Catalyst Project Progress Report

Grower Information	
Grower Name:	Mario Raccanello
Entity Name:	Raccanello Family Trust
Trial Farm No/Name:	F8571
Mill Area:	Tully
Total Farm Area ha:	436.11
No. Years Farming:	30
Trial Subdistrict:	Riversdale
Area under Cane ha:	350

Background Information

Aim: Evaluating the application of anaerobically fermented fungal and bacterial strains and biological amendments to replace between 25% and 50% of Six Easy Steps (6ES) recommended N application without significant yield reduction.

Background: (Rationale for why this might work)

I want to focus on biological soil health and be less reliant on artificial inputs. The current profit/loss of sugarcane production is becoming increasingly challenging. The most practical way to improve the bottom line is the reduce input costs. If this can be done in a manner that also enhances the productive capacity of the land, I feel it can only be positive. The focus on soil health is vital because the current practices are causing detrimental effects on the soil. I have seen my father use similar practices, many years ago in bananas and have seen our soil deplete using so many artificial inputs.

Potential Water Quality Benefit:
"The more we can reduce artificial inputs the more likely we can reduce any form of run off."

This project wil test the viability of replacing a significant protion of inorganic N with biology. Focussing on both a reduction in the application of inorganic N (less N on = less N runoff) and improved nutrient/mineral cycling. It is expected to observe a decrease in bulk density (compaction) and an increase in soil carbon, both of which will result in less runoff (increased porosity and water holding capacity). Stabilization of the inorganic N applied by mixing it with potassium humate (done at fertilization application via Confidor injector infrastructure) is anticipated to increase the residence time of N in the profile. There is a strong emphasis on the need to be able to replace the inorganic N with another process in order to meet the plants nitrogen requirements whilst maintaining yield. A system that could enable us to reduce that application of inorganic N by up to 50% could be a game changer for water quality and the reef.

Expected Outcome of Trial:
To grow the same amount of cane (tons/ha and CCS) with less cost and soil improvements.

Service provider contact:
T.R.A.P. Services

Where did this idea come from:
The idea was always in me from watching my father grow bananas but at project catalyst I met other farmers and got talking with Gavin Kay that had the same idea and it snowballed from there.

Grower Comments:

Plan - Project Activities	Date : (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	**Nov-Dec 2016**	Harvest of Trial – 2nd Harvest Fertilizer Applied Soil samples collected to conduct chromas Data collection and analysis
Stage 2	**Jan- Mar 2017**	Biofertilizer Application
Stage 3	**Nov-Dec 2017**	Harvest of Trial – 3rd Harvest Fertilizer Applied Soil samples collected to conduct chromas Data collection and analysis
Stage 4	**Jan- Mar 2018**	Biofertilizer Application
Stage 5	**Nov-Dec 2018**	Harvest of Trial – 4th Harvest Fertilizer Applied Soil samples collected to conduct chromas All plots soil sampled to compare soil analysis between treatments Data collection and analysis

