Catalyst Project FINAL Report

Grower Information	
Grower Name:	Daniel Pantovic
Entity Name:	MD & Pantovic
Trial Farm No/Name:	F4044, F1425, F1580
Mill Area:	Tully Sugar Mill
Total Farm Area ha:	282.72 Ha
No. Years Farming:	30 +
Trial Subdistrict:	Bilyana
Area under Cane ha:	282.72 Ha (including fallow)

Background Information

Aim: Evaluate the benefits of lignite in improving nutrient use efficiency for NPK in sugarcane.

Background: (Rationale for why this might work)
There has been a lot of research conducted in the horticultural sector with lignite to assist with the stabilization of nitrogen, as well as phosphorus and potassium in the soil profile, improving plant uptake and NUE.

Due to the nature of the amount of biomass produced by a sugarcane crop, the nutrient requirements for the whole crop is placed subsurface in a single pass, which has the potential for a quantity of nutrients to be lost to the environment through leaching or as a gas.

Potential Water Quality Benefit:
If the lignite, when coblended as a granule with Urea, is able to stabilize the nitrogen in the environment for a loger period of time that Urea alone, and improved NUE will be gained and the potential loss of nutrients to the environment will be reduced.

Expected Outcome of Trial:
A greater NUE for N, P and K, thorugh reduced fertilizer rates without loss of yield or mining of the soil.

Service provider contact:
Charissa Rixon – T.R.A.P. Services

Where did this idea come from:
Service provider

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**Oct- Dec 2016**	Identify suitable paddock Peg out trial and apply treatments
Stage 2	**Jan- Sep 2017**	Biomass & Tissue sampling 3, 6 and 9 months after application (MAA)
Stage 3	**Sep – Dec 2017**	Hand harvest of trial plots Commercial harvest of trial Soil Sampling from each plot Analyse and Report on Data Refertilize Trial
Stage 4	**Jan- Sep 2018**	Biomass & Tissue sampling 3, 6 and 9 months after application (MAA)
Stage 5	**Sep – Dec 2018**	Hand harvest of trial plots Commercial harvest of trial Soil Sampling from each plot Analyse and report on Data Refertilize Trial
Stage 6	**Jan- Sep 2019**	Biomass & Tissue sampling 3, 6 and 9 months after application (MAA)
Stage 7	**Sep – Dec 2019**	Hand harvest of trial plots Commercial harvest of trial Soil Sampling from each plot Analyse and report on Data Refertilize Trial

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q208 (1R 2017 Harvest)
Trial Block No/Name:	F4044 Blk 02B
Trial Block Size Ha:	11.39 Ha
Trial Block Position (GPS):	18.1123°S 1459153°E
Soil Type:	Thorpe

Block History, Trial Design:

Small Plot Trial – RCB Design.
10 treatments x 4 replications

410 T9	409 T10	408 T2	407 T1	406 T8	405 T7	404 T6	403 T3	402 T5	401 T4
310 T3	309 T6	308 T4	307 T5	306 T7	305 T1	304 T10	303 T2	302 T9	301 T8
210 T5	209 T7	208 T9	207 T3	206 T2	205 T4	204 T8	203 T1	202 T6	201 T10
110 T1	109 T8	108 T4	107 T10	106 T6	105 T3	104 T9	103 T2	102 T5	101 T7

↗N

Treatments:

1. **100% N P K BAU**
2. **75% N (Lignite/Urea) 100% P K**
3. **75% N (Urea) + 100% P K**
4. **50% N (Lignite/Urea) 100% P K**
5. **50% N (Urea) + 100% P K**
6. **75% N (Lignite/Urea) 75% P K**
7. **75% N (Urea) + 100% P K**
8. **50% N (Lignite/Urea) 50% P K**
9. **50% N (Urea) + 100% P K**
10. **UTC**

Results:

