Project Catalyst Final Report

Proximal Sensing of Nitrogen

Grower Information	
Grower Name:	Richard Kelly
Entity Name:	LAWRENCE KELLY FAMILY TRUST
Trial Farm No/Name:	BKN-07333A
Mill Area:	Kalamia
Total Farm Area ha:	97.44ha
No. Years Farming:	
Trial Subdistrict:	Maidavale
Area under Cane ha:	97.44ha

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

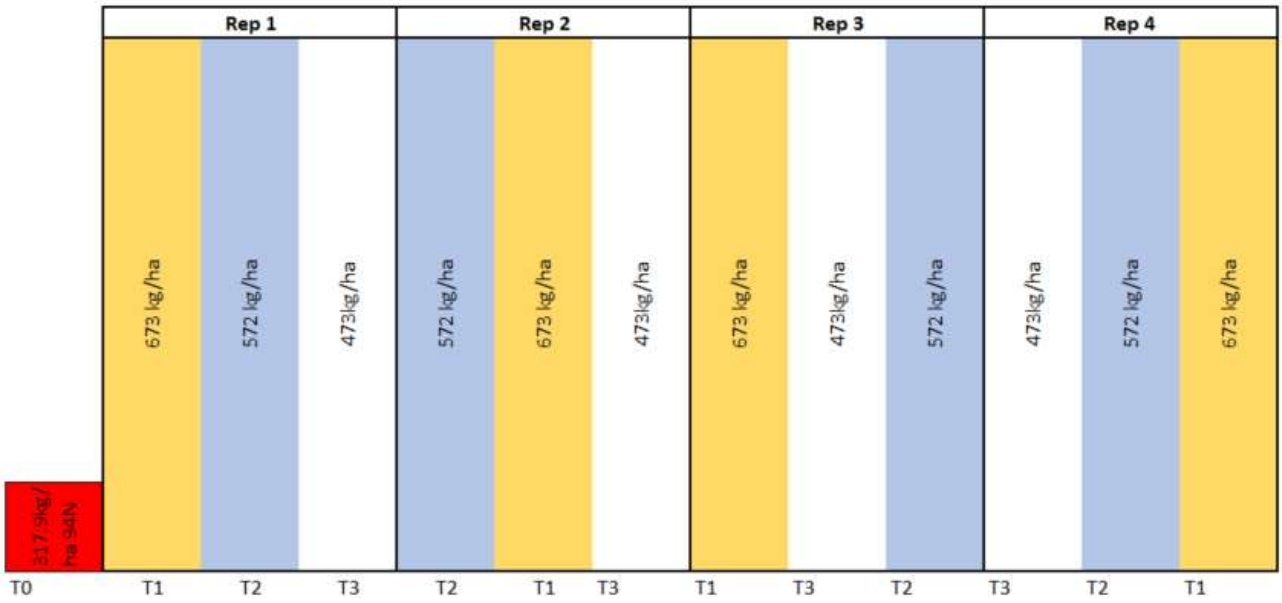
Where did this idea come from: Advisor

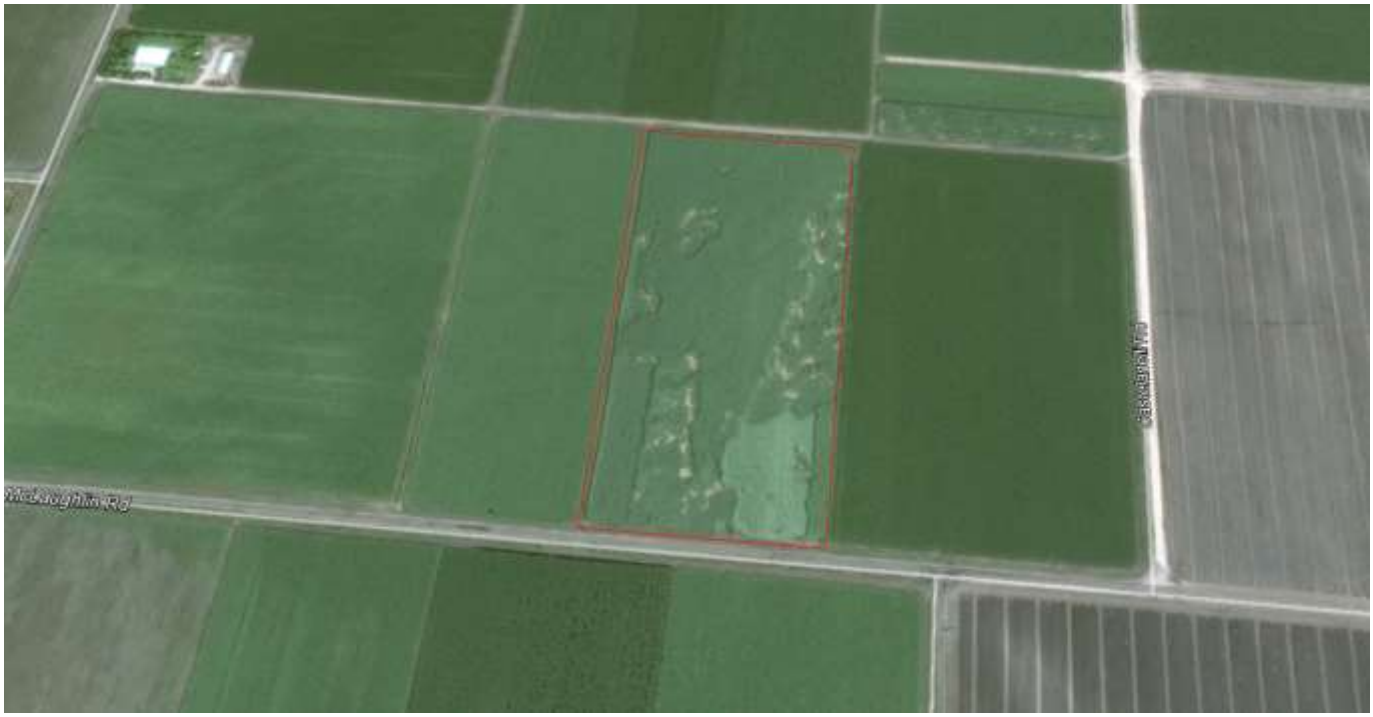
Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**September 2016**	• Trial was implemented with 3 different rates (206N, 164N, 147N) along with a 50meter strip of 100N
