

# Catalyst Project Report

## Grower Information

<b>Grower Name:</b>	Sam Deguara
<b>Entity Name:</b>	SS Deguara
<b>Trial Farm No/Name:</b>	MKY-3134A-1-1
<b>Mill Area:</b>	Mackay
<b>Total Farm Area ha:</b>	56.5
<b>No. Years Farming:</b>	10 – 3 <sup>rd</sup> generation
<b>Trial Subdistrict:</b>	North Eton - Sandy Creek
<b>Area under Cane ha:</b>	160

## **Background Information**

**Aim: To compare cane yields and soil analysis from locations where liquid fertiliser has been applied sub-surface compared to liquid fertiliser that has been applied to the surface.**

### **Background: (Rationale for why this might work)**

There is always a risk that fertilisers applied onto the top of the soil are subjected to greater loss pathways than fertilisers applied sub-surface. Liquid fertiliser supplied as Dunder is traditionally applied onto the surface of the soil with irrigation used to incorporate the fertiliser into the soil.

The grower wants to apply liquid fertiliser into the sub-surface of the soil at an approximate depth of 100mm. The rationale for this practice change is that nutrients will be more readily available to the plant and will also reduce the risk of being lost either by volatilisation or washed out of the paddock from heavy rainfall events or irrigation.

### **Potential Water Quality Benefit:**

Reduced nutrient loss off farm

### **Expected Outcome of Trial:**

The plant will access the nutrients at a faster rate improving Nitrogen Use Efficiency and reducing the risk of nutrient loss.

### **Service provider contact: Farmacist**

### **Where did this idea come from: Grower**

<b>Plan - Project Activities</b>	<b>Date: (mth/year to be undertaken)</b>	<b>Activities :(breakdown of each activity for each stage)</b>
<b>Stage 1</b>	<b>September 2016</b>	2016 cane crop harvested
<b>Stage 2</b>	<b>October 2016</b>	Nutrients applied as per trial design
<b>Stage 3</b>	<b>September 2017</b>	Harvest production
<b>Stage 4</b>	<b>October 2017</b>	Reapply treatments
<b>Stage 5</b>	<b>December 2017</b>	Rainfall simulator
<b>Stage 6</b>	<b>June 2018</b>	Sugar cane biomass samples
<b>Stage 7</b>	<b>September 2018</b>	Harvest trial
<b>Stage 8</b>	<b>October 2018</b>	Reapply treatments
<b>Stage 9</b>	<b>June 2019</b>	Sugar cane biomass samples
<b>Stage 10</b>	<b>October 2019</b>	Harvest trial

## Project Trial site details

<b>Trial Crop:</b>	Q138
<b>Variety: Rat/Plt:</b>	2017 harvest = 3R
<b>Trial Block No/Name:</b>	1-1
<b>Trial Block Size Ha:</b>	6.7
<b>Trial Block Position (GPS):</b>	148.930054/-21221815
<b>Soil Type:</b>	Victoria Plains – Black Earth

## Treatments

Trial design for the 2016 application of nutrients to be harvested in 2017 are shown in Figures 1 and 2 with the rates and nutrients applied represented in Tables 1 and 2.

	Guard 10 rows	Repetition 1		Repetition 2		Repetition 3		Guard 7 rows	↑W →N
		T1	T2	T2	T1	T1	T2		
No. Rows	10	6	6	6	6	6	6	7	
	<b>Treatments</b>				Area	Rate	Unit	Product	Total
	1	Apply liquid nutrient sub-surface (100mm deep)			2	3.5	m3/ha	Dunder LOS+P	7
	2	Apply liquid nutrient surface applied			2	3.5	m3/ha	Dunder LOS+p	7
	Guard	Liquid Surface applied - grower rate			1.8	3.5	m3/ha	Dunder LOS+p	6.3

Figure 1 - trial design for 2016 application to be harvested 2017

Table 1 - Product, rates and nutrient applied 2016 for 2017 harvest

Treatment/Product	Rate	N	P	K	S
T1 Dunder LOS+P	3.5	160	16.5	89	25.6
T2 Dunder LOS+P	3.5	160	16.5	89	25.6

	Guard 10 rows	Repetition 1		Repetition 2		Repetition 3		Guard 7 rows	↑W →N
		T1	T2	T2	T1	T1	T2		
No. Rows	10	6	6	6	6	6	6	7	
	<b>Treatments</b>				Area	Rate	Unit	Product	Total
	1	Apply liquid nutrient sub-surface (100mm deep)			2	4.3	m3/ha	MKY140P	8.6
	2	Apply liquid nutrient surface applied			2	4.3	m3/ha	MKY140P	8.6
	Guard	Liquid Surface applied - grower rate			1.8	4.3	m3/ha	MKY140P	7.74

