

Catalyst Project Report

Grower Information

Grower Name:	Gerry Deguara
Entity Name:	Gerry Deguara Harvesting
Trial Farm No/Name:	MKY-3130A
Mill Area:	Mackay Sugar
Total Farm Area ha:	160 ha
No. Years Farming:	45 – 2 nd generation
Trial Subdistrict:	North Eton
Area under Cane ha:	700 ha on all entity farms

Background Information

Aim: To compare the application of liquid fertilisers sub-surface against sub-surface application of granular fertilisers at the same rate.

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 loss of Nutrients 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

Plan - Project Activities	Date: (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	November 2016	2016 cane crop harvested
Stage 2	November 2016	Nutrients applied as per trial design
Stage 3	September 2017	Harvest trial
Stage 4	September 2017	Re-apply treatments
Stage 5	June 2018	Sugarcane biomass samples
Stage 6	October 2018	Harvest trial
Stage 7	October 2018	Re-apply treatments
Stage 8	June 2019	Sugarcane biomass samples
Stage 9	October 2019	Harvest trial

Project Trial site details

Trial Crop:	Q240
Variety: Rat/Plt:	2017 Class = 1R
Trial Block No/Name:	2-1
Trial Block Size Ha:	15.64 ha/ Trial size = 3.6 ha
Trial Block Position (GPS):	148.947257; -21.222997
Soil Type:	Victoria Plains – Black Earth

Block History, Trial Design:

Figure 1 is an image of the sub-surface dunder applicator, showing the placement of the fertiliser in relation to the plants. It works as a side dress applicator that pumps dunder from the tank at the rear of the vehical and carries it through the hoses to the culters, which cut through the trash and soil to create a slot for the fertiliser to fall in to.



Figure 1 - Sub-surface liquid applicator

Figures 2 and 3 represent the trial design for application of treatments during 2016 for the 2017 harvest and 2017 application of treatments for the 2018 harvest.

	Guard 7 rows	Repetition 1		Repetition 2		Repetition 3		Guard
No. Rows	7	6	6	6	6	6	6	7
		T1	T2	T2	T1	T1	T2	
		Treatments		Area	Rate	Unit	Product	Total
	1	Apply liquid nutrient sub-surface (100mm deep)		1.8	4	m ³ /ha	MKY 190P	7.2
	2	Apply Granular sub-surface		1.8	590	kg/ha	Reefchoice 3	1062
	Guard	Liquid Surface applied - grower rate		1.4	4	m ³ /ha	MKY 190P	5.6

Figure 3 - 2017 application for the 2018 harvest

Figure 4 represents the amount of nutrients applied for each treatment (expressed in kg/ha). The rate of the liquid fertiliser applied (Mky 190P) is expressed in m³ per hectare.

Treatments:

	Rate	N	P	K	S
T1 – Mky 190P	4	153.5	14.4	103.4	25.2
T2 – Reefchoice 345	590	152.81	10.62	102	21.2

Figure 4 - Treatments applied with calculated nutrient rates (kg/ha)

Results:

2017 harvest

Cane yield results for the 2017 harvest is shown in Figure 5 with CCS from the 2017 harvest shown in figure 6 and sugar yields shown in figure 7. There were no significant differences between each treatment.

