

Case Study 6: Gerry Deguara, North Eton

Action on the Ground - Carbon Farming Futures

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Assessment of banded surface applied mill mud as a component of a seasonal nutrient program in sugarcane

BACKGROUND

Gerry Deguara is a second-generation cane farmer in the Mackay and Whitsunday region. The Deguara family has long been leaders in the region's local innovation in the sugar industry. This started in the early 1980s with major changes to their water infrastructure with the successful use of centre pivots for irrigation.

The Deguara family has adopted controlled traffic farming with all machinery set at 2m wheel centres and tillage operations have been reduced where possible to conserve organic carbon and improve soil health.

Incorporating mill mud into a seasonal nutrient program is seen as a means to potentially reduce granula urea inputs and optimise nutrient cycling through enhanced soil health. Gerry traditionally applies a liquid Dunder blend and fortified with urea to provide the crops nutrient requirements.

Gerry has developed a 3 row, tractor drawn mill mud applicator which is capable of applying the mud at an application rate of 50 ton/ha. With a 6P5 equipped tractor, mill mud can be accurately applied between dual row sugarcane (50cm apart) in a 2m row configuration.

TRIAL OBJECTIVES

The trial has three major purposes:

- Assess the potential of mill mud banded at relatively low application rates as a total seasonal nutrient program in ratoon sugarcane
- Assess the potential of incorporating banded mill mud applications at low rates as part of seasonal nutrient program for sugarcane
- Compare sugarcane yields from mill mud based seasonal nutrient program with standard industry endorsed 6 Easy Steps nutrient programs.

TRIAL DESIGN

Deep EC mapping patterns derived from a Veris 3100 soil survey and satellite yield ratio mapping were utilised to assess paddock variability and select the most appropriate site to establish the trial. The trial design incorporates 4 nutrient treatment programs with 3 replications per treatment. Randomised replicated plots are block length (370m) and 6 metres wide (3 x 2m row spacing s).

Treatments were applied as outlined in the tables below:

Table 1: Site treatments and descriptions

Treatment	Description
T1	Mud applied banded on plant surface @ 50t / ha
T2	Control - 6 Easy steps Nutrient rates LOS @ 36m ³ / ha
T3	Mud @ 50t / ha plus LOS @ 2.9m ³ / ha
T4	Mud @ 50t ha plus urea applied @ 280kg / ha

Table 2: Nutrients applied

	Nutrients applied from mud application (kg / ha)					Nutrients applied from top - up application (kg / ha)					Total nutrients applied (kg / ha)				
	N	P	K	S		N	P	K	S		N	P	K	S	
T1	30	25	15	10	0	0	0	0	0	0	30	25	15	10	
T2	0	0	0	0	161	0	92	14	14	161	0	92	14	14	
T3	30	25	15	10	131	0	78	12	12	161	25	93	22		
T4	30	25	15	10	130	0	0	0	0	160	25	15	10		



Opposite:

Incorporating mill mud into a seasonal nutrient program is seen as a means to potentially reduce granula urea inputs and optimise nutrient cycling through enhanced soil health.

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TRIAL OUTCOMES TO DATE

- As was the case in 2013, the 2014 cane and sugar yield for treatment T1 (mud only) is significantly lower than other treatments on this site. However cane and sugar yields for T1 are similar to the regional average.
 - Results appear to indicate that the mud only treatment (T1) has increased in yield from 2013 to 2014 whilst the other treatments have remained at or slightly below 2013 levels. This would appear to indicate that there may be a continuation of nutrients being released from mud into the second year after application.
 - Cane and sugar yields for treatments T2, T3 and T4 are significantly higher than the region average.
 - Results in 2014 have validated the results of 2013 that by reducing nitrogen applications in association with alternative nutrient sources (T3 and T4) has no significant impact on cane and sugar yields when compared to the industry standard application (T2)
 - Treatments T3 and T4 have similar net \$ returns to the grower compared to industry standard T2.
 - Soil organic carbon levels at the site indicate a similar declining trend for all treatments. However it does appear that the rate of decline in the mud only treatment (T1) has slowed compared to other treatments.
 - The results of 2014 have further validated that failure to reduce nitrogen application when used in conjunction with alternative nutrient sources has the potential to reduce water quality, increase Nitrous Oxide emissions and enhance the vigor of weeds.
- This trial will continue for another season.