Figure 2 - Trial design for 2017 application to be harvested in 2018

Table 2 - Product, rates and nutrient applied 2017 for 2018 harvest

Treatment/Product	Rate	N	P	K	S
T1 MKY 140 P	4.3	155	13	124	25.6
T2 MKY 140 P	4.3	155	13	124	25.6

## Results:

### 2017 harvest

Cane yield results for each of the replications for the 2017 harvest is shown in Figure 3 and sugar yields shown in Figure 4. The average tonnes of cane per hectare between the treatments were very similar with 63.1t/ha for the subsurface application, and 62.9t/ha for the surface application. The average tonnes of sugar per hectare were 8.5t/ha for subsurface and 9.1t/ha for surface.

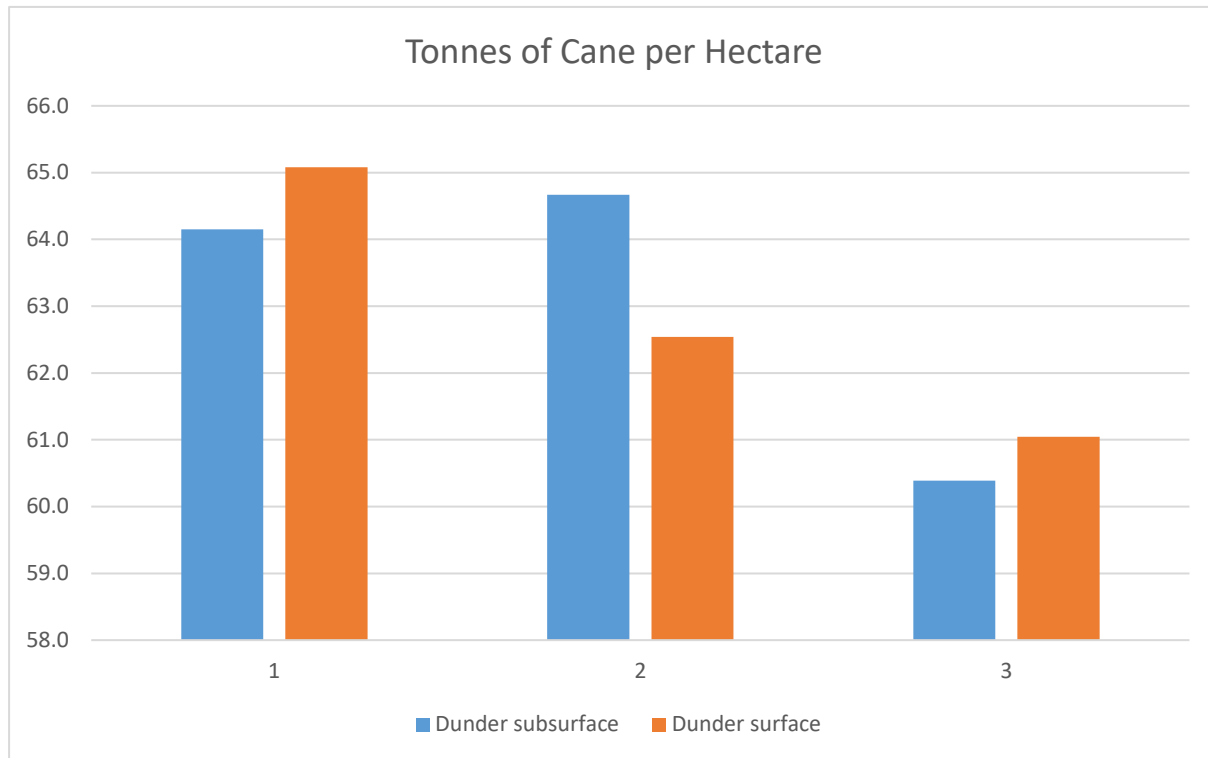


Figure 3 - cane yields 2017 harvest

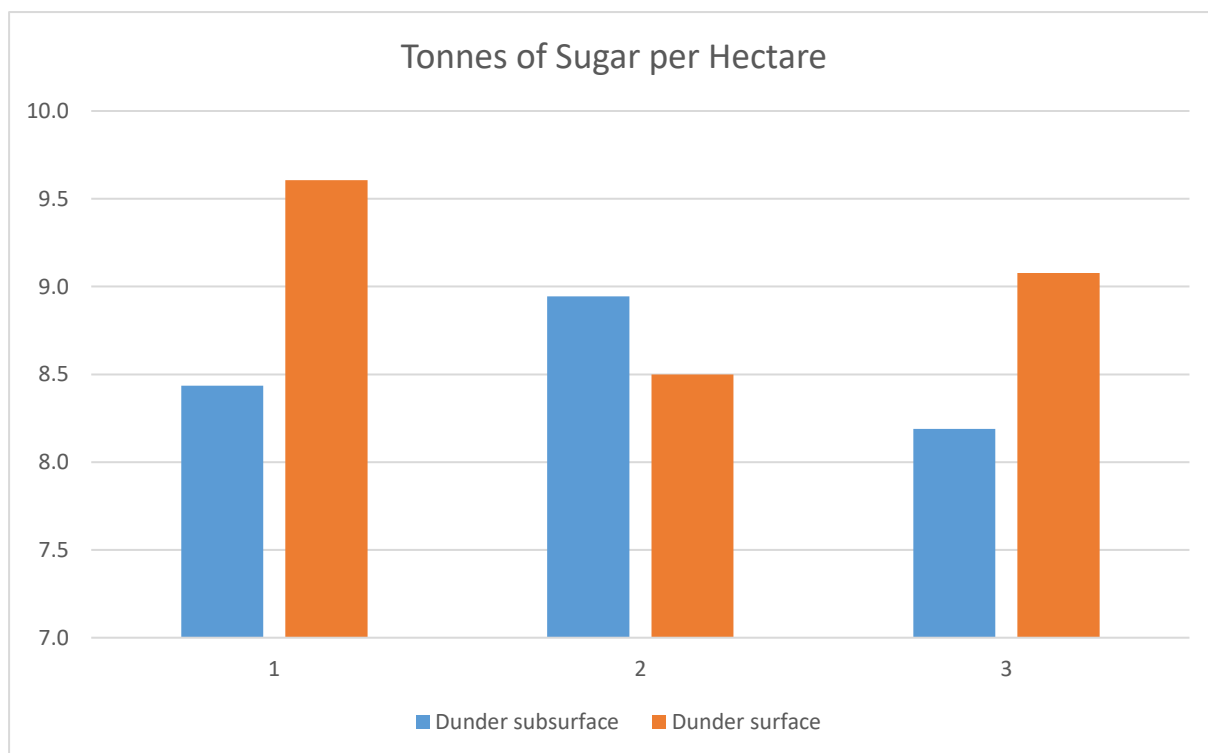


Figure 4 - sugar yields 2017 harvest

**2018 Harvest Results**

Cane yield results for the 2018 harvest is shown in Figure 5 and sugar yields shown in Figure 6. Similar to the 2017 harvest there were no significant differences between each treatment for 2018.

