CASE STUDY

CONTROLLED TRAFFIC FARMING

CAIRNS REGION

May 2019

CANEGROWERS CAIRNS REGION

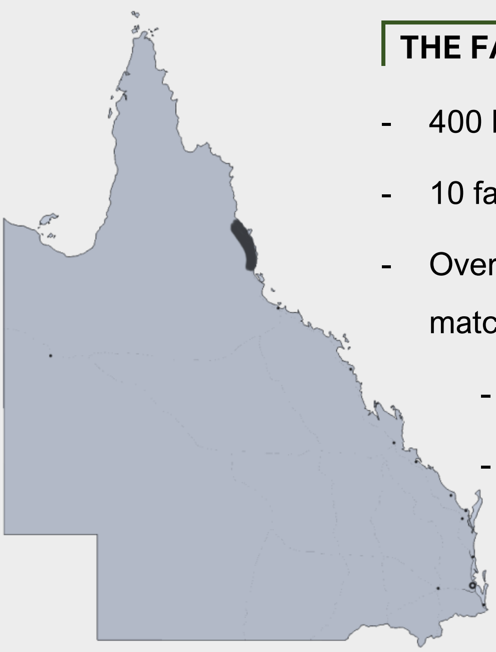
BEHAVIOUR INNOVATION

MSF Sugar

This data was taken from a farmer who uses Controlled Traffic Farming on all of his farm blocks. The data from his farm were compared with the zone average in the region. This data represents the 2017 season only. The findings of this case study are specific to the individual businesses evaluated and may not represent the impact of controlled traffic farming more broadly.

SNAPSHOT SUMMARY

- Controlled Traffic is a farming method that involves matching all farm machinery to the same wheel spacing. It enables for a separate traffic zone and crop zone, which limits soil compaction on the crop area.
- Reducing soil compaction through controlled traffic helps to improve soil structure and increases the cane's root zone and mass, an important consideration for improving soil health and in turn productivity and profitability.
- The present document provides a case study of a controlled traffic farming operation in Babinda North, approximately 50 kilometres south of Cairns. Productivity outcomes (tonnes cane per hectare) are compared to the zone average in the region.
- It should be noted that the grower has recently completed the first crop cycle of Controlled Traffic Farming over the farm. Further productivity improvements and effects to soil health are expected across subsequent seasons.
- Overall, greater productivity outcomes and fewer cost inputs were observed in the Controlled Traffic Farming operation compared to the previous practices utilised by the grower.
- This document shows that benefits to productivity are achievable through Controlled Traffic Farming regardless of variations in soil type, crop classes, and cane varieties.



THE FARM

- 400 hectares – South of Cairns
- 10 farms
- Over 5 years changed their row spacing from 1.65 to 1.8m to better match the wheel tracks of their harvester and haul-out equipment.
  - GPS guidance across all machines except haul-outs
  - An elevator extension was fitted to the harvester.
    - Smartcane BMP accredited
    - **Follows Six Easy Steps**

ECONOMIC ANALYSIS

Economic analysis indicates that the grower will experience **340 days** of time efficiency gains and a total cost saving of **$179,146** following the completion of a full crop cycle (i.e., plant – fifth ratoon) across all farms. Table 1 provides a breakdown of cumulative cost and time savings of all farming and harvesting operations throughout the crop cycle.

Year	Cumulative Cost Saving ($)	Cumulative Time Saving (Hours)
First Year (Plant)	$29,858	453
Second Year	$59,715	906
Third Year	$89,573	1,359
Fourth Year	$119,431	1,811
Fifth Year	$149,288	2,264
Sixth Year (Fifth Ratoon)	$179,146	2,717
Total	**$179,146**	**2,717**

Table 1. *An economic analysis of the grower's expected cost and time savings across a full 6-year crop cycle (i.e., plant – fifth ratoon).*

Additional Benefits

Additional benefits from moving to Controlled Traffic Farming included:

- **Harvester Benefits –** Reduced harvester fuel consumption, improved efficiency of harvesting operations, greatly reduced track wear from the lesser distance covered, and less stool damage when harvesting in wet weather due to slower ground speed of the harvester.
- **Time Saving –** By moving to wider row spacing to match farm machinery, especially harvesting equipment, the grower is able to cover more land in less time**.** Controlled Traffic Farming also requires less turns because of the reduced number of rows per hectare – this saves the grower considerable time and means they are able to farm more land.