2017 HARVEST RESULTS

Treatment		Clean Stick 9MAF (t/ha)		Small Mill CCS 9MAF (%)		Sugar Yield 9MAF (t/ha)	
1	100% N P K BAU	84.3	a	14.423	-	12.08	-
2	75% N (Lignite/Urea) 100% P K	80.9	ab	14.825	-	12.00	-
3	75% N (Urea) + 100% P K	83.0	ab	14.070	-	11.68	-
4	50% N (Lignite/Urea) 100% P K	82.7	ab	14.340	-	11.79	-
5	50% N (Urea) + 100% P K	73.6	abc	14.558	-	10.81	-
6	75% N (Lignite/Urea) 75% P K	79.4	ab	14.943	-	11.86	-
7	75% N (Urea) + 75% P K	83.0	ab	14.678	-	12.22	-
8	50% N (Lignite/Urea) 50% P K	78.6	ab	14.955	-	11.75	-
9	50% N (Urea) + 50% P K	70.5	bc	14.410	-	10.15	-
10	UTC	62.8	c	14.470	-	9.14	-
p-value (p=0.05)		0.0057		0.9860		0.2848	
LSD (p = 0.05)		10.42		N/A[1]		N/A[1]	

2018 HARVEST RESULTS

Treatment		Clean Stick 9MAF (t/ha)		Small Mill CCS 9MAF (%)		Sugar Yield 9MAF (t/ha)	
1	100% N P K BAU	52.6	ab	18.047	-	9.45	-
2	75% N (Lignite/Urea) 100% P K	59.6	a	17.459	-	10.42	-
3	75% N (Urea) + 100% P K	58.6	a	18.025	-	10.59	-
4	50% N (Lignite/Urea) 100% P K	53.4	ab	18.305	-	9.78	-
5	50% N (Urea) + 100% P K	44.4	bc	18.058	-	7.65	-
6	75% N (Lignite/Urea) 75% P K	45.1	bc	18.307	-	8.25	-
7	75% N (Urea) + 75% P K	50.3	abc	17.824	-	8.99	-
8	50% N (Lignite/Urea) 50% P K	47.1	bc	18.200	-	8.56	-
9	50% N (Urea) + 50% P K	46.5	bc	17.870	-	8.28	-
10	UTC	41.4	c	18.199	-	7.53	-
p-value (p=0.05)		0.0161		0.2819		0.2555	
LSD (p = 0.05)		9.81		N/A[1]		N/A[1]	

N/A[1] = Not Applicable due to a p-value > 0.05

Conclusions and comments

The first and second season of trials showed no significant difference between treatments for CCS and Sugar yield.

However a spatial ANOVA of Clean Stick showed that at the 2017 harvest, all treatments had a significantly higher cane yield compared to the untreated control, except for a 50% reduction in N or 50% reduction in NPK when there was no lignite present. Where lignite was present and there was a 50% reduction in N or NPK the yield was significantly higher than the untreated and not significantly different to the growers standard practice.

In 2018 a spatial ANOVA of the clean stick yield showed that, the untreated control had a significantly lower yield compared to the growers standard practice, a 25% reduction in N with or without lignite and a 50% reduction of N when lignite was present. A 50% reduction in N without Lignite and a 25% or 50% reduction in NPK with or without lignite had a statistically similar yield to the untreated control.

This trial showed that the addition of lignite with the Urea did assist in maintaining yields when only the nitrogen rates were reduced by 50%, however the yeild difference was not significantly different.

Advantages of this Practice Change:
The results from this trial suggests that lignite may assist with maintaining higher yields when nitrogen rates are reduced.

Disadvantages of this Practice Change:
The disadvantage of this practice change is we have not been able to source a commerciallhy available source that is suitable for application through a standard cane stool splitter for subsurface application

Will you be using this practice in the future: Not until a commercially available formulation suitable for application becomes available and further trials are conducted. However interested in following this further if product becomes commercially available at an affordable level.

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