

Project Catalyst Report

Nitrogen Use Efficiency on Q240

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

- Continuing

Background Information

Aim:

This project aims to investigate different Nitrogen rates to determine the Nitrogen Use efficiency of some of the newer varieties in the Burdekin.

Background: (Rationale for why this might work)

There has been much anecdotal data to suggest that some of the newer varieties (Q240, Q253 and Q232) have the potential to be much more efficient users of Nitrogen. This has been found by growers who have suffered CCS losses when applying high rates of N. To verify this, we need to find what %N reduction can be achieved to maintain yield in varieties that have shown to be more efficient in N utilisation such as Q240, Q253 and Q232. As a result there is the potential to reduce amount of N applied, improve sugar production, reduce costs and improve water quality.

Potential Water Quality Benefit:

As the presence of Q240, Q253 and Q232 will be increasing in the future, if we can work out an optimised N rate that will give us both high tonnes and increased sugar accumulation there is the potential for significant reductions of N across the region. Henceforth, there will be a reduction in the amount of Nitrogen that is leaving our catchment and entering the Great Barrier Reef.

Expected Outcome of Trial:

It is expected that there will not be a reduction in yield tc/ha however there may be a CCS increase in the lower rates. Water quality leaving these locations will be improved.

Service provider contact: Farmacist

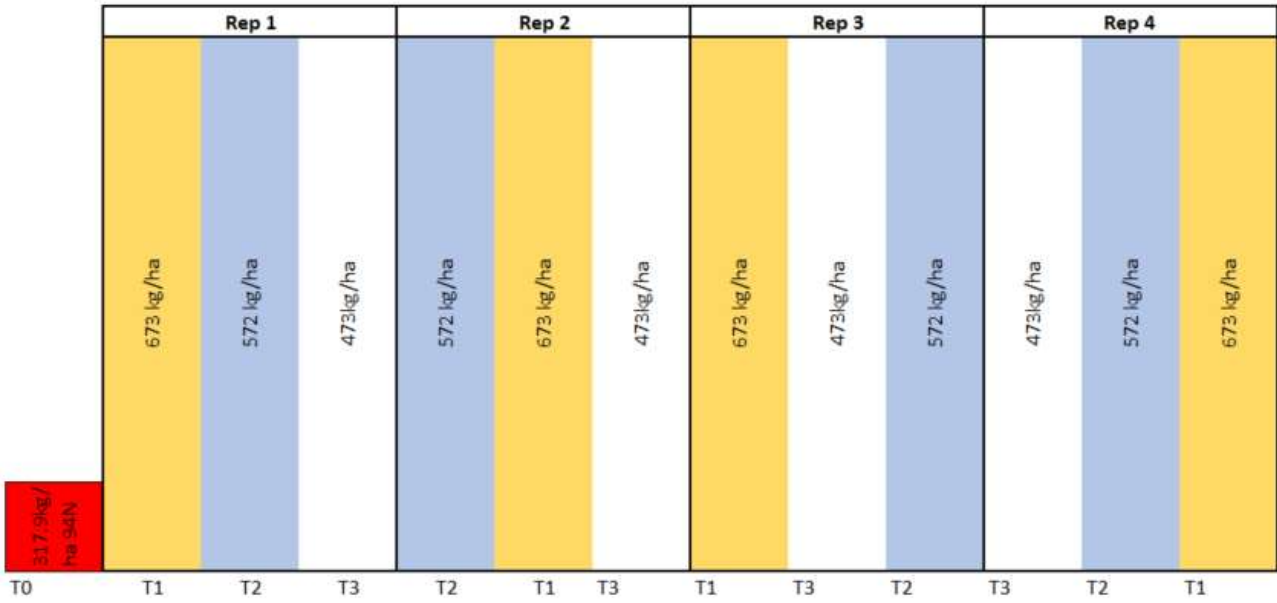
Where did this idea come from: Advisor

<u>Plan - Project Activities</u>	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	September 2016	<ul style="list-style-type: none"> • Trial was implemented with 3 different rates (206N, 164N, 147N) along with a 50meter strip of 100N
Stage 2	September 2017	<ul style="list-style-type: none"> • Harvest trial site • Analysis of trial data
Stage 3	October 2017	<ul style="list-style-type: none"> • Reapplication of trial for year two data
Stage 4	October 2018	<ul style="list-style-type: none"> • Harvest trial site • Analysis of trial data
Stage 5	November 2018	<ul style="list-style-type: none"> • Reapplication of trial for year three data
Stage 6	December 2019	<ul style="list-style-type: none"> • Harvest trial site • Analysis of trial data • Prepare final report.