TONNES OF CANE PER HECTARE

This section highlights that in aggregate, Controlled Traffic Farming will not reduce tonnage when compared to the zone average.

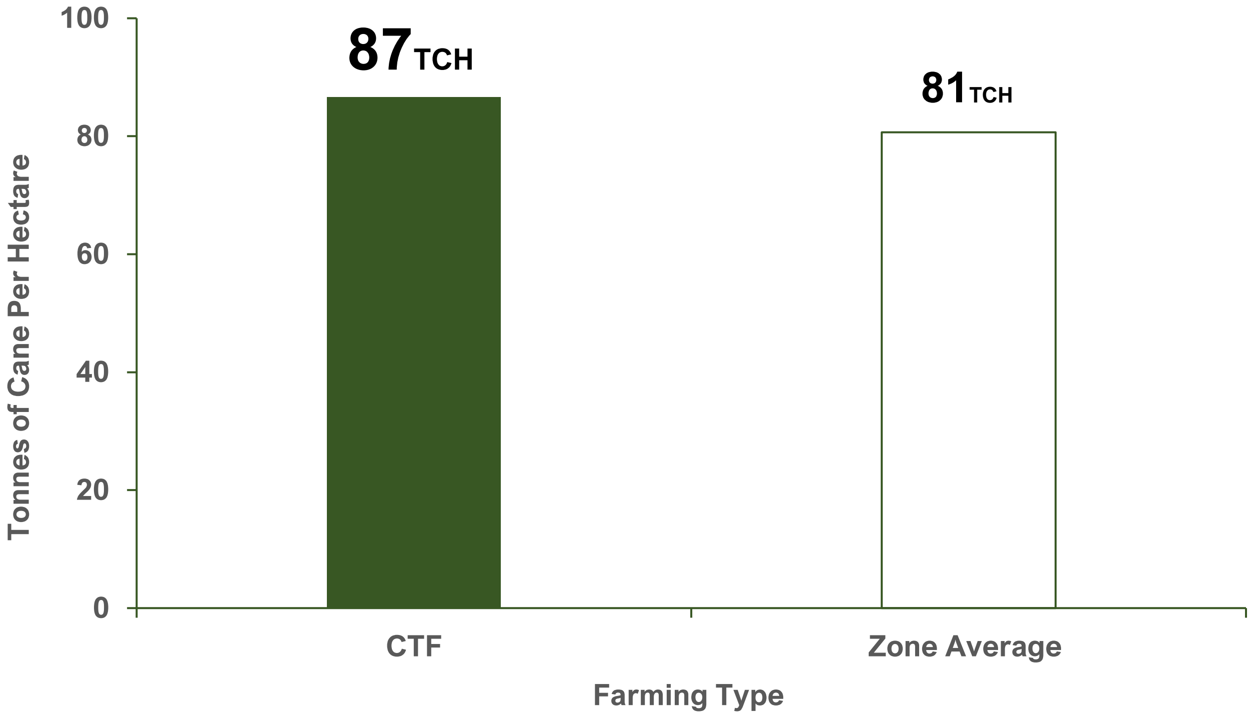


Figure 1. *Average tonnage from Controlled Traffic Farming compared to the zone zone average in the region.*

Comparison	Controlled Traffic	Zone Average
Aggregate	86.63	80.67
Q208	84.65	81.29
Q241	97.72	75.68
Poorly Drained Alluvial	81.09	78.04
Granitic	83.89	77.69
First Ratoon	90.35	83.70

Table 2. *A summary of the main comparisons discussed throughout the document.*

SOIL TYPE

This section summarises the impact of Controlled Traffic Farming on each of the soil types identified on the farm. While tonnage can vary significantly based on differences in soil type, the graphs highlighted in Figure 3 show that adopting Controlled Traffic Farming did not reduce tonnage.