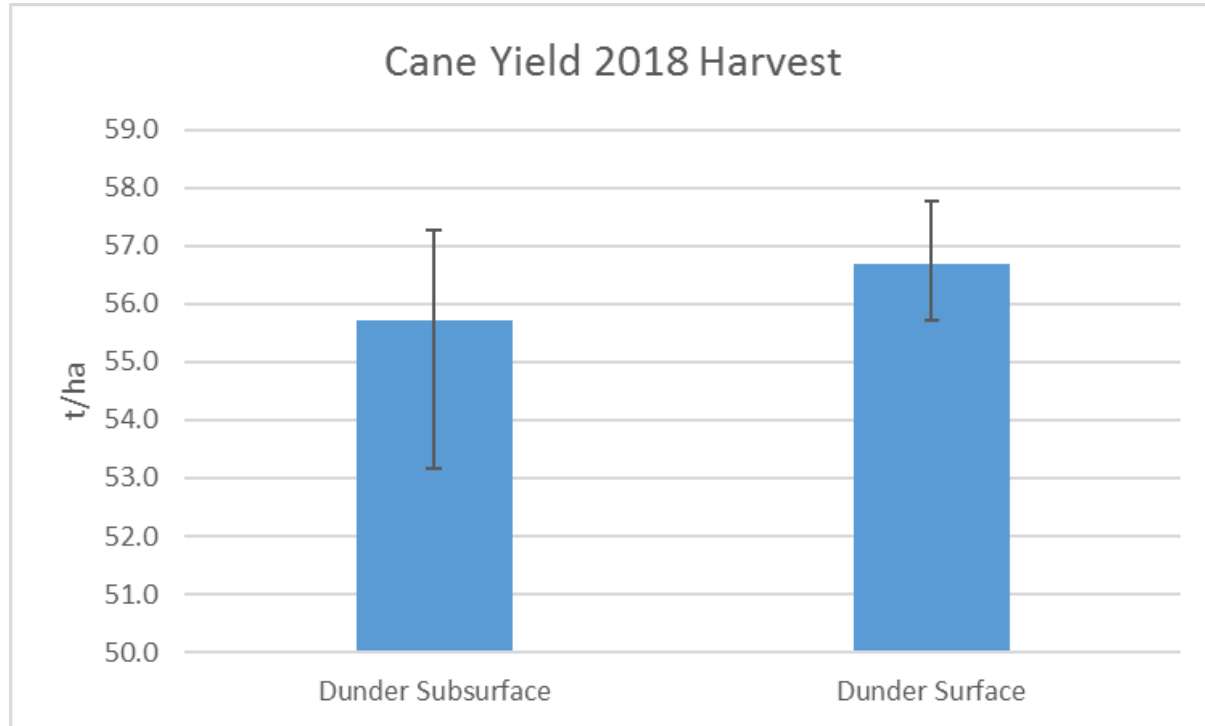


Figure 5 - cane yields 2018 harvest

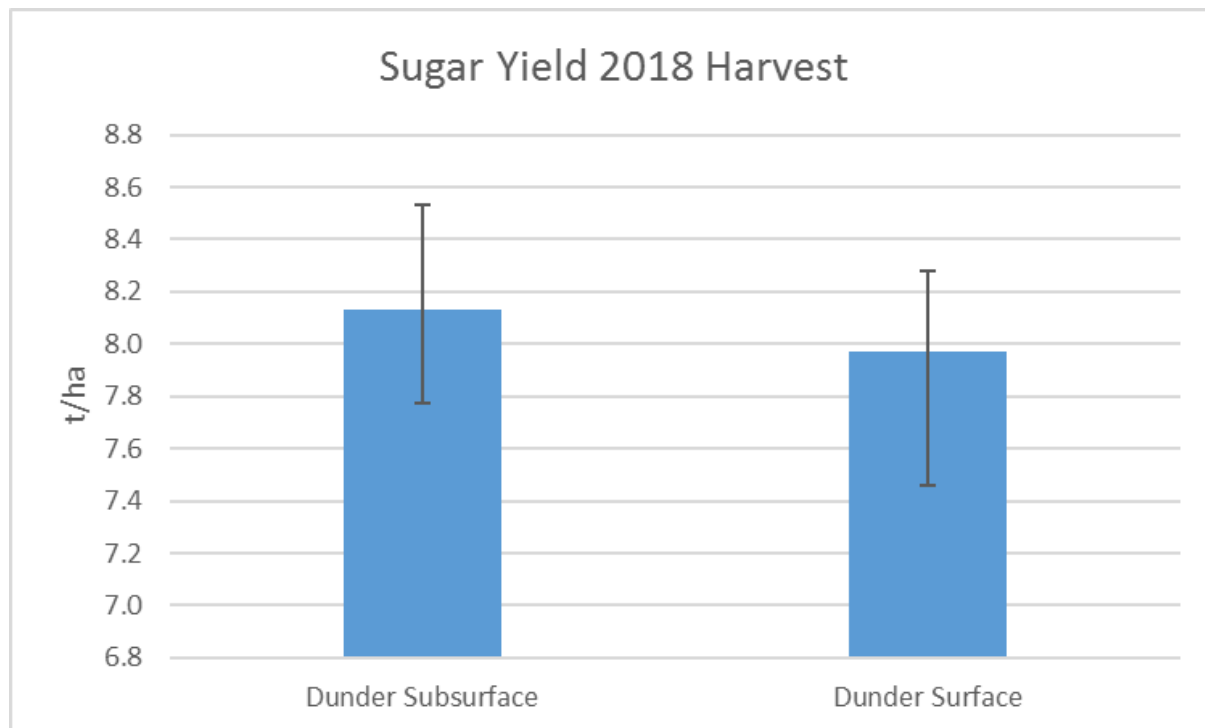


Figure 6 - sugar yields 2018 harvest

**Leaf Sample Results 2019**

Leaf samples were taken in March 2019 to compare nutrient content of the different treatments. All nutrients were above critical values, indicating that there was no deficiency for either treatment. The surface applied treatment

had slightly higher nutrition values for most of the nutrients, however it is unlikely that this difference is large enough to cause any variation in final yield.

