

Project Catalyst Trial Report

Wilmar's sub-surface applied Mill By-Products trial

Grower Information

Grower Name:	Wilmar
Entity Name:	Wilmar
Trial Farm No/Name:	Sub-surface applied mill by-products trial F# 0848A
Mill Area:	Victoria
Total Farm Area ha:	6,600ha in total across Herbert, Burdekin, Proserpine and Plain Creek
No. Years Farming:	9 years since becoming Wilmar Sugar in 2010.
Trial Subdistrict:	Orient
Area under Cane ha:	1012.15 ha @ Farm# 0848

Background Information

Aim:

This project aims to investigate the use of varying rates of mill mud and ash banded sub-surface into the planting line, and whether transporting the mill by-products is economically viable, when the paddock is outside the traditional mill truck transportation area.

Background: (Rationale for why this might work)

Mill by-products have traditionally been used as an ameliorant to improve soil conditions and as a source of nutritional value. By banding the mill by-products sub-surface into the planting line, the benefits are localised to the growing region of the soil and not lost to run off due to heavy rainfall events. Furthermore, banding the mill by-products means that less is required to be transported. This may reduce costs associated with transporting to areas outside the usual region of transportation by the mill trucks.

Potential Water Quality Benefit:

Banding mill by-products sub-surface reduces the risk of loss to run off to the Great Barrier Reef. This is particularly important regarding phosphorous.

Expected Outcome of Trial:

That the varying rates of mill by-products will have a positive impact on productivity. Though the rates in this trial are much lower than the commercially applied rates, banding will localise the benefits to the stool and reduce total volume of product required, predicted to reduce overall costs.

Service provider contact: Megan Zahmel 0447 317 102

Where did this idea come from: Wilmar/ Peter Larsen

Plan - Project Activities	Date: (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	Establish trial	Baseline soil nutrient samples – 1 st of Dec 2015 Application of Mud and Ash – Dec 2015 Flumes set up to monitor water runoff quality. - 5 th Jan 2016 Nutrient soil samples after mud application – 4 th May 2016 Planted May 2016
Stage 2	Sampling 2017	Stalk counts and biomass - 10 th Nov 2016 - 16 th Feb 2017 Water runoff data collected – 26/01/2016 – 23/03/2017 Final Harvest results for 2017 – completed see attached results
Stage 3	Sampling 2018	Final Harvest results – Oct 2018 Soil samples - Nov 2018
Stage 4	Sampling 2019	Final Harvest and CCS results – 2019 season
Stage 5		
Stage 6		

Project Trial site details

Trial Crop:	Sugarcane
Variety: Rat/Plt:	Plant Q208 2016
Trial Block No/Name:	B# 1-2 F# 0848A Mill By-product sub-surface applied
Trial Block Size Ha:	22.3 ha
Trial Block Position (GPS):	Refer to google earth map
Soil Type:	shallow loam overlying a sodic clay

Block History, Trial Design:

300 m ↔	Edge of field	Northern End																						
		Buffer Rows	T1 - R1 Control	T2 - R1 Mud Banded at 50	Not treated	T4 - R1 Mud Broadcast at 200	T5 - R1 Ash Banded at 50	Not treated	Not treated	Not treated	Not treated	T2 - R2 Mud Banded at 50	T4 - R3 Mud Broadcast at 200	T5 - R2 Ash Banded at 50	T1 - R3 Control	Not treated	Not treated	Not treated	Not treated	T5 - R3 Ash Banded at 50	Not treated	T1 - R3 Control	T4 - R3 Mud Broadcast at 200	Buffer Rows
600 m ↔	Edge of field	Cross drain ←																						
		Buffer Rows	T1 - R1 Control	T2 - R1 Mud Banded at 50 t/ha	T3 - R1 Mud Banded at 100 t/ha	T4 - R1 Mud Broadcast at 200 t/ha	T5 - R1 Ash Banded at 50 t/ha	T6 - R1 Ash Banded at 100 t/ha	Missed treatment (ran out of ash) supposed	T3 - R2 Mud Banded at 100 t/ha	T7 - R2 Ash Broadcast at 200 t/ha	T2 - R2 Mud Banded at 50 t/ha	T4 - R2 Mud Broadcast at 200 t/ha	T5 - R2 Ash Banded at 50 t/ha	T1 - R2 Control	T6 - R2 Ash Banded at 100 t/ha	T3 - R3 Mud Banded at 100 t/ha	Missed treatment (ran out of ash) supposed	T2 - R3 Mud Banded at 50 t/ha	T5 - R3 Ash Banded at 50 t/ha	T7 - R3 Ash Broadcast at 200 t/ha	T1 - R3 Control	T4 - R3 Mud Broadcast at 200 t/ha	Buffer Rows
		6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	6 rows	4 rows
		240 m ↔																						
		*Note - T7R1 and T6R3 are missing due to running out of ash																						
		*Note - Some treatments only run to the cross drain, while some extend all the way through to the northern end of the field																						