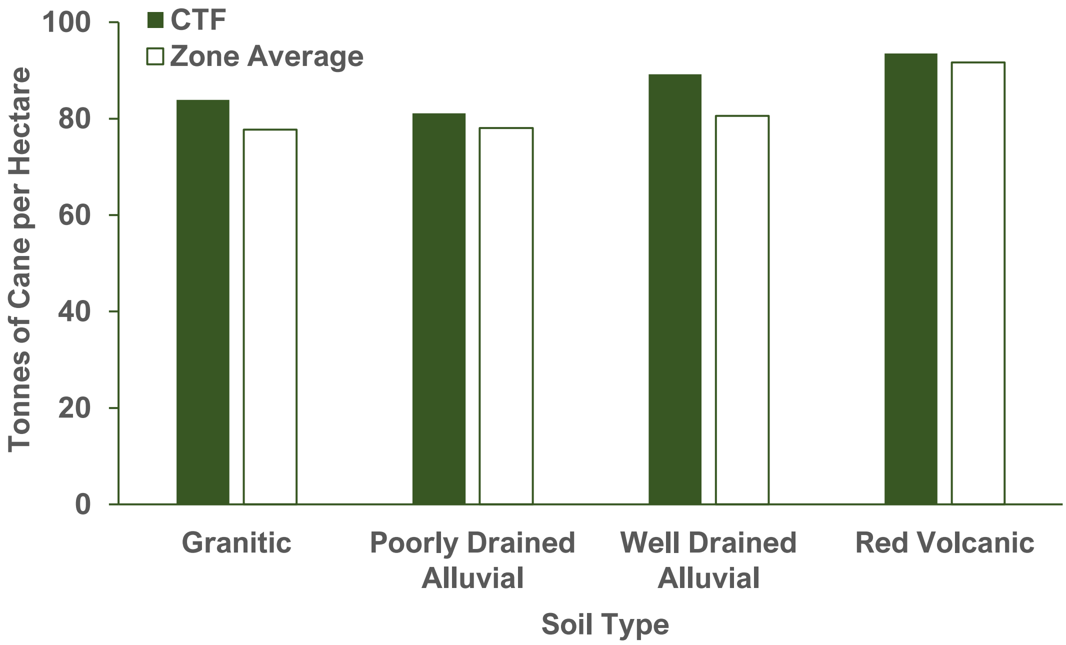


Figure 3. *A comparison of Controlled Traffic Farming to the zone average for each major soil type.*

On this grower's farm, Controlled Traffic Farming has not reduced tonnage across different soil types.

CROP CLASS

This section summarises the impact of Controlled Traffic Farming at each crop class on the farm. The pattern of results presented in Figure 4 shows that overall, Controlled Traffic Farming maintains or can improve productivity across crop classes.