Project Trial site details

Trial Crop:	Sugarcane
Variety:	Q240
Rat/Plt:	1 st 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:



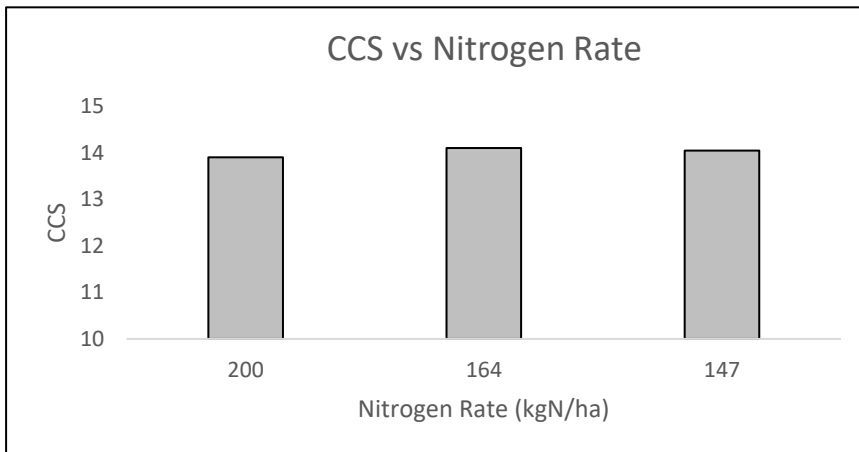
Treatments:

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

Results:

First year Results:

N Rate	Treatment	TC/HA	CCS	TS/HA
200N	T1R1	162.8435	13.6	22.14671
	T1R2	156.8347	14.2	22.27052
	T1R3	150.2979	14.2	21.3423
	T1R4	138.1271	13.7	18.92341
164N	T2R1	154.7197	13.9	21.50603
	T2R2	155.0194	14.2	22.01276
	T2R3	150.5513	14.3	21.52883
	T2R4	149.4717	14.1	21.07551
147N	T3R1	157.7436	14	22.0841
	T3R2	152.9082	14	21.40715
	T3R3	153.3483	14.3	21.9288
	T3R4	138.2964	13.9	19.22321



First year results did not show a statistical difference in tc/ha, CCS or ts/ha with yield results ranging from 138tc/ha to 162tc/ha.

This is unsurprising considering there may be residual Nitrogen available in the soil from the plant cane crop. This block also only received an 8 week dry down due to late rainfall before the crushing.

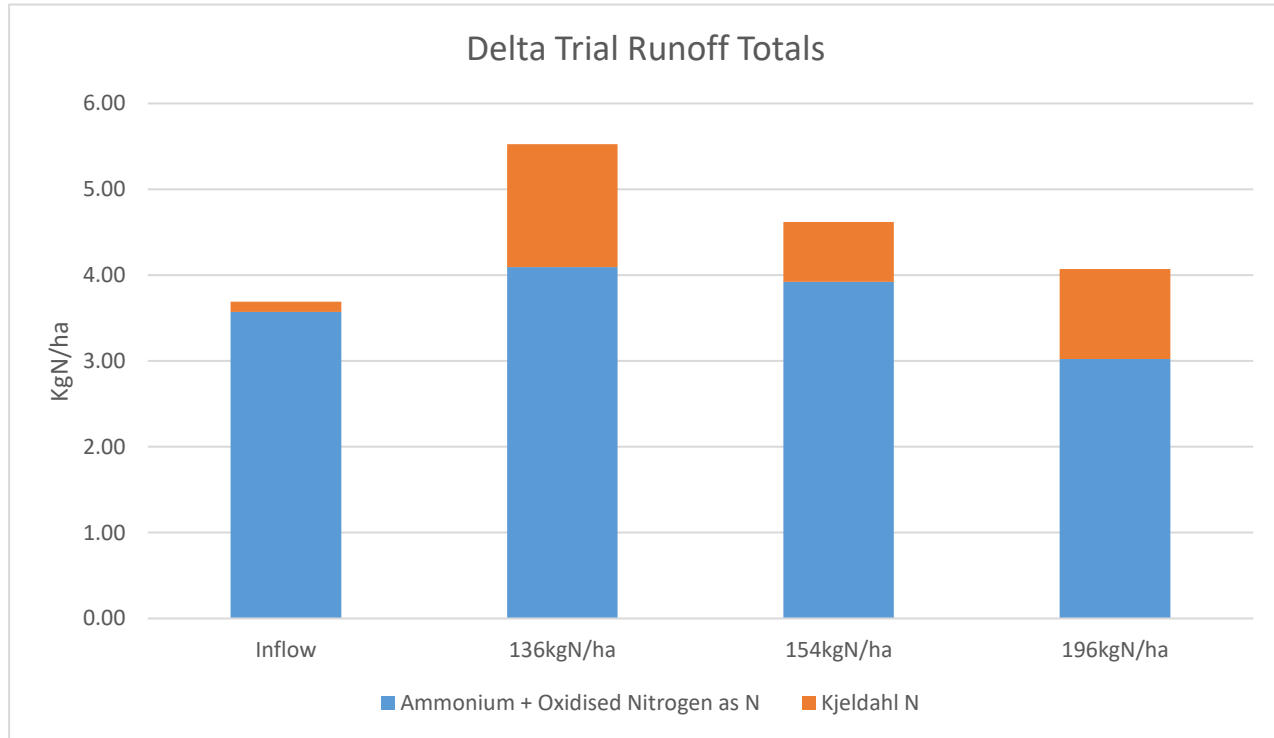
The trial has been re-established for a second year with harvest due in the crushing of 2018.