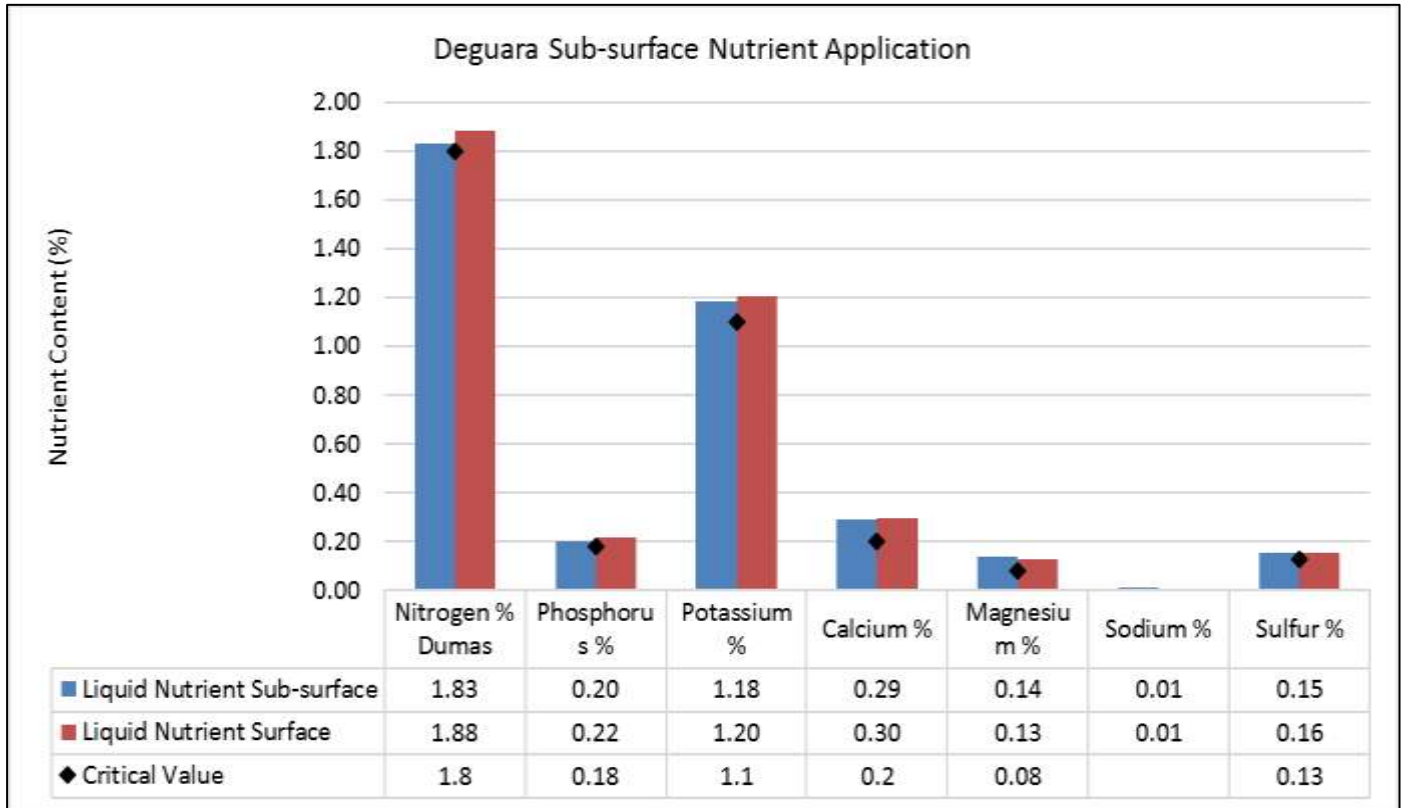


Figure 7 Leaf sample results 2019



## Conclusions and comments

This trial has indicated very similar yields between subsurface application of liquid fertiliser and surface application of liquid fertiliser. Traditionally Dunder is applied on the surface but this raises concerns regarding losses of fertiliser to run off water. By applying dunder sub-surface this trial has indicated that it is possible to achieve the same yield and sugar produced as applying liquid fertiliser to the surface. Treatments at this site have been re-applied for the 2018 harvest.

Separate trials are being undertaken to compare yields between subsurface application of dunder vs subsurface application of granular fertiliser; as well as a trial applying subsurface dunder at lower rates. Together these trials will provide a good indication of the potential for subsurface application, however the trials need to be monitored over a number of years before firm conclusions can be made.

### Advantages of this Practice Change:

Reduced risk of nutrient loss.

Placement of fertiliser in the root zone of the plant.

### Disadvantages of this Practice Change:

Increased time and labour cost, impacting profitability.

### Will you be using this practice in the future:

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

Project site continuing 2019