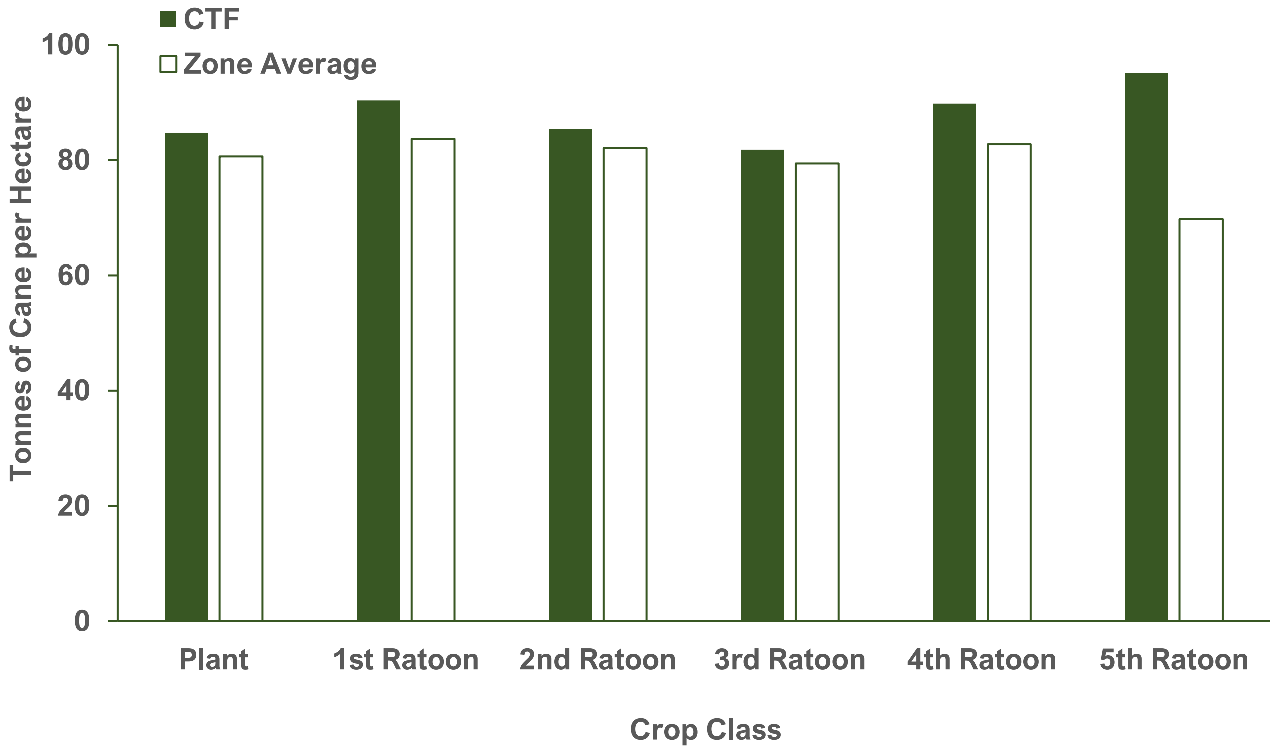


Figure 4. *Controlled Traffic Farming compared to the zone average for each crop class.*

There was no major loss in tonnage for Controlled Traffic Farming across crop classes.

VARIETY AND SOIL TYPE

This section breaks down the effect of Controlled Traffic Farming to identify trends within cane varieties and soil types. The effects of Controlled Traffic Farming are compared to the zone average for each cane variety and soil type. It should be noted that tonnage was only compared when there was a sufficient amount of cane (i.e., two or more blocks).