Year 2 results:

The year 2 trial also had water quality monitoring conducted using KP samplers to assess the effects of different nitrogen rates on their runoff characteristics. KP samplers were installed in each treatment in two of the replications.

Data was gathered over 8 events including 7 irrigation events and 1 rainfall.

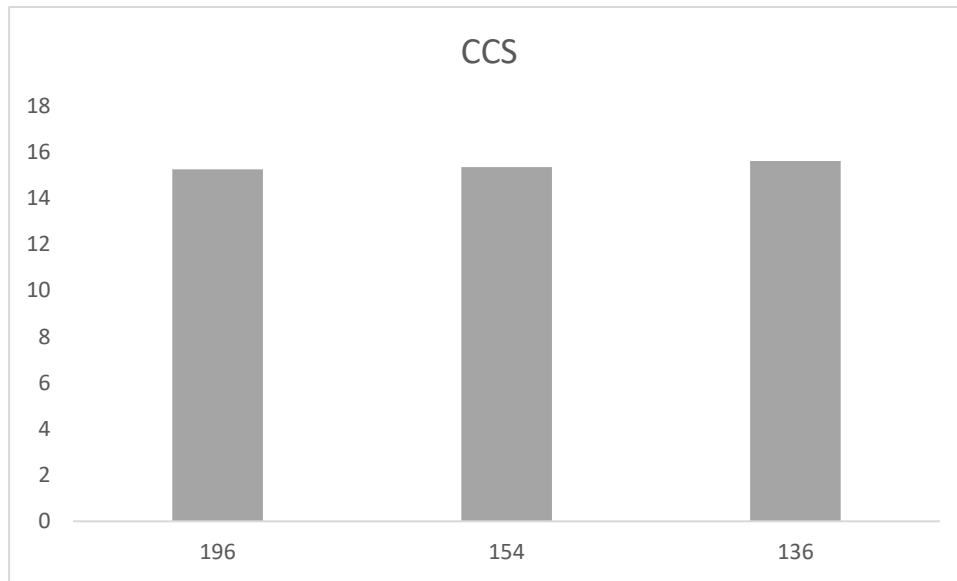
The results are as follows below:



The results were unexpected compared to the expected outcome with the highest Nitrogen rate having the lowest runoff amounts, and the lowest Nitrogen rates showing the highest runoff. We expect this is due to the soil type (loam) and its characteristics that may include deep drainage. The runoff figures of the site are very low in comparison to other trial sites with similar Nitrogen rates, therefore we expect much of the losses in this paddock are occurring either as deep drainage or gaseous losses such as volatilization or denitrification.

