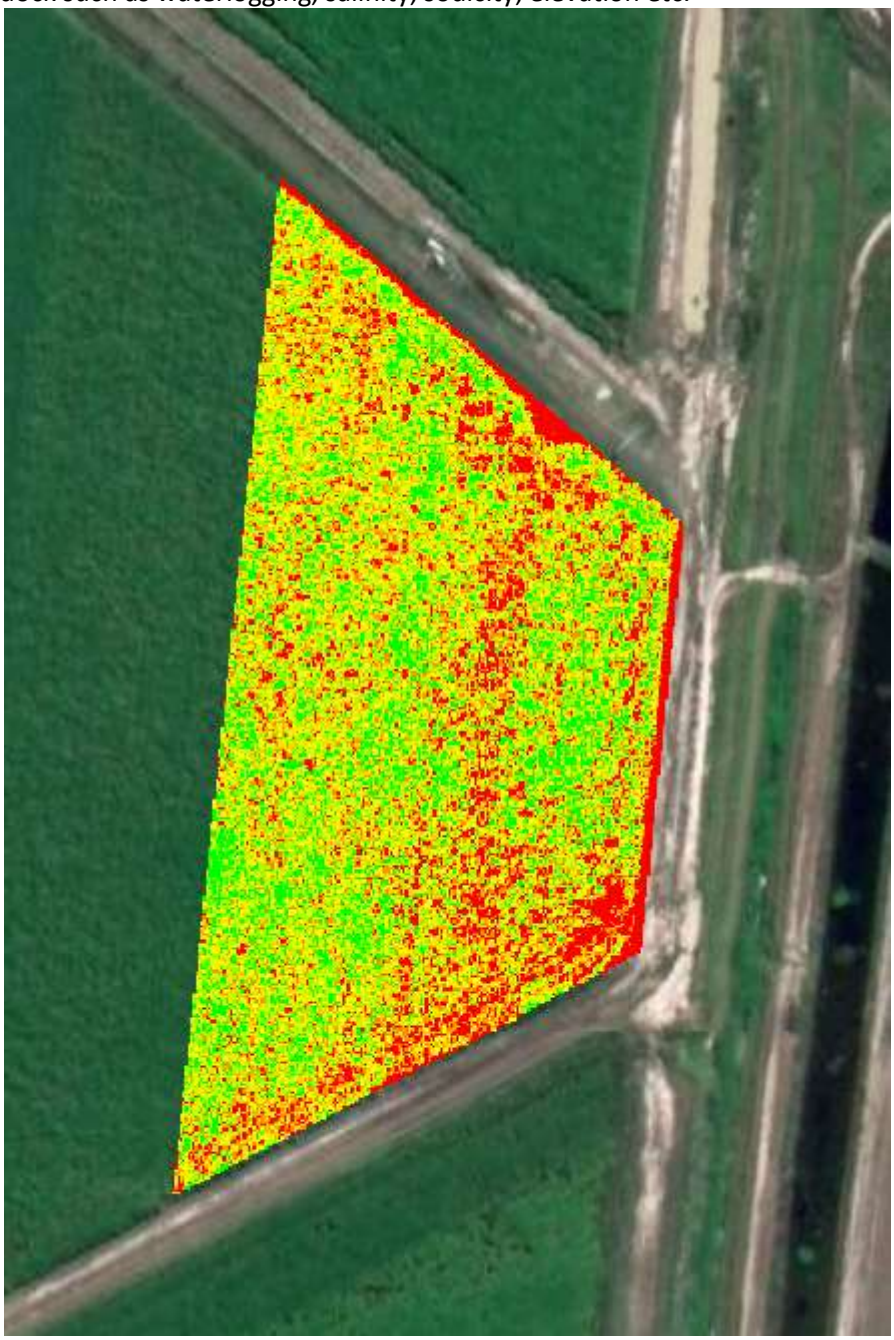


Dalsanto OptrX- NDVI reflectance values



There has been a good correlation between biomass accumulation and the NDVI readings. It was also identified that the paddock has been waterlogged on the bottom end of the paddock, however it did not show any correlation with the individual nitrogen rates applied to the paddock.

The below imagery from April 2018 also showed some in crop variation however these were not related to any of the different nitrogen rates that were applied. This highlights that NDVI readings can be affected by other issues in the paddock such as waterlogging, salinity, sodicity, elevation etc.



The trial was not reimplemented for a third harvest season due to the lack of results in the first two seasons.

Conclusions and comments

Advantages of this Practice Change:
Advantages of using this practice include visually inspecting what is happening to your cane mid season. Whereas normally growers are unaware of what is happeneing within their paddocks from canopy closure till harvest.

Disadvantages of this Practice Change:
The disadvantages of this practice include that it is not able to be used for nitrogen management as it is only able to pick up 0N plots, not other rates of nitrogen. Drone imagery can only be collected on either full sun days or full cloud cover with no rain or wind. However ground based sensors can only get on the paddock once it is dry which is difficult in an irrigated area.

Will you be using this practice in the future: Using drones to detect nitrogen is not a viable option at this point in time. While this may change in the future currently not enough information is available to add it to our tool kit for managing nitrogen. However drone's still have their place for identifying other issues in growth which can then be ground truthed to verify the problems.
% of farm you would be confident to use this practice : 0%