Q208

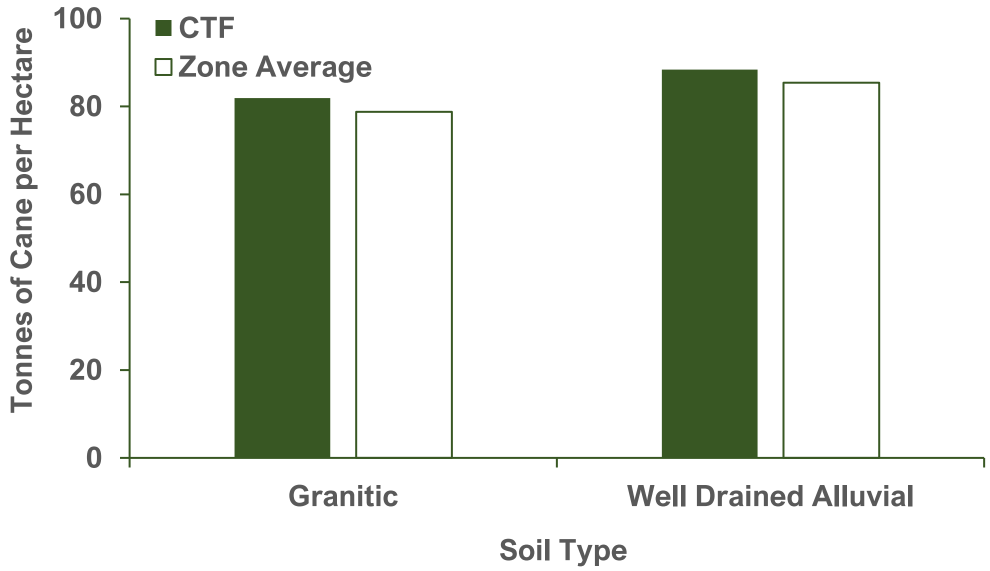


Figure 5. *Controlled Traffic Farming compared to the zone average for Q208 grown in granitic and well drained alluvial soils.*

Soil Type	Controlled Traffic	Zone Average
Granitic	81.93	78.77
Well Drained Alluvial	88.42	85.43

Table 3. *Controlled Traffic Farming compared to the zone average for Q208 grown in two main soil types.*

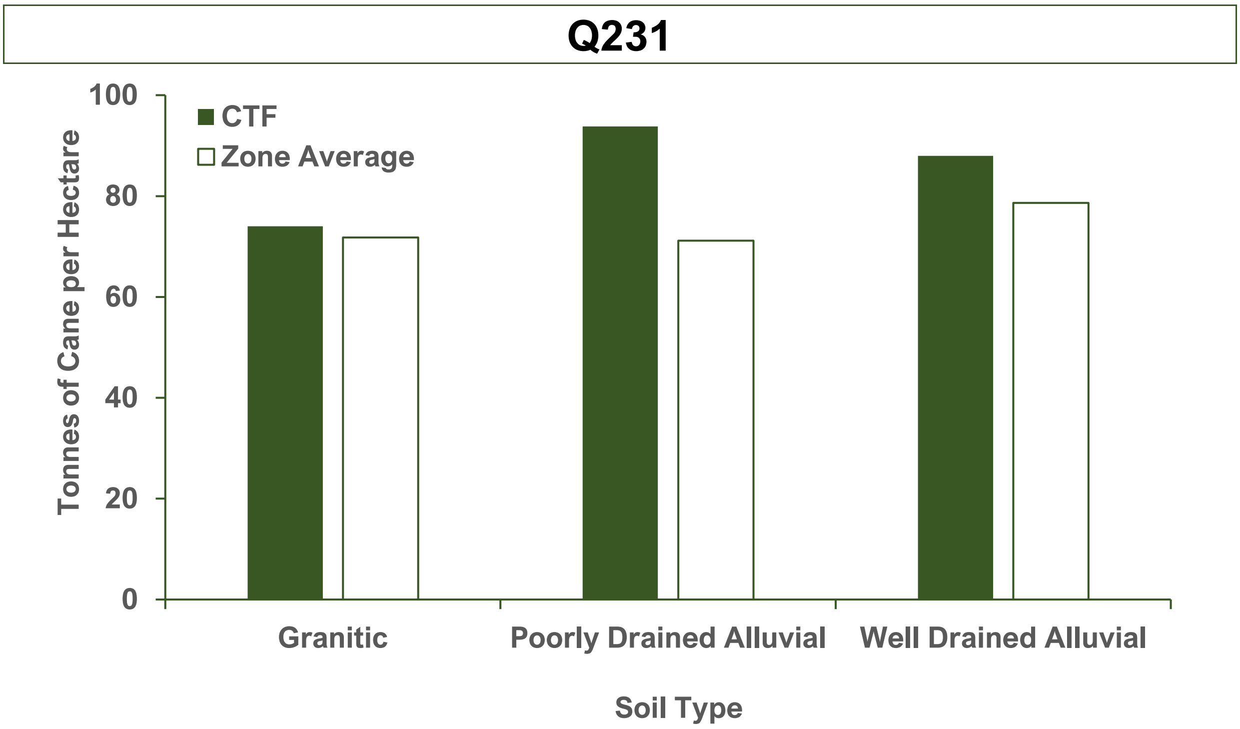


Figure 6. *Effect of Controlled Traffic Farming for Q231 grown in granitic, poorly drained alluvial and well drained alluvial soils.*