N Rate	Treatment	TC/HA	CCS	TS/HA
196N	T1R1	117.0	14.5	17.0
	T1R2	125.1	14.8	18.5
	T1R3	126.2	15.7	19.8
	T1R4	130.1	16.0	20.8
154N	T2R1	123.5	15.1	18.6
	T2R2	125.2	15.3	19.2
	T2R3	129.6	15.1	19.6
	T2R4	128.6	15.9	20.4
136N	T3R1	129.6	15.5	20.1
	T3R2	125.3	15.9	19.9
	T3R3	124.7	15.9	19.8
	T3R4	127.2	15.2	19.3

In 2018 there was no significant difference between tc/ha, ccs or ts/ha. With yield results ranging from 117tc/ha to 130tc/ha.

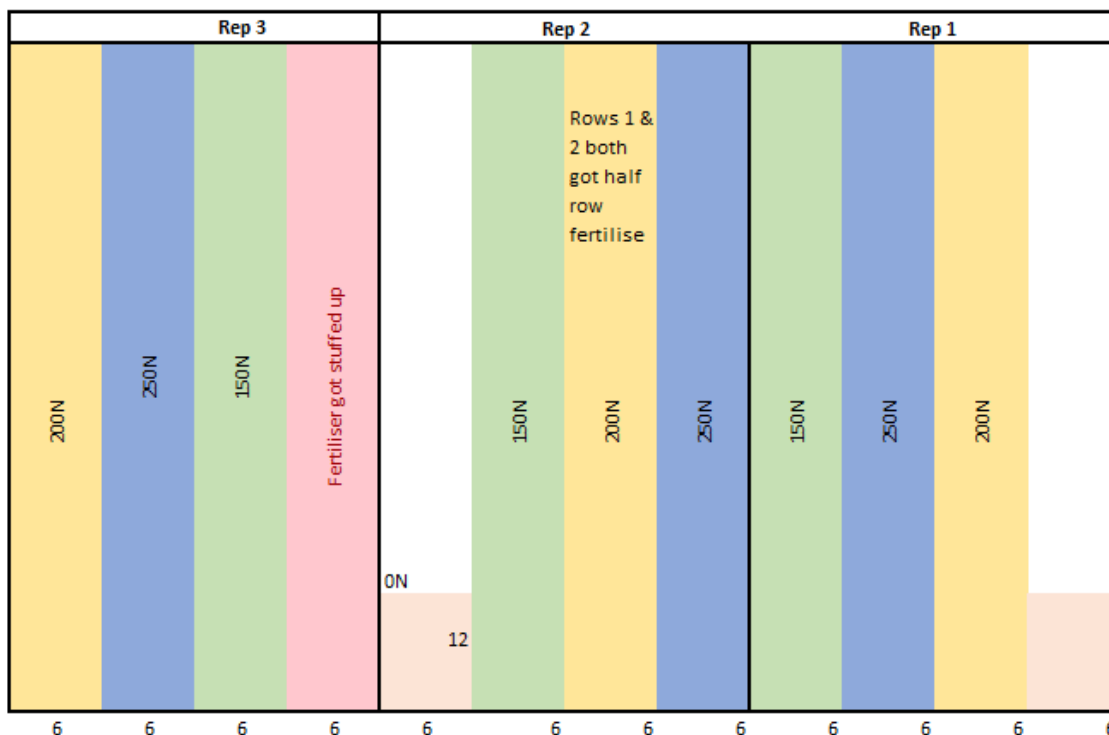


There was no real trend in increasing CCS while reducing nitrogen rates, however it did show that it was possible to reduce nitrogen rates and maintain the yield within the paddock.

The trial was implemented in 2018 for 2019 harvest however some major changes did occur in the layout, treatments and objective of the trial. Water Quality was no longer continued however gas sampling has now begun.

Trial Design;

The trial has been reduced to 3 treatments within the paddock, however has been moved to the other side of the paddock so as not to pick up any treatment effects from the previous two years.



Throughout replicates 1 and replicates 2 there are two types of greenhouse gas samplers that are been used to monitor the gases that are being produced from the fertiliser. There are both automatic chambers, as well as manual samplers that require frequent sampling throughout the duration of the trial.

The aim is to establish the differing amounts of greenhouse gases that are coming off the different fertiliser rates.

The trial will have continual monitoring with 11 greenhouse gas sampling events already occurring since harvest with many more before the end of the season.

Harvest will occur in 2019.



Conclusions and comments

Advantages of this Practice Change:

Disadvantages of this Practice Change:

Will you be using this practice in the future:

% of farm you would be confident to use this practice :