Stage 2	**September 2017**	• Harvest trial site • Analysis 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
Stage 5	**November 2018**	• Reapplication of trial for year three data
Stage 6	**December 2019**	• Harvest trial site • Analysis of trial data • Prepare final report.

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q240 1st Ratoon
Trial Block No/Name:	BKN-07333A-27-2
Trial Block Size Ha:	5.96
Trial Block Position (GPS):	147.344194 -19.618179
Soil Type:	RUgc

Block History, Trial Design:



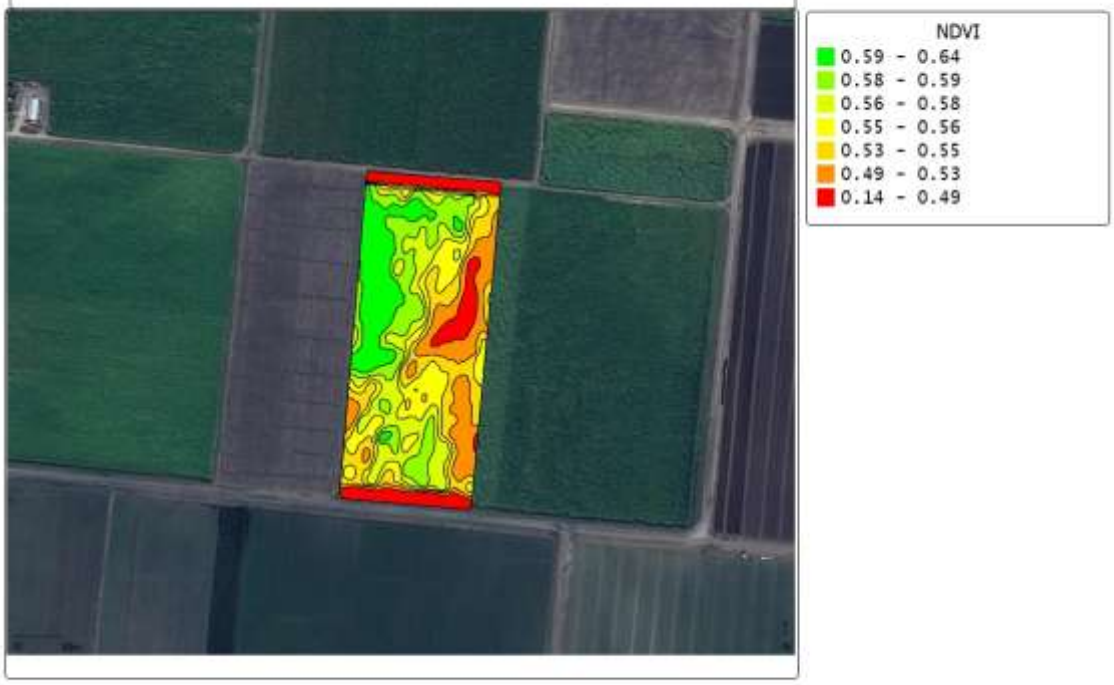


Treatments:
T1 – 206
T2 – 164N
T3 – 147N
T0- 100N

Results:

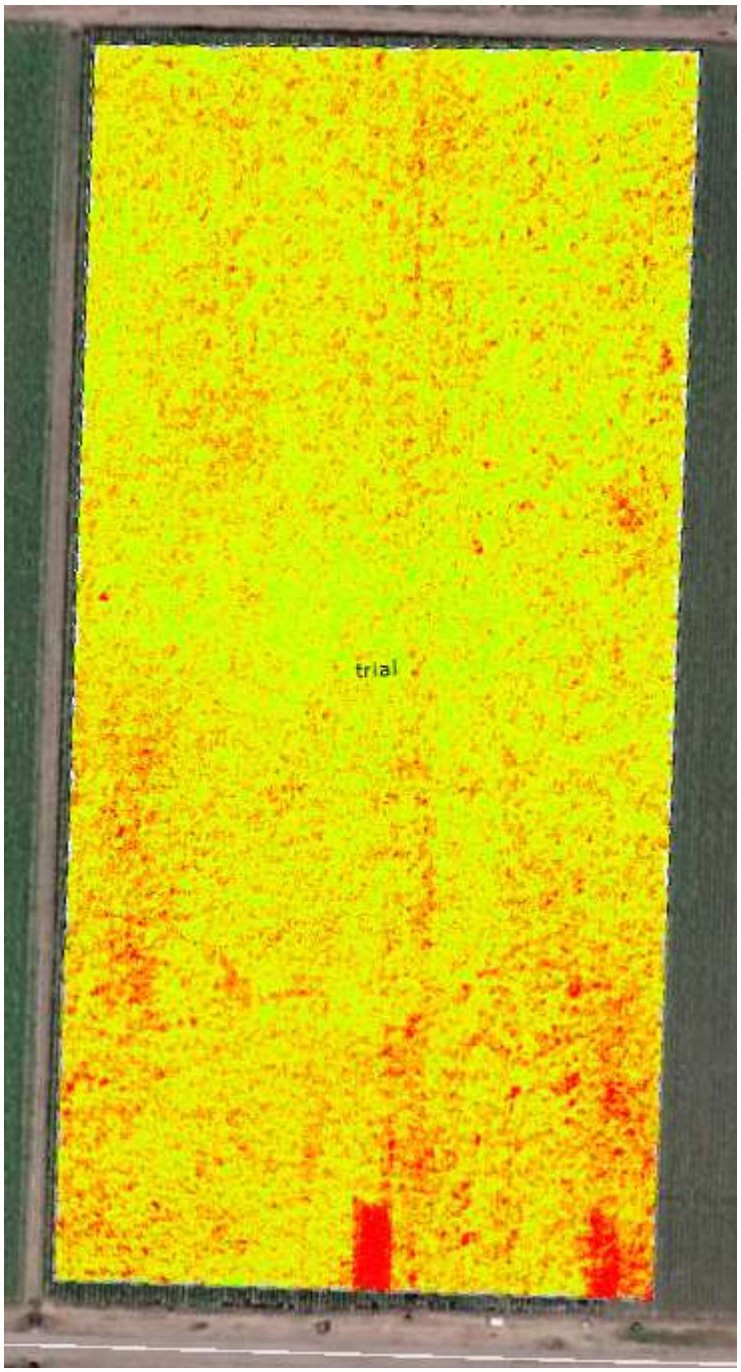
Kelly- OptrX NDRE reflectance map

Kelly- Greenseeker NDVI reflectance map



Sensor collation has begun and been completed for two years. Data shows strong correlation between both Greenseeker and OptRx sensors which also correlates well with Parrot Sequoia drone imagery. While individual nitrogen rates are not distinguishable, it is able to pick up differences in biomass and distinguish between yield management zones.

The latest imagery is from 2/4/2019 and can be seen below.



This shows very clearly the 0N plots that are present in the paddock. However the other nitrogen rates are not visible in the NDVI. This is consistent with the other data we have gathered which suggests that only severly stressed 0N cane is visisble in imagery.

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%