Soil Type	Controlled Traffic	Zone Average
Granitic	74.02	71.78
Poorly Drained Alluvial	93.78	71.18
Well Drained Alluvial	87.99	78.65

Table 4. *Controlled Traffic Farming compared to the zone average for Q231 grown in three soil types.*

Q241

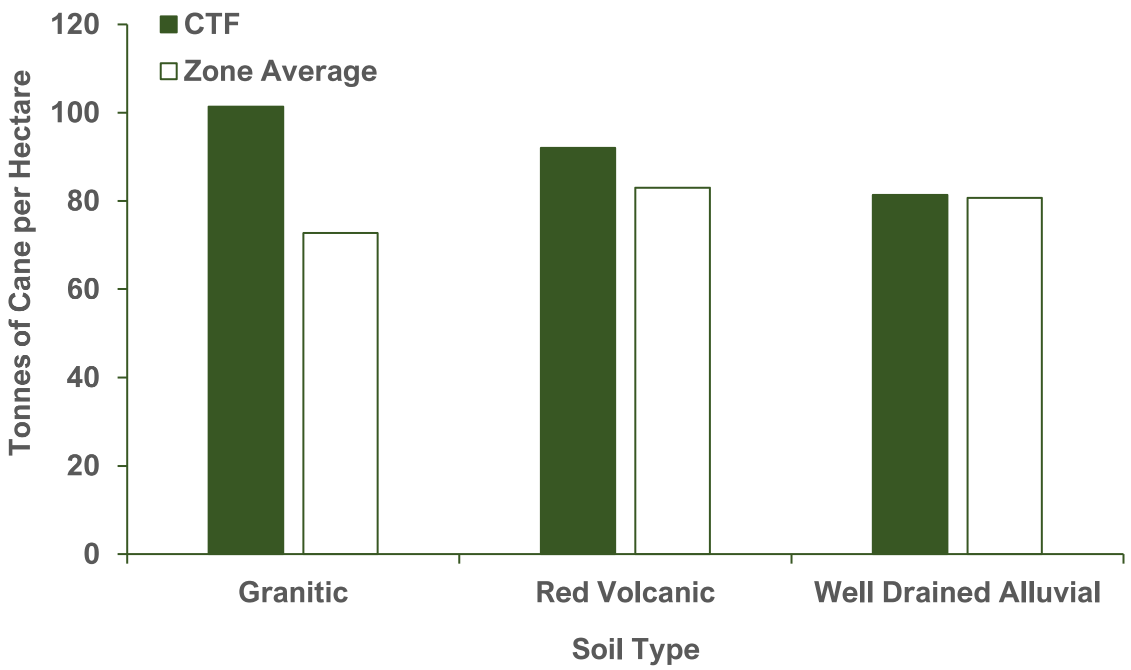


Figure 7. *A comparison of Controlled Traffic Farming to the zone average for Q241 across the three main soil types across the district.*

Soil Type	Controlled Traffic	Zone Average
Granitic	101.35	72.74
Red Volcanic	92.02	83.03
Well Drained Alluvial	81.35	80.70

Table 5. *A comparison of Controlled Traffic Farming to the zone average for Q241 across granitic, red volcanic and well drained aluvial soils.*