Block History:

Previous variety MQ239, only went to 2R
 Last followed - 2016

Treatments:

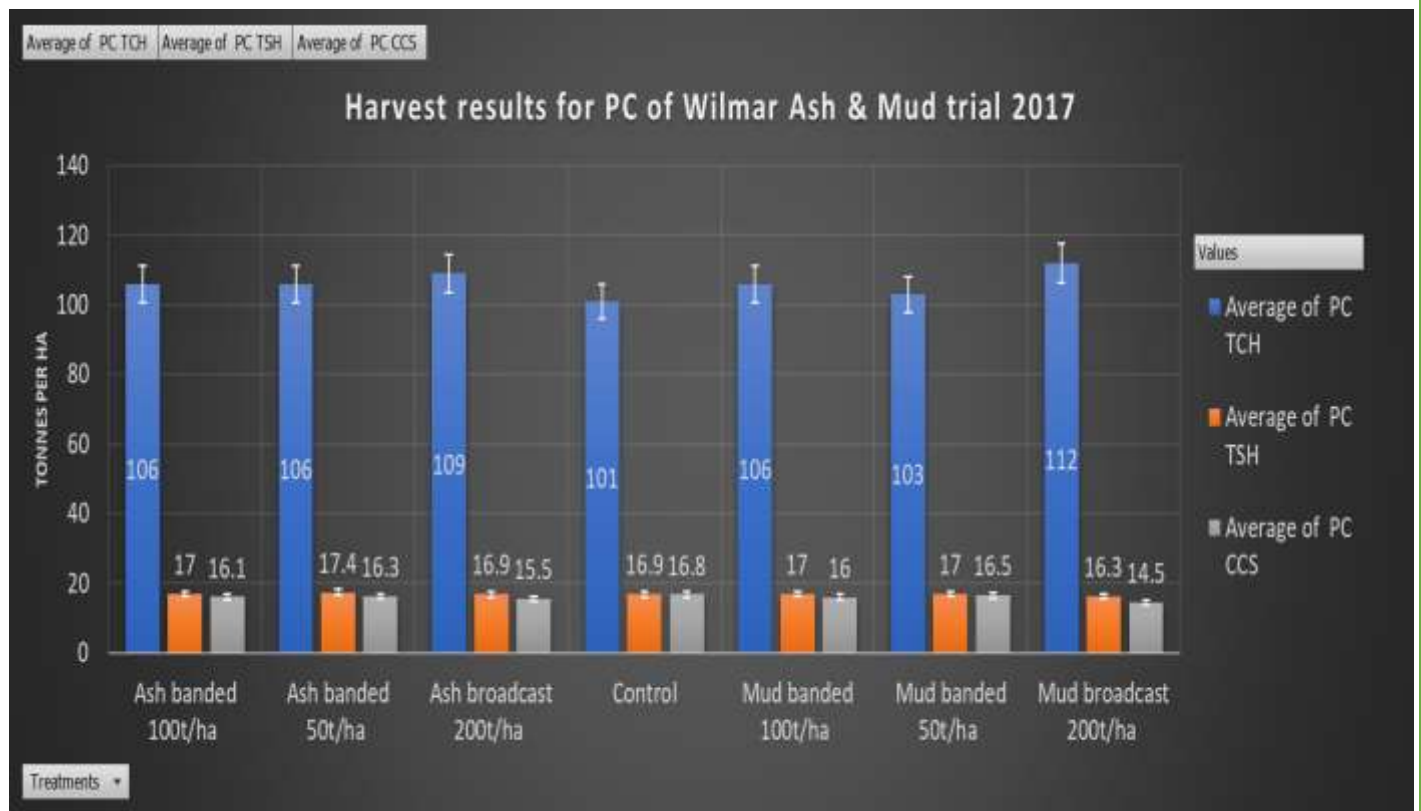
- T1 Control
- T2 Mud Banded 50 t/ha
- T3 Mud Banded 100 t/ha
- T4 Mud Broadcast 200t/ha
- T5 Ash Banded 50 t/ha
- T6 Ash Banded 100 t/ha
- T7 Ash Broadcast 200 t/ha