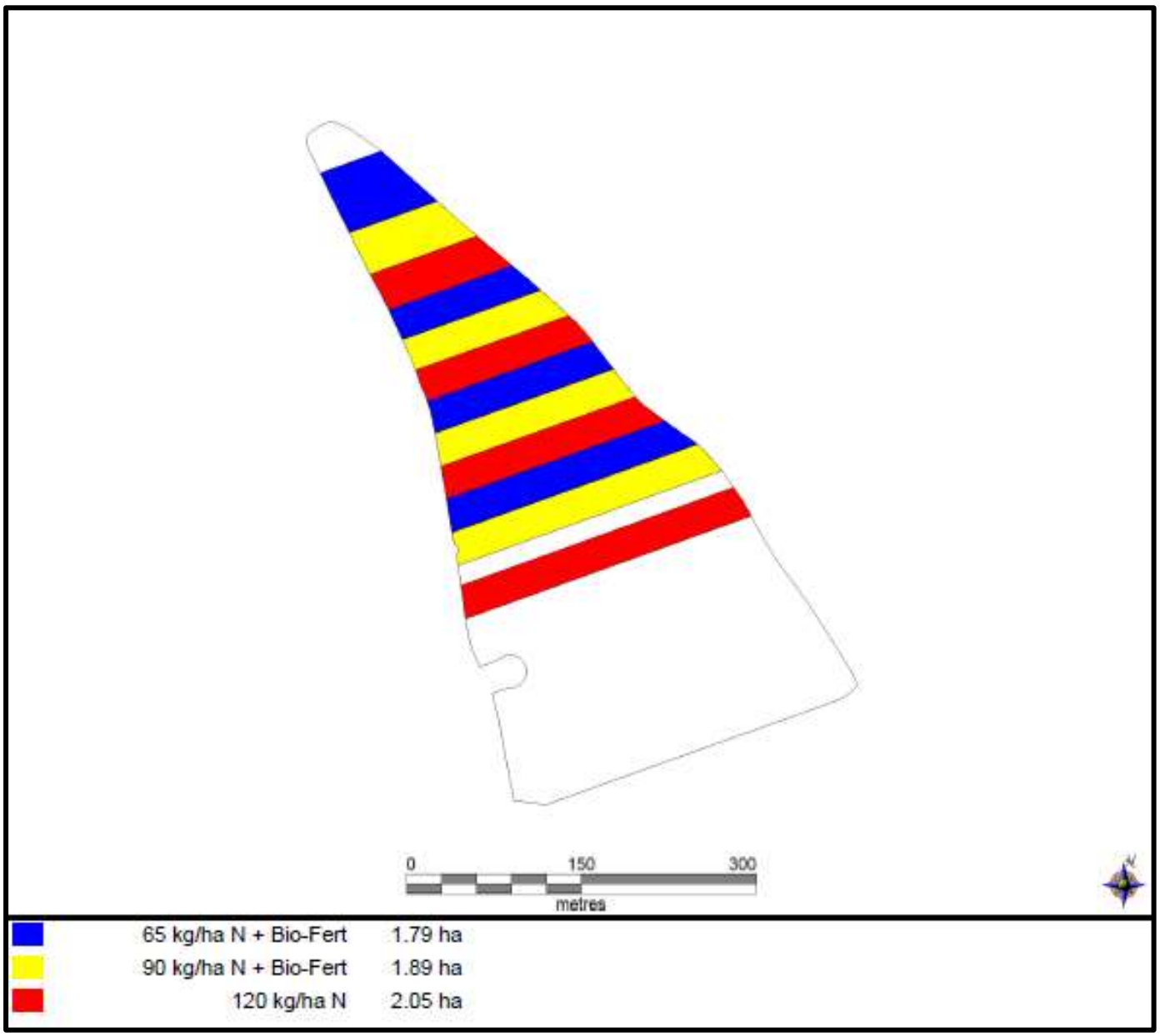
Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q200 1st Ratoon Onwards
Trial Block No/Name:	85
Trial Block Size Ha:	11.24
Trial Block Position (GPS):	S 17.9630 E 145.8220
Soil Type:	Tully Series

Block History, Trial Design:

Bananas for 5 years; plant cane 1 year, trial established in 1st ratoon crop.

Trial Design: 4 replicate randomised complete block (RCB) design.



Treatments:

1. BAU – 131 kg/ha of N (285 kg/ha Urea)
2. 75% BAU – 105 kg/ha of N + MAS Humus amendments (biofert/potassium humate)
3. 50% BAU – 65 kg/ha of N + Mas Humus amendments (biofert/potassium humate)

Results:

2015 Harvest

Treatment		tc/ha		CCS		ts/ha	
1	100% BAU	123.62	-	11.96	-	14.79	-
2	75% BAU + MAS Humus Amendments	122.12	-	11.92	-	14.55	-
3	50% BAU + MAS Humus Amendments	122.91	-	11.86	-	14.58	-
p-value (p=0.05)		0.7022		0.8258		0.8311*	
LSD (p = 0.05)		N/A		N/A		N/A	

*Analysis performed on Abbott's transformed data.