Figure 1: Deguara site Average %OC (2012, 2013 and 2014)

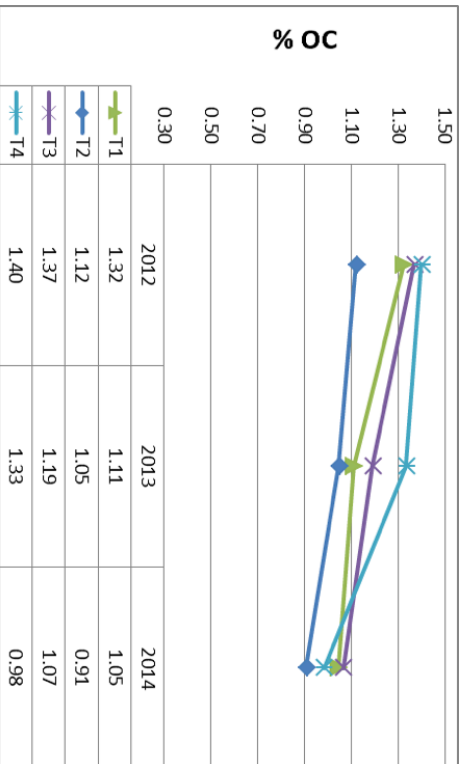


Figure 2: Deguara site comparison of yields (2013 and 2014)

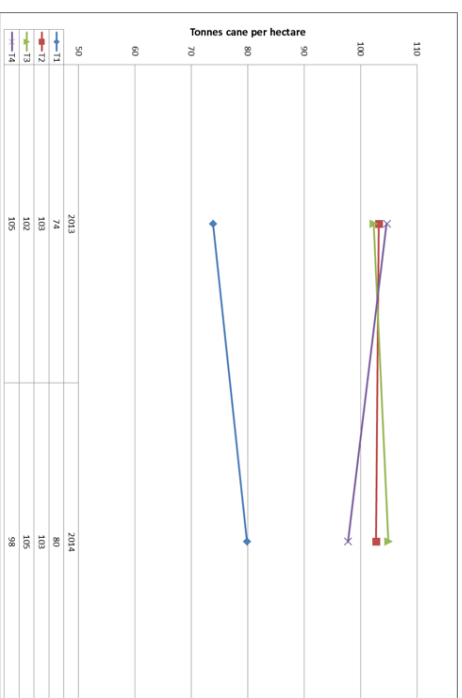
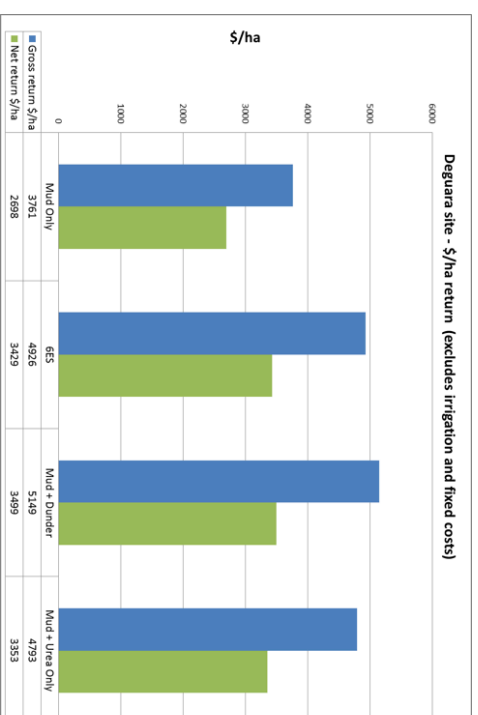


Figure 3: Deguara site \$/ha return (excluding irrigation and other fixed costs)



This trial is supported by Reef Catchments Sustainable Agriculture Program, through funding from the Australian Government's Action on the Ground Carbon Farming Futures.

Right:

Mill mud spreader and banded mill mud.

Top:

Gerry Deguara and Nakalie Fiocco from Farmacist in a chickpea strip.