Results:

2017 Economic results

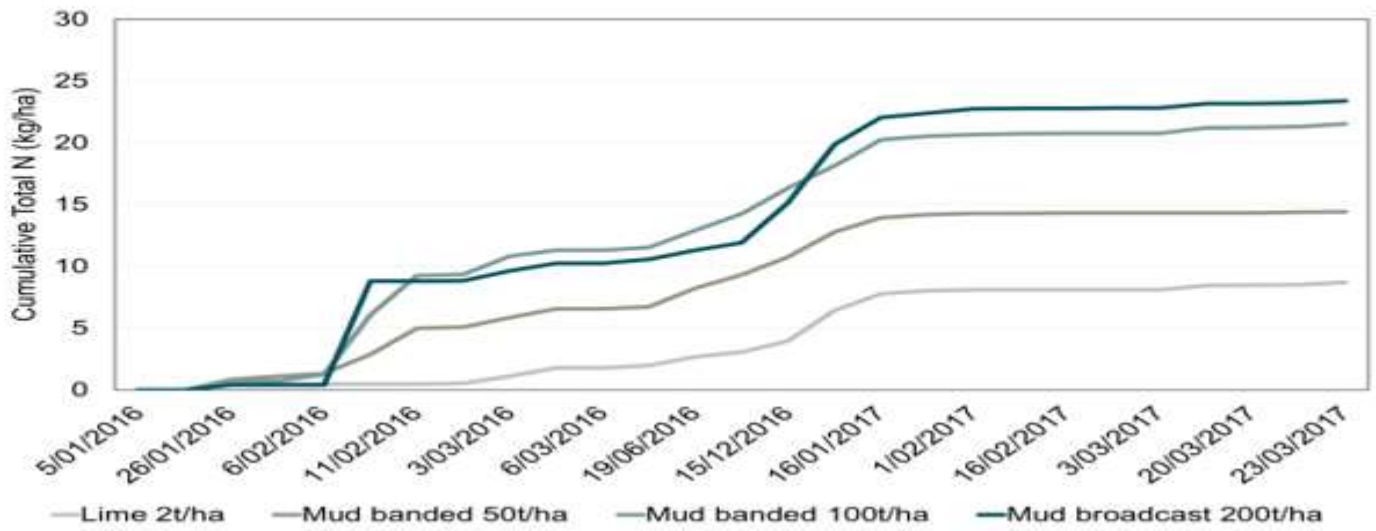
Treatment	Average TCH	Average TSH	Average CCS	Average Revenue	Average total expense*	Average gross margin
Control	101.0	16.9	16.8	\$ 4,711	\$ 1,178	\$ 3,532
Mud banded 50t/ha	102.9	17.0	16.5	\$ 4,706	\$ 1,218	\$ 3,488
Mud banded 100t/ha	105.5	16.9	16.0	\$ 4,636	\$ 1,491	\$ 3,144
Mud broadcast 200t/ha	112.5	16.3	14.5	\$ 4,316	\$ 2,054	\$ 2,262
Ash banded 50t/ha	106.4	17.4	16.3	\$ 4,792	\$ 1,250	\$ 3,543
Ash banded 100t/ha	105.3	16.9	16.1	\$ 4,637	\$ 1,490	\$ 3,147
Ash banded 200t/ha	108.9	16.8	15.5	\$ 4,560	\$ 2,022	\$ 2,538
					*Cost of ameliorant, land prep, harvesting	
Sugar price	400 \$					
Constant	0.6353					
Levies	0.518 \$/t					
Harvesting cost	8.5 \$/t					
Mud cost/t delivered	5 \$/t					
Ash cost/t delivered	5 \$/t					
Lime	134 \$/t					
Extra operation cost	40 \$/ha					