2016 Harvest

Treatment		tc/ha		CCS		ts/ha	
1	100% BAU	108.00	-	9.00	b	9.73	b
2	75% BAU + MAS Humus Amendments	109.38	-	10.48	a	10.48	a
3	50% BAU + MAS Humus Amendments	108.29	-	9.61	b	9.61	b
p-value		0.6604		0.0002		0.0078	
LSD (p = 0.05)		N/A		0.194		0.467	

2017 Harvest

Treatment		tc/ha		CCS		ts/ha	
1	100% BAU	107.11	a	12.01	c	12.83	-
2	75% BAU + MAS Humus Amendments	92.86	b	12.99	a	12.04	-
3	50% BAU + MAS Humus Amendments	101.50	a	12.39	b	12.57	-
p-value		0.0079		0.0005		0.2368	
LSD (p = 0.05)		6.771		0.2860		N/A	

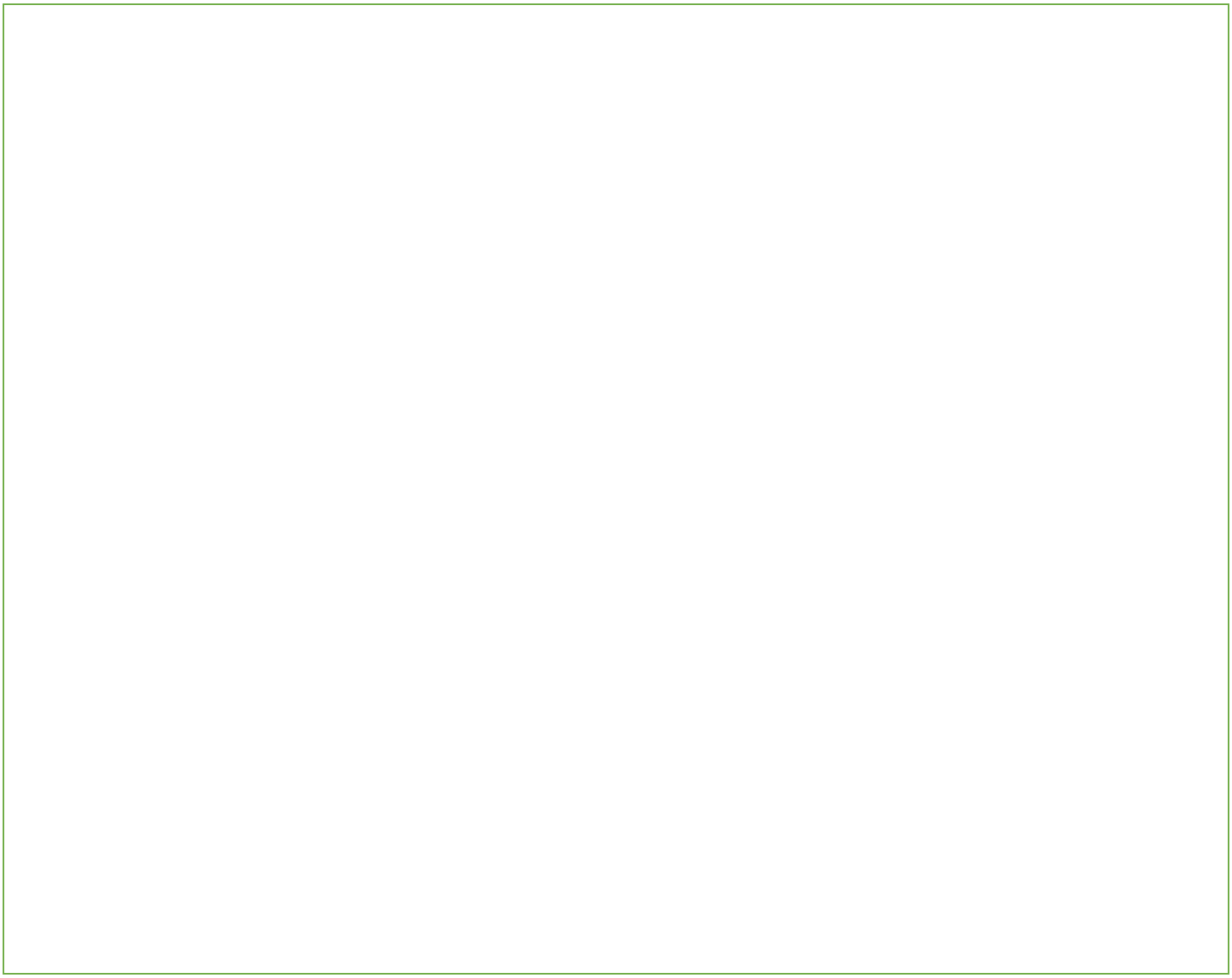
2018 Harvest

Treatment		tc/ha		CCS		ts/ha	
1	100% BAU	100.02	a	14.605	b	14.61	a
2	75% BAU + MAS Humus Amendments	89.76	b	15.288	a	13.72	b
3	50% BAU + MAS Humus Amendments	100.33	a	14.823	b	14.86	a
p-value		0.0010		0.0030		0.0069	
LSD (p = 0.05)		3.972		0.2858		0.580	