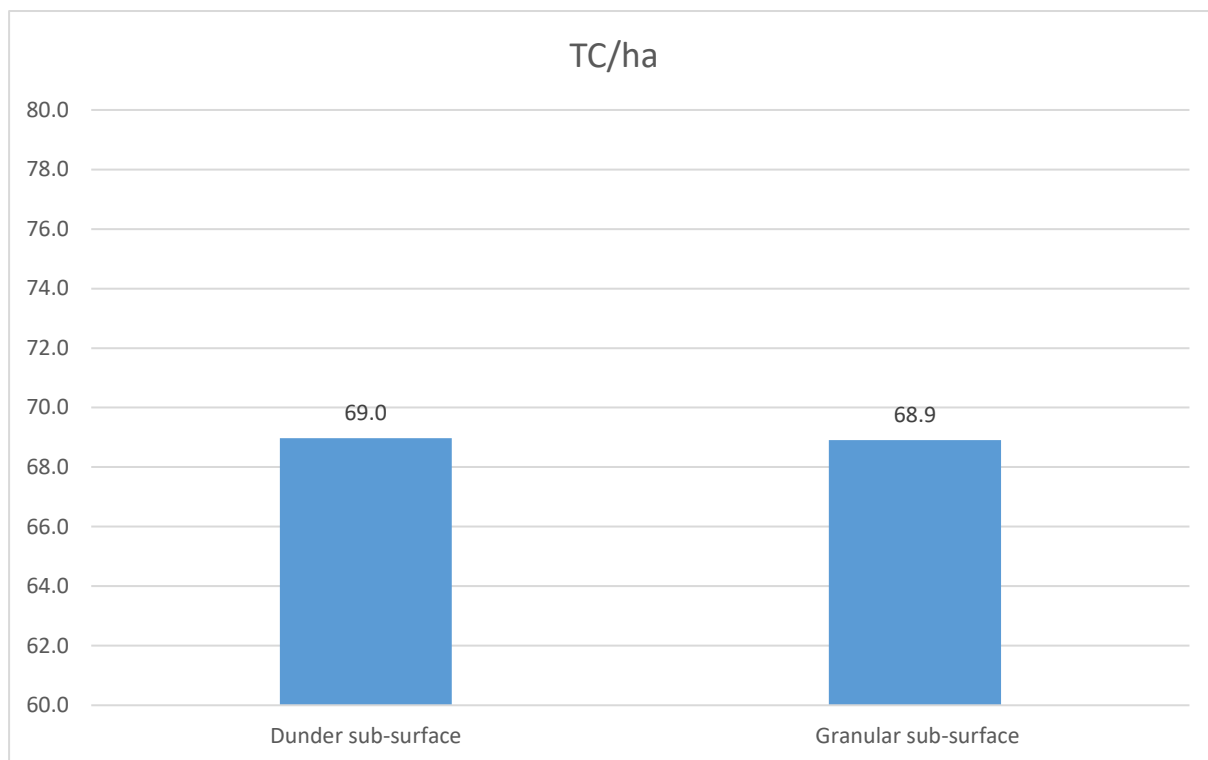


Figure 5 - cane yields from 2017 harvest

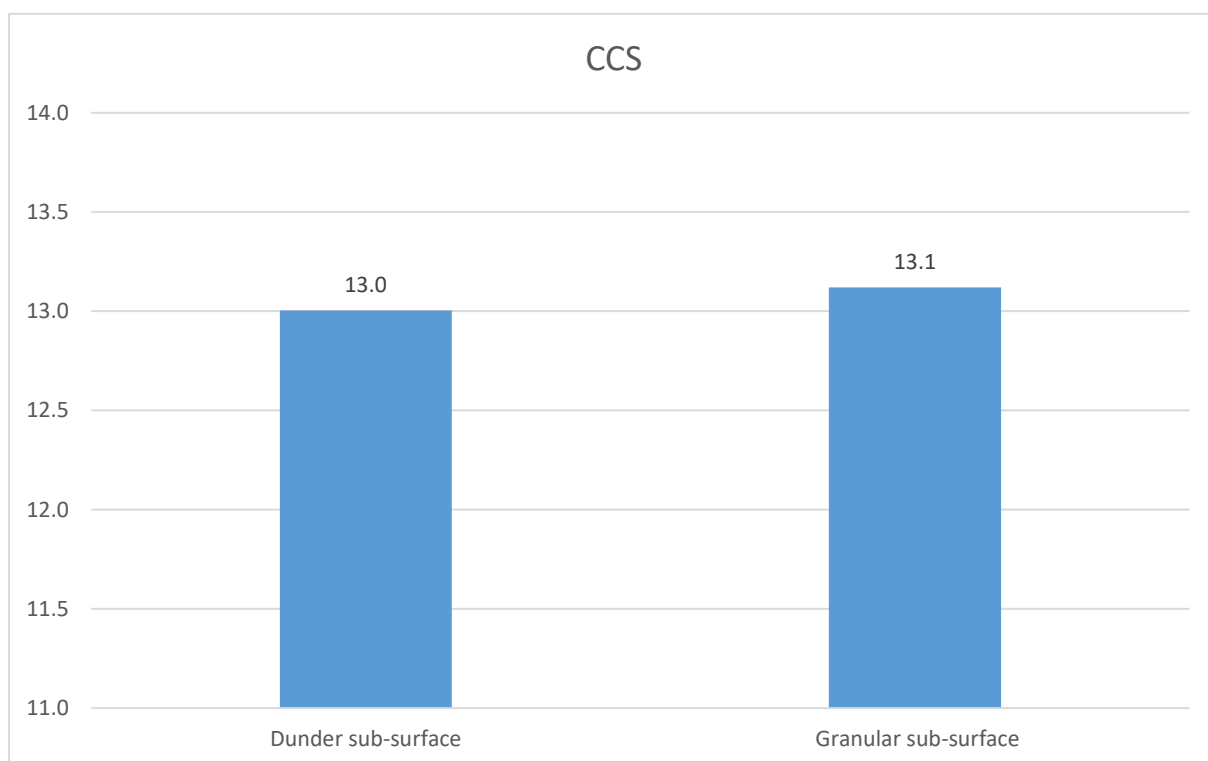


Figure 6 – CCS results from 2017 harvest

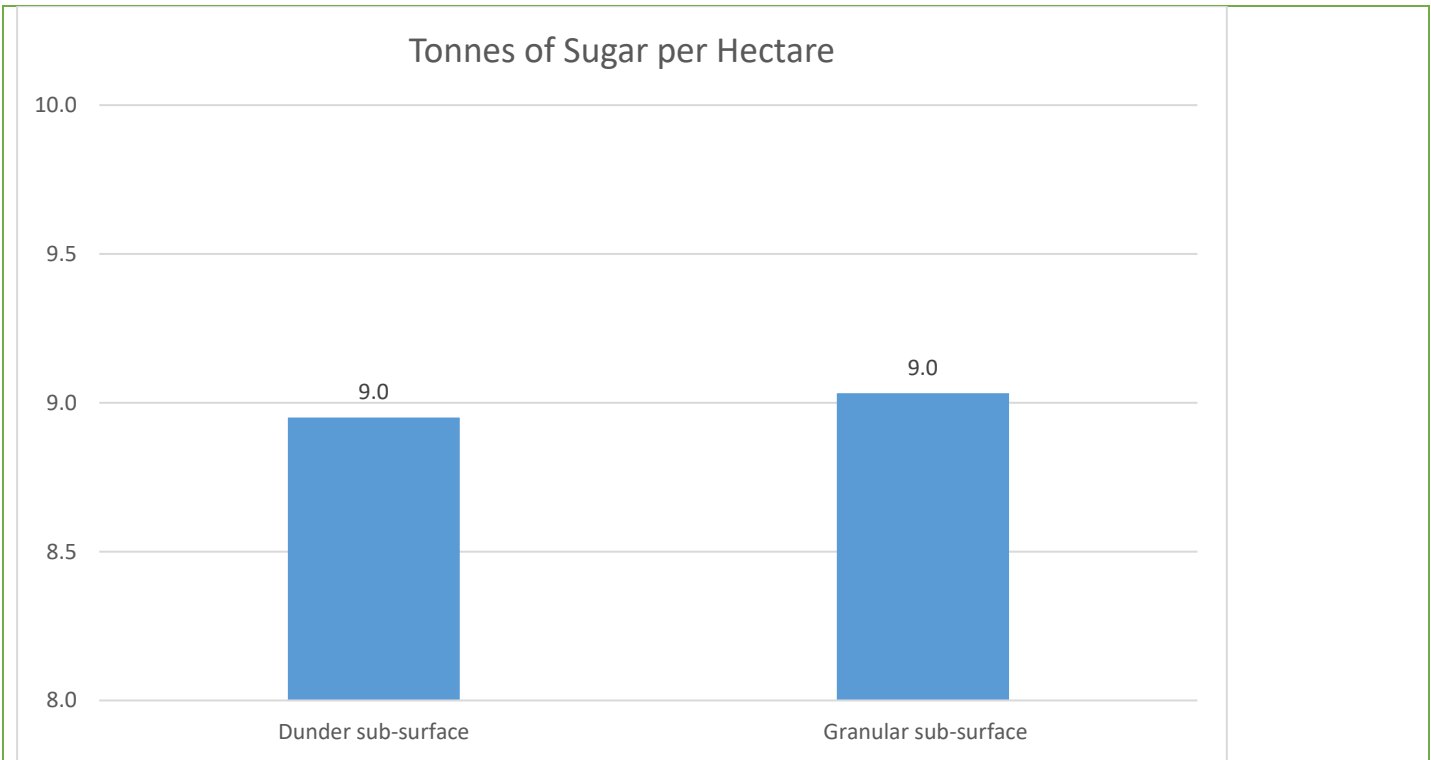


Figure 7 - sugar yields 2017 harvest

2018 Harvest Results

Cane yield results for the 2018 harvest is shown in Figure 8 and sugar yields shown in figure 9. Similar to the 2017 harvest there were no significant differences between each treatment for 2018.