Yield & Sugar Data for Plant Cane 2017

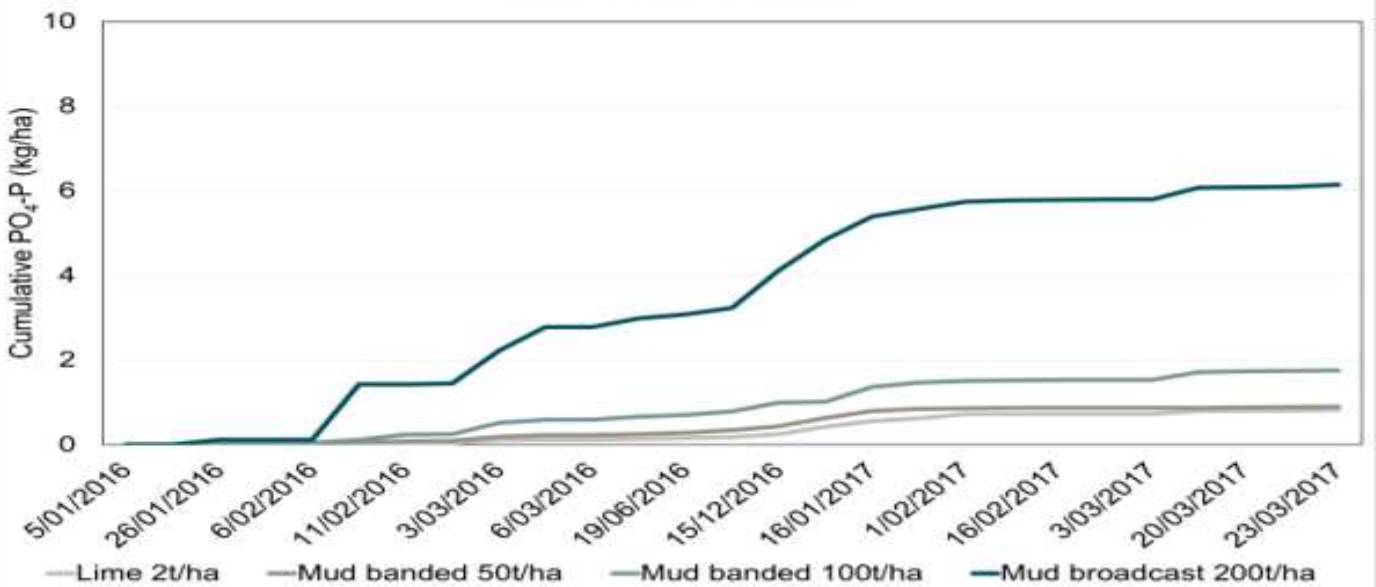


Water Quality Data for 2017 on Mud treatments

Cumulative quantity of total nitrogen in runoff water from the Orient.