Q250

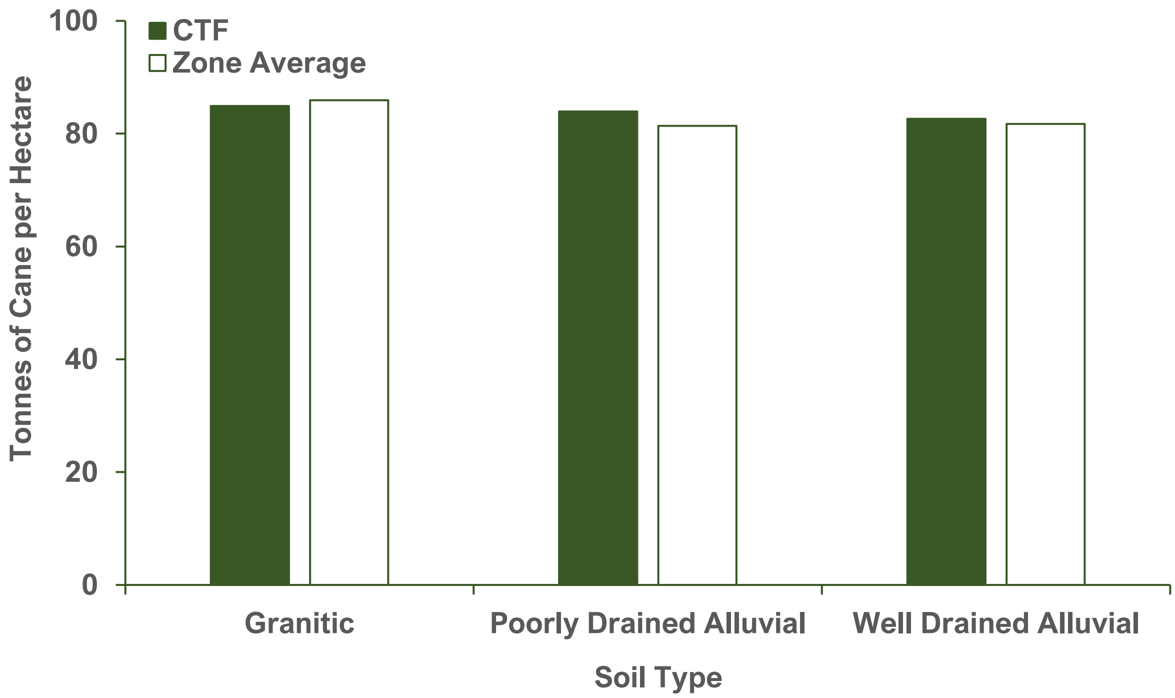


Figure 8. *The effect of Controlled Traffic Farming for Q250 grown in granitic, poorly drained alluvial and well drained alluvial soils.*

Soil Type	Controlled Traffic	Zone Average
Granitic	84.93	85.91
Poorly Drained Alluvial	83.94	81.38
Well Drained Alluvial	82.64	81.73

Table 6. *Controlled Traffic Farming compared to the zone average for Q250 grown in three major soil types.*

Interpretation

This section compared the effect of Controlled Traffic Farming to the zone average across the main sugarcane varieties and soil types in the district. Differences in productivity are often observed between different cane varieties and soil types – however, the pattern of results indicates that transitioning to Controlled Traffic Farming does not impact tonnage even after accounting for these variations.

Across cane varieties and soil types, the grower did not experience any major reduction to their tonnage after transitioning to Controlled Traffic Farming.

SUMMARY

Overall, the pattern of results shows that Controlled Traffic Farming is a safe practice that does not set the grower back from their previous productivity. Another finding is that Controlled Traffic Farming maintains tonnage throughout later crop classes. This is most clearly depicted in Figure 4.

Following the completion of a full crop cycle, it is expected that the grower will gain **340 days** in time efficiency, while experiencing a total of **$179,146** in cost savings across all farming and harvesting operations. Additional benefits to the harvester were also observed, which included a significant reduction in track wear and fuel consumption.

In sum, this case study shows that Controlled Traffic Farming, even during a transition period, will not hinder tonnage when assessed against the zone average across various soil types, crop classes and sugarcane varieties. Controlled Traffic Farming also benefits the grower economically through reduced fuel costs, reduced machinery hours, and time efficiency gains. This means that by transitioning to Controlled Traffic Farming, growers may receive an equal or greater yield while applying fewer cost inputs.