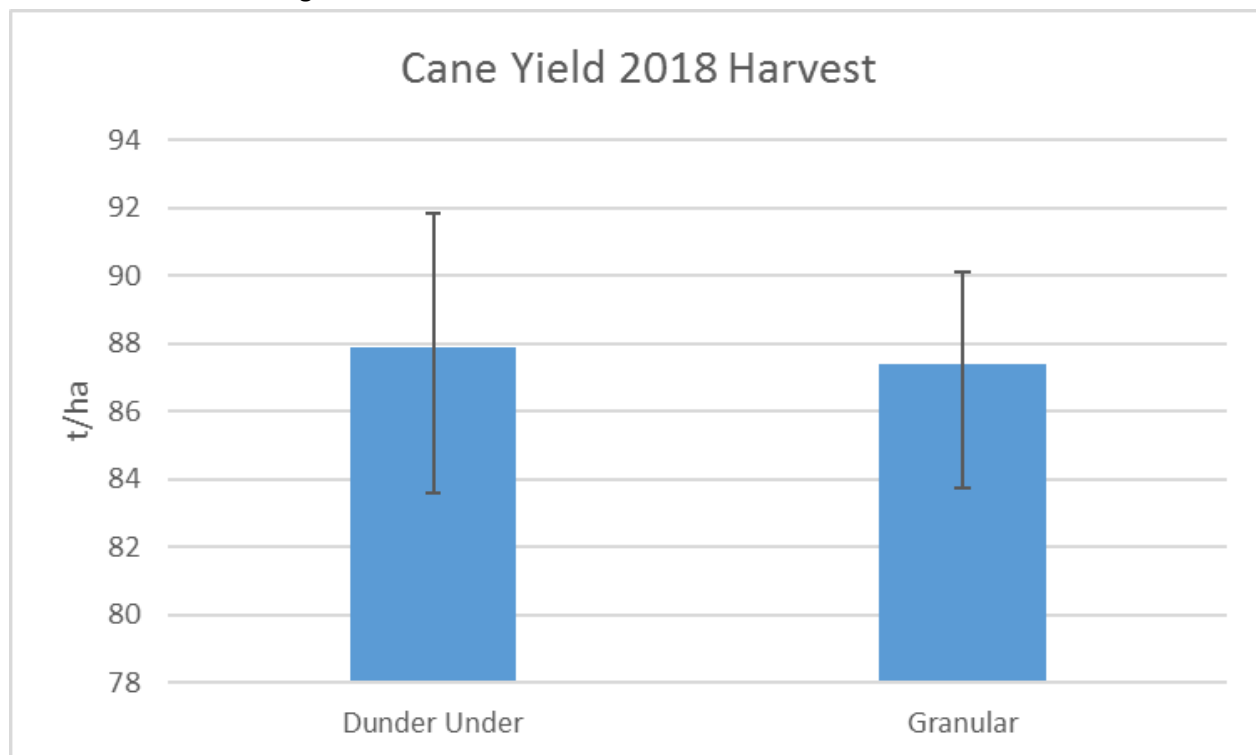


Figure 8 - cane yields for the 2018 harvest

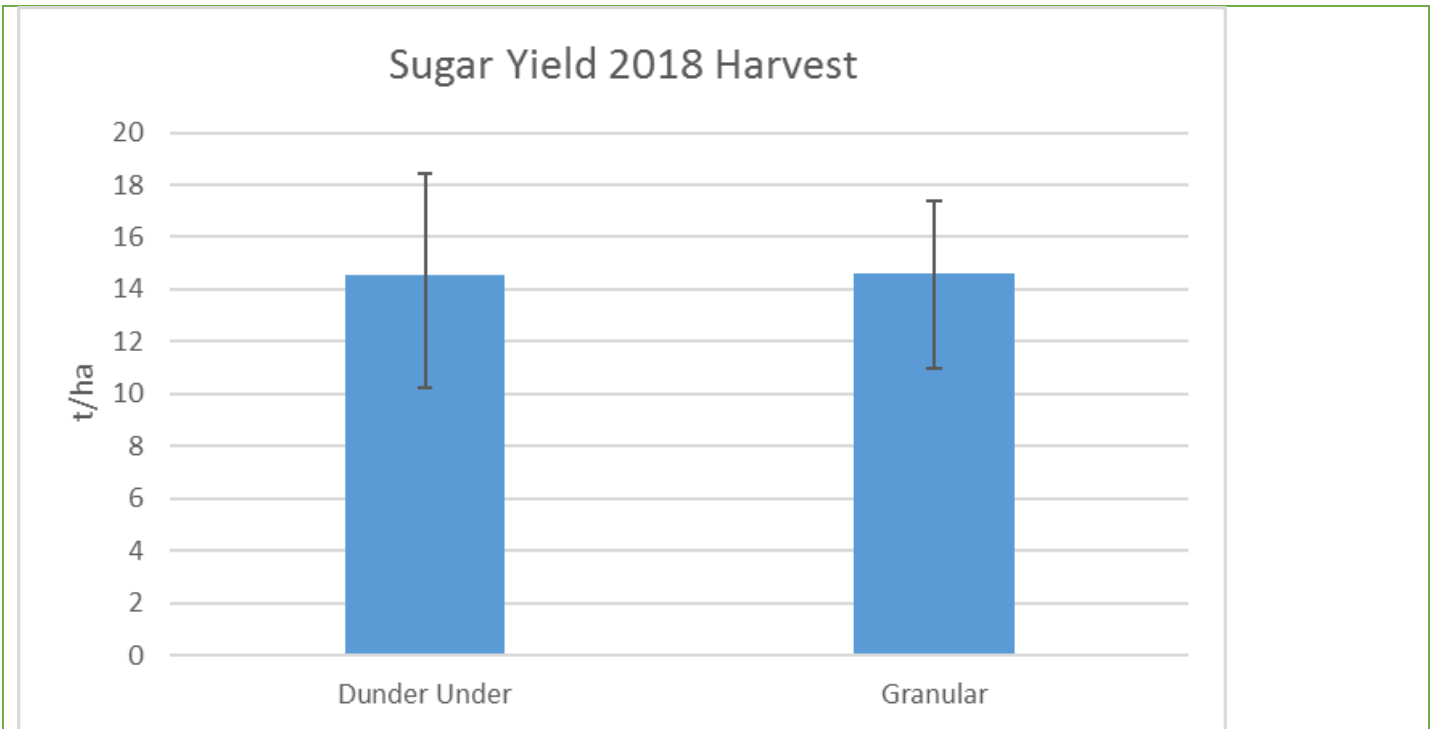


Figure 9 - sugar yields 2018 harvest

The results to date indicate that no yield gains or losses occur by applying liquid fertilisers sub-surface compared to granular fertilisers applied sub-surface.