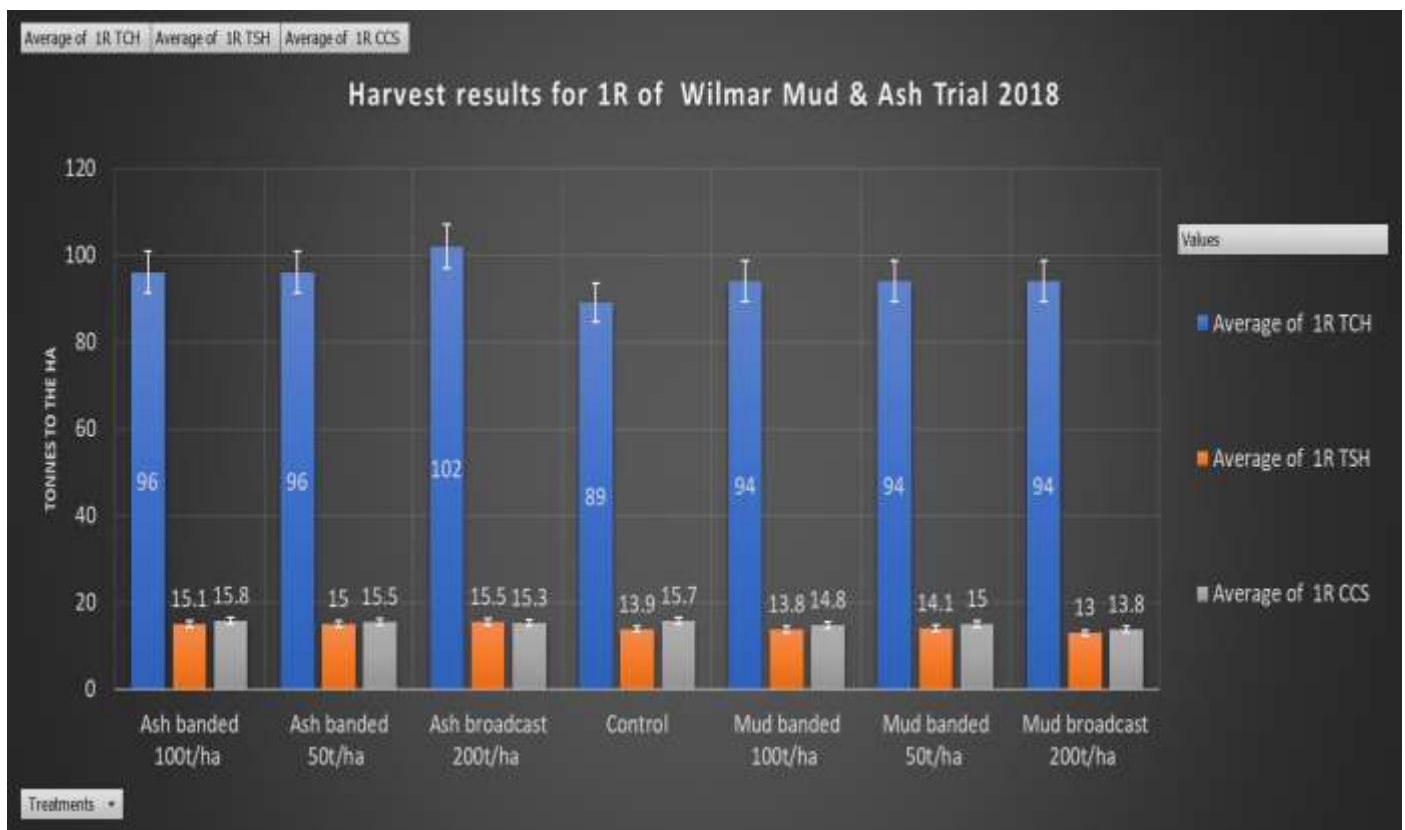
Cumulative quantity of dissolved inorganic phosphorus in runoff water from the Orient.