2015 -2018 Harvest Summary

Treatment		tc/ha		CCS		ts/ha	
1	100% BAU	109.86	-	11.89	-	13.00	-
2	75% BAU + MAS Humus Amendments	103.53	-	12.44	-	12.70	-
3	50% BAU + MAS Humus Amendments	108.26	-	11.99	-	12.91	-
p-value		0.2949		0.7556		0.9175	
LSD (p = 0.05)		N/A		N/A		N/A	

Results: Chromas



Conclusions and comments

Advantages of this Practice Change: Potential savings and improvements to water quality and soil.
Disadvantages of this Practice Change: The time spent investigating, designing and sorting out the system. "*One of the problems with being the guinea pig. The first lot of trials was very time consuming and things didn't work in the filtering of the biofert with lots of blockages and so-on. Application of the fertilizer was hard (very time consuming because of limited tank capacity). Now we have the filtering process right and have built a 5000L tanks. Total cost $51,000 plus harvesting and collection of tiral data. This does not count the time I have put in (approx.. 5 weeks work).*"
Will you be using this practice in the future: Yes with necessary modifications.
% of farm you would be confident to use this practice :

Appendix I – Trial Diary

Date	Treatment 1	Treatment 2	Treatment 3
Aug-14	Plant Cane Harvested		
05-Aug-14	Stool Split with Fertilizer	Stool Split with Fertilizer + Humic Acid	Stool Split With Fertilizer + Humic Acid
27-Oct-14	Soil Samples taken for Chromatography		
02-Nov-14		Soil Dench/ spray 100l/ha CowBiol + 2 l/ha K-Humate + 1 l/ha Fish x2	
09-Nov-14 To 06-Dec-14		Spray 60 l/ha Biofert with Sulphates + 10l/ha LSDEK + 2 l/ha K-Humate + 1 l/ha Fish x 5	
10-Dec-14	Soil Samples taken for Chromatography		
16-Nov-15	1st Ratoon Cane Harvested		
19-Nov-15	Soil Samples taken for Chromatography		
25-Nov-15	Stool Split with Fertilizer	Stool Split with Fertilizer + Humic Acid	Stool Split With Fertilizer + Humic Acid
7-Dec-15		Soil Dench/ spray 100l/ha CowBiol + 2 l/ha K-Humate x 2	
14-Dec-15 To 31-Dec-15		700 L/Ha total - Spray 70 l/ha Biofert with Sulphates + 10 L/ha LSDEK + 2 l/ha K-Humate + 1 l/ha Power x 4	
		700 L/Ha total - Spray 70 l/ha Biofert with Sulphates + 10 L/ha LSDEK + 2 l/ha K-Humate + 1 l/ha Power Fish + 20 l/ha Diazotrophics + 20 l/ha Mychorriza x 1	
16-Nov-16	2nd Ratoon Cane Harvested		
18-Nov-16	Soil Samples taken for Chromatography		
24-Nov-16	Stool Split with Fertilizer	Stool Split with Fertilizer + Humic Acid	Stool Split With Fertilizer + Humic Acid
26-Nov-16		700 L/ha Total Soil Dench/ spray 220 l/ha CowBiol + 2 l/ha K-Humate x 2	
2-Dec-16 To 16-Dec-16		700 L/Ha total - Spray 138 l/ha Biofert with Sulphates + 10 L/ha LSDEK + 2 l/ha K-Humate + 1 l/ha Power Fish x 3	
		700 L/Ha total - Spray 138 l/ha Biofert with Sulphates + 10 L/ha LSDEK + 2 l/ha K-Humate + 1 l/ha Power Fish + 20 l/ha Diazotrophics + 20 l/ha Mychorriza x 1	