Leaf Results 2019

Leaf samples were taken in March 2019 with results shown in Figure 10. All nutrients were about critical values and no differences were noted between the liquid and granular treatments.

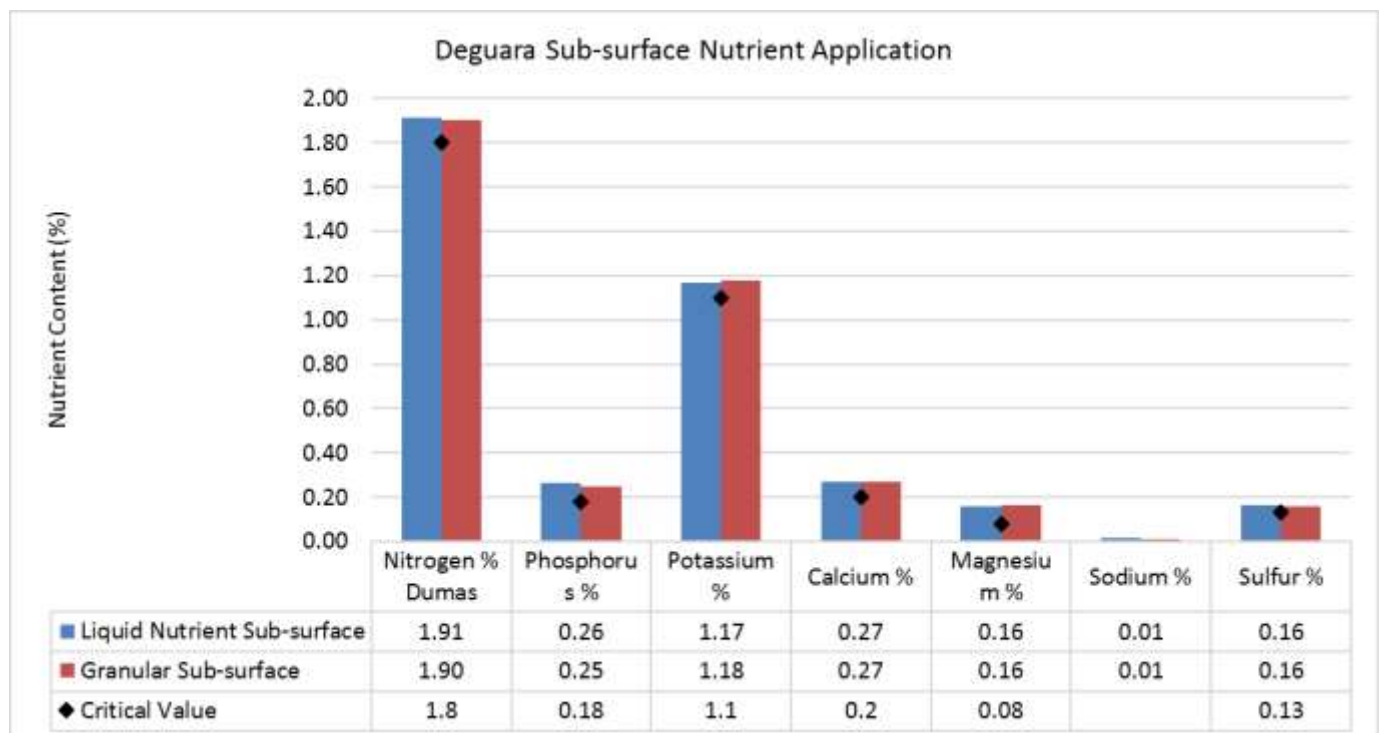


Figure 10 Leaf sample results 2019

Conclusions and comments

This trial has proved that it is possible to achieve the same yield results from subsurface application of dunder and granular products. Separate trials are being undertaken to compare yields between surface and subsurface application of dunder 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 loss nutrient loss pathways.

Disadvantages of this Practice Change:

Investment in new equipment required.
Slightly higher input costs due to increased application times.

Will you be using this practice in the future:

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

Project site continuing 2019