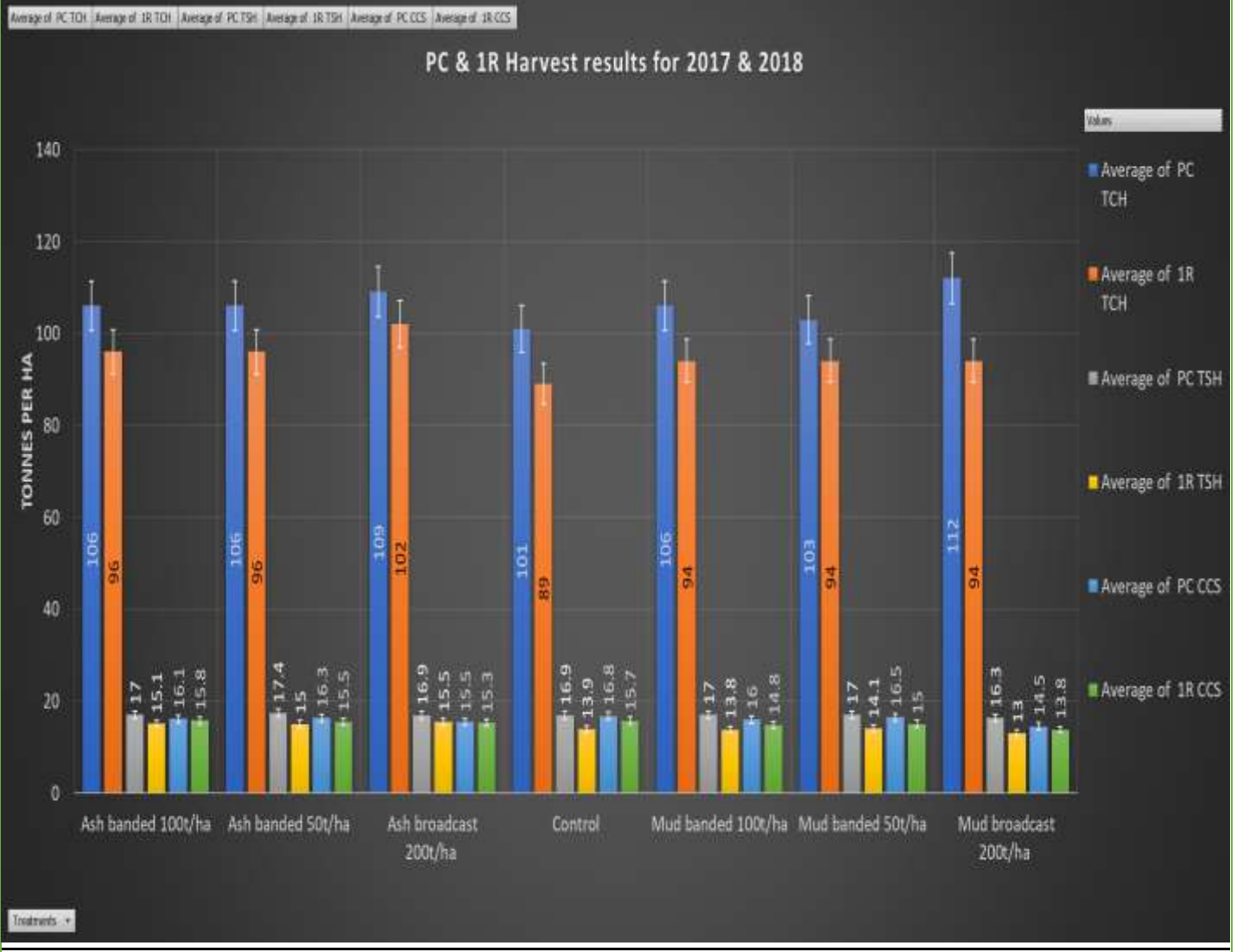
2018 Economic results

Treatments	CCS		TCH		TSH		Revenue to date	Total extra expenses to date	Gross margins to date
	PC	1R	PC	1R	PC	1R	PC & 1R	PC & 1R	PC & 1R
Control	16.8	15.7	101	89	16.9	13.9	\$8,512	\$1,843	\$6,669
Mud banded 50t/ha	16.5	15	103	94	17	14.1	\$8,498	\$2,201	\$6,297
Mud banded 100t/ha	16	14.8	106	94	17	13.8	\$8,345	\$2,474	\$5,871
Mud broadcast 200t/ha	14.5	13.8	112	94	16.3	13	\$7,715	\$3,040	\$4,675
Ash banded 50t/ha	16.3	15.5	106	96	17.4	15	\$8,852	\$2,254	\$6,598
Ash banded 100t/ha	16.1	15.8	106	96	17	15.1	\$8,781	\$2,254	\$6,289
Ash broadcast 200t/ha	15.5	15.3	109	102	16.9	15.5	\$8,775	\$3,077	\$5,698

