



Phil, Lucy, Ricky and John Deguara

# CASE STUDY



National Landcare Program



## BACKGROUND

Phil Deguara is a fourth generation sugarcane farmer, who has been farming full time for 11 years on the family farm in Eton. They began adopting sustainable agriculture practices with the hope of improving long-term productivity and profitability for their farm.

The aim of the trial was to demonstrate and measure soil health and sugarcane yield benefits from the deep placement of soil ameliorants including mill mud, mill ash and composted bagasse.

The burying of soil ameliorants below the surface of the soil can have the potential to improve soil qualities further down the profile, increasing organic carbon levels and to expand the top soil and root zone. The deep placement of ameliorants also reduces the likelihood of nutrient run-off, promotes microbial activity and has the potential to increase a crops nitrogen use efficiency.

The treated component included the opening of furrows, separate passes to apply mill ash, mill mud and composted bagasse into the furrows and the complete burial of materials in the bed forming process. The untreated sections had the furrows opened and the bed forming process completed to remove confounding effects from the tillage activity.

At harvest, 20 meters of stalks were counted and 20 stalks were topped and weighed to calculate the tonnes of cane per hectare.

Each year, soil samples are sent to a Sugar Research Australia laboratory for analysis of parasitic and free-living nematodes, and *Pachymetra chaunorhiza*, a sugarcane fungal root pathogen.

## FOCUS ON



- ▶ Measuring and demonstrating soil health and increased sugar cane yield benefits through the deep placement of soil ameliorants.

## KEY POINTS



- ▶ The trial is still under way, however it was noted that the ameliorants were not buried deeply enough.
- ▶ There has been some promising development in the cane's root systems in the subsurface applied areas.
- ▶ Future work will attempt to place ameliorants into the B horizon, around 30 cm deep.

“The most important learning we have made so far is that there has been no negative impacts by applying mill mud and mill ash to the subsurface, and that it can be done in a cost-effective way.”

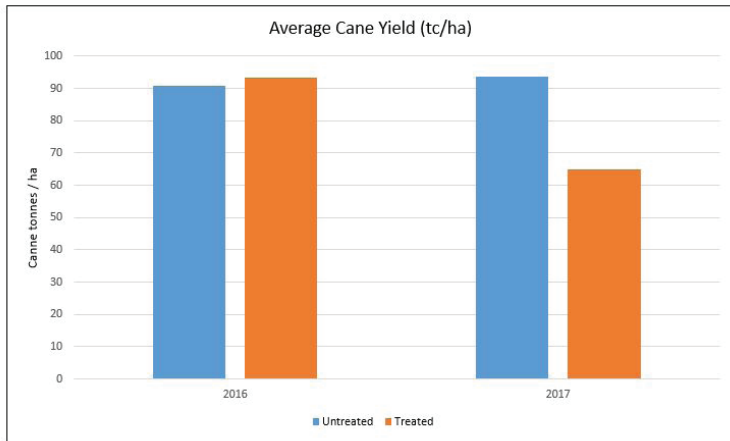
– Phil Deguara, Landholder

**Phil Deguara Subsurface Ameliorants Site**

Rep 1 Treatment 1		Rep 1 Treatment 2		Rep 2 Treatment 1		Rep 2 Treatment 2	
Untreated		Buried		Untreated		Buried	
Furrows opened no ameliorant		Ash 100t/ha Mud 50t/ha Bagasse 50t/ha		Furrows opened no ameliorant		Ash 100t/ha Mud 50t/ha Bagasse 50t/ha	
6 rows		15 rows		6 rows		6 rows	

50m (left side), Water Furrow (right side)

**Trial Design**



**Tonnes cane/ha yield results**

1m soil cores have also taken each year, which then undergo a slaking and dispersion test, to evaluate the structural integrity of the soil.

The family is in full swing at the moment making preparations for the upcoming harvest. Repairing and maintaining machinery and roads is a full-time job on its own, and there is also the soybean crops that are being harvested.

“We have been working with Reef Catchments since Reef Rescue One. They have been a big help with funding trials, extensions and equipment.”

– Phil Deguara, Landholder

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**OUTCOMES TO DATE**



In 2016, treated plots produced a higher yield but only by 3 tonnes/ha, however in 2017 the untreated plots yielded higher. Lodging occurred in the treated plots, which would have negatively impacted crop yield.

Soil bulk density was reduced in the treated site at all depths to 30 cm . This reduction in bulk density is likely to aid water infiltration and crop root development.

Collectively results indicate that the total parasitic nematode numbers are higher in the untreated than the buried treatment, indicating the buried organic materials are supporting a better nematode community.

Soil structural integrity, as indicated by dispersion values were relatively consistent down the profile for both treatments. It is expected to take some time for the buried treatments to have a meaningful change in soil integrity.



“We will be continuing this project through the crop cycle, and we are still working on more effective ways to apply the mill mud and ash to the subsurface.”

– Phil Deguara, Landholder