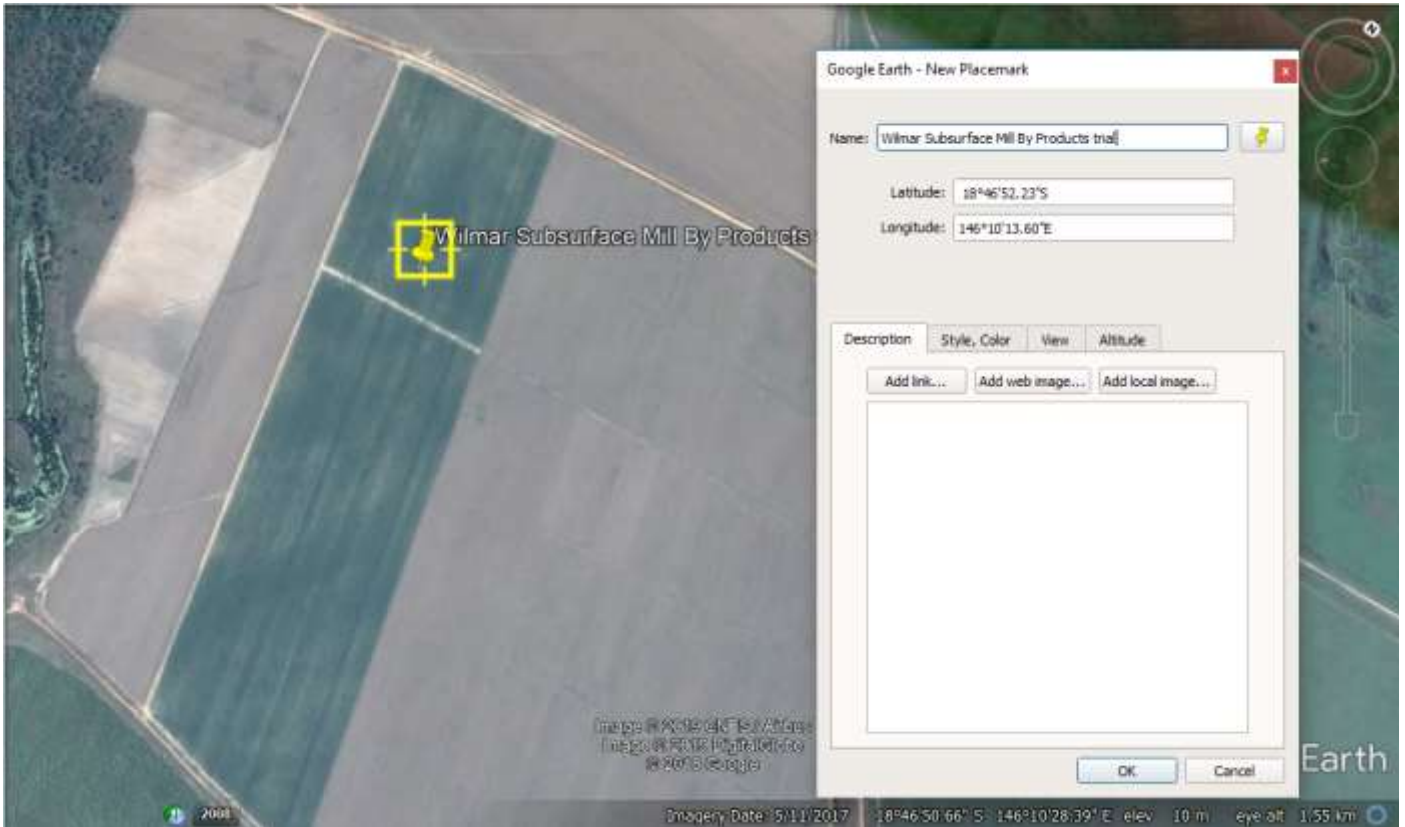
2018 Yield & Sugar Data for 1st Ratoon



Plant Cane & 1st Ratoon summary of Yield and Sugar Data



Google Earth reference Map



Conclusions and comments

The trial has two years of harvest and economic data currently. So far, the data suggested that 50T/ha of either Mud or Ash is the sweet spot for gaining results in yield and sugar per hectare as well as being economically sound. The water quality data suggests that there is a greater reduction in nitrogen and phosphorus runoff at 50t/ha banded compared to the conventional practice of 200t/ha broad cast. To summarise the data so far, it would predict that 50t/ha banded subsurface can be achieved, have benefits to the crop and be an economically sound practice.

Advantages of this Practice Change:

Banding mill by-products via sub-surface application reduces the rate that it is applied, reducing the amount of nitrogen and phosphorous applied to the paddock, thus reducing the amount of these nutrients that may leave the farm in run off. This is especially important considering the proximity of the Herbert river catchment to the Great Barrier Reef.

Traditionally, only growers that are close to the mill can afford mill by-product applications due the high rate that it is applied and the wet weight of the product. By banding mill by-products subsurface into the planting line, rates can be reduced. This may increase the number of growers that will be able to afford mill by-product applications.

Disadvantages of this Practice Change:

There still needs to be more work done on applying the product subsurface. There were initial issues with getting the mud and ash deep enough into the soil.

Will you be using this practice in the future?

Yes, but this practice is still in a trial phase and will continue to monitor results.

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

Not sure at this stage, still waiting on 2019 harvest data before deciding