Catalyst Project Report – Final Report

Trickle irrigation in sugar cane

Grower Information	
Grower Name:	Joe Muscat
Entity Name:	Sunrise Family Trust
Trial Farm No/Name:	MKY-04533B-14-03
Mill Area:	Mackay
Total Farm Area ha:	172Ha
No. Years Farming:	40
Trial Subdistrict:	Sandy Creek
Area under Cane ha:	112Ha

Background Information

Aim:
To compare irrigation methods and their impact on plant nutrient uptake and water quality

Background:
Trickle irrigation provides a targeted irrigation approach, applying water only to the stool and the root zone of the plant. As the water is not soaking the whole profile, less water is used, therefore nutrient losses through leaching and denitrification caused by waterlogging are less likely. This method of irrigation also reduces the chance of direct runoff from the paddock due to overapplication of irrigation water, which can particularly occur with flood irrigation. There is also an environmental saving in that less power is needed to run the irrigation and less water is lost through evaporation as it is applied below the surface. This means that irrigation can be applied throughout the day which in turn allows the use of solar panels to power the pumps. As well as irrigation, this system can support fertigation, meaning it can apply fertiliser as the same time. Fertigation allows for fertiliser to be applied in smaller amounts more frequently, assisting in the plant's utilisation of applied nutrients. This trial will compare a block of trickle irrigation to a block watered by a centre pivot. Comparisons will include cane yield, economics and monitoring water quality run off using KP samplers.

Potential Water Quality Benefit:
Reduction in runoff and leaching

Expected Outcome of Trial:
Economical irrigation method with a reduction in the amount of irrigation runoff

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	**March 2016-September2016**	Set up Trickle infrastructure
Stage 2	**September 2016**	Plant Cane
Stage 3	**October 2017**	Harvest Cane Rainfall simulations
Stage 4	**May 2018**	Sugarcane biomass samples
Stage 5	**October 2018**	Harvest trial

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q240 PLT
Trial Block No/Name:	MKY-04533B-14-03 compared to MKY-04533B-10-02
Trial Block Size Ha:	Block 14-03: 4ha block 10-02: 7.5ha
Trial Block Position (GPS):	Longitude:148.993995, Latitude: -21.321147
Soil Type:	Sand

Block History, Trial Design:

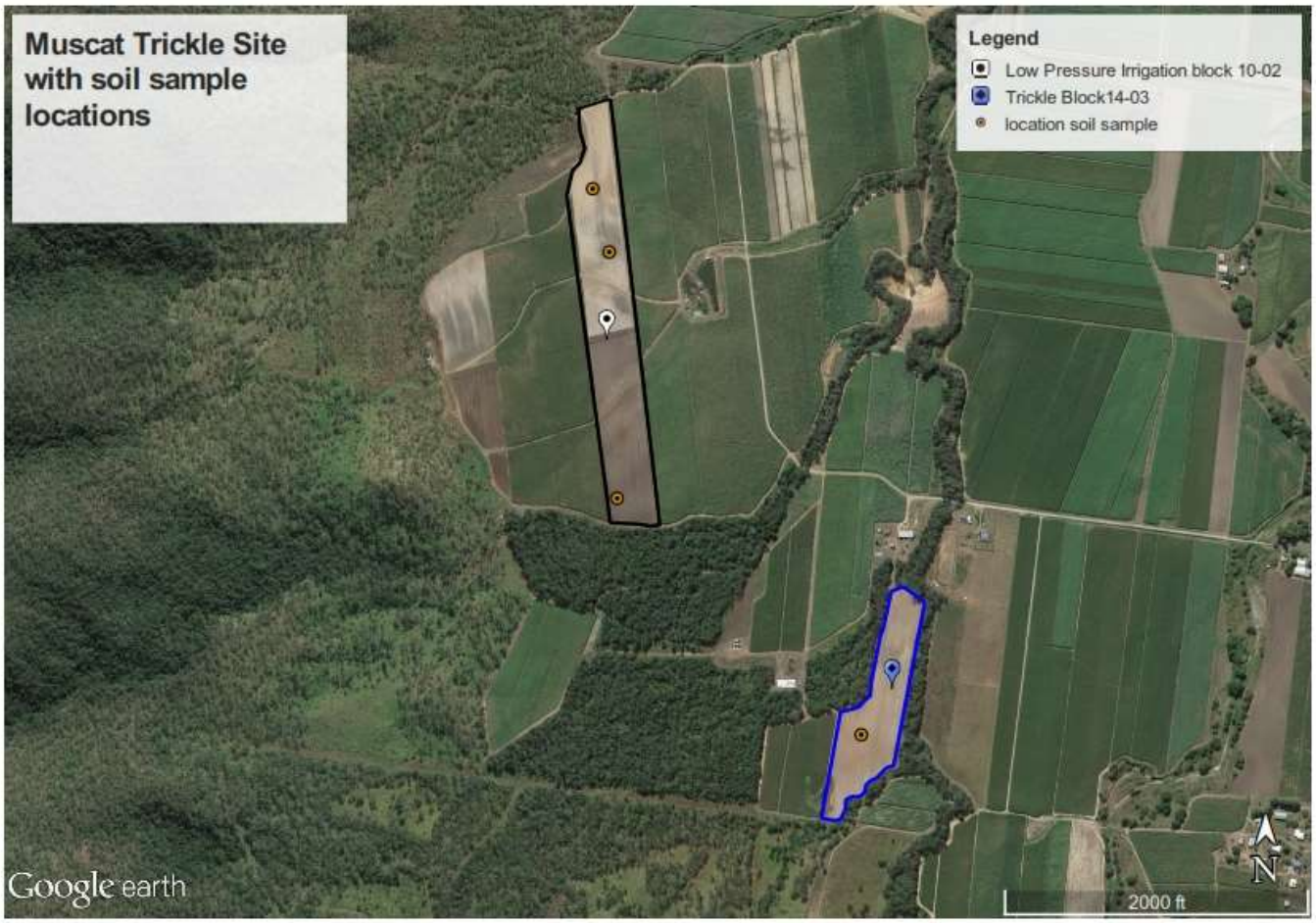

Figure 1 - Location of trickle paddock and conventional irrigated paddock.

Figure 2 Plant cane where trickle is established

Figure 3 Trickle pump station

Figure 1 shows the two paddocks that were used to compare the different irrigation techniques, whilst Figures 2 and 3 show the setup of the trickle irrigation system.

Treatments:
MKY-04533B-14-03 Trickle Irrigation
Control- MKY-04533B-10-02 Low pressure centre pivot Irrigation

Results:

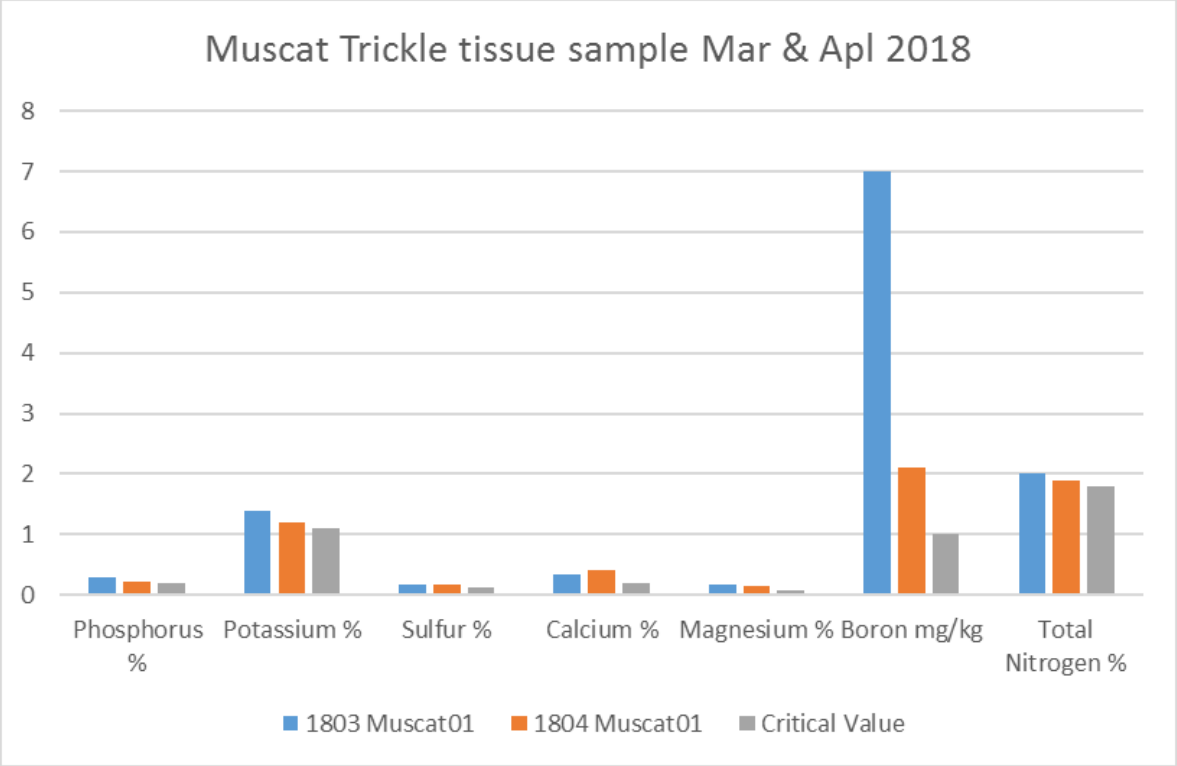

Figure 4 - Tissue sample results taken early 2018 from the trickle irrigated block.

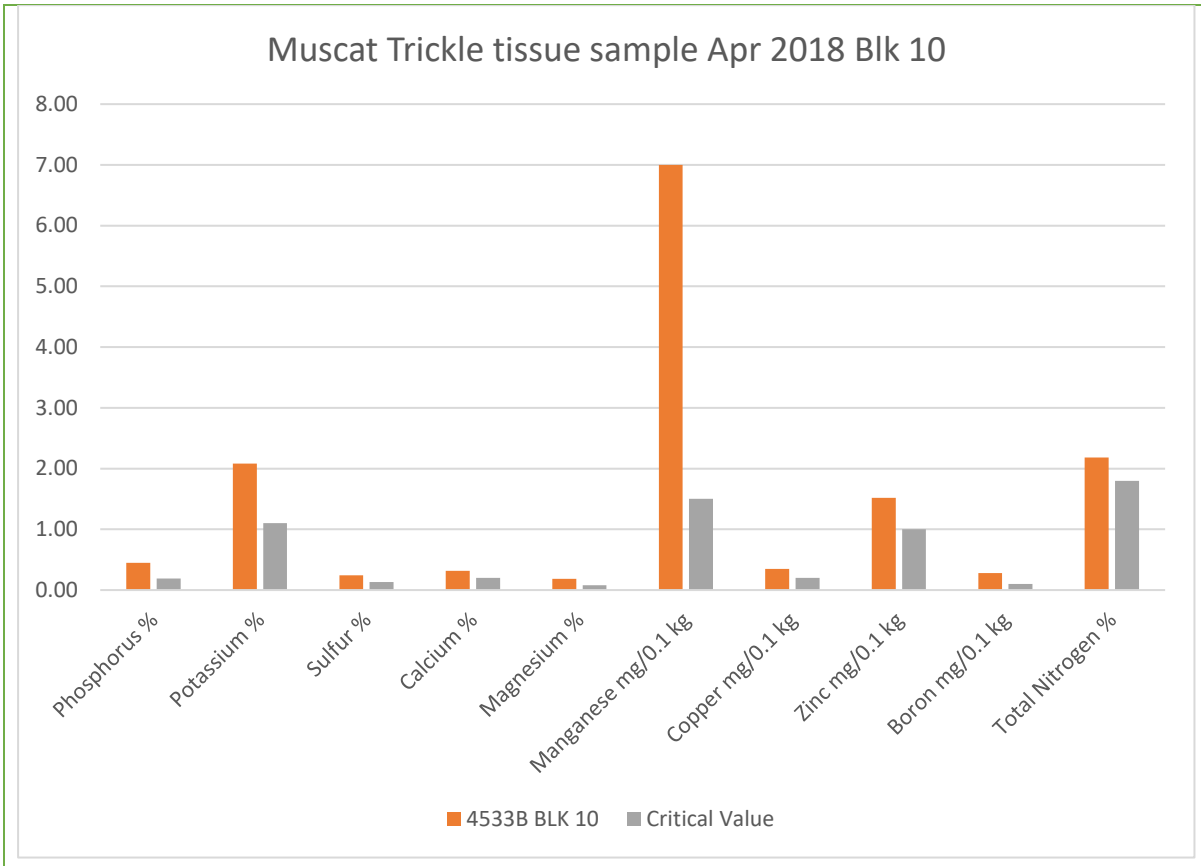

Figure 5 - Leaf sample results taken early 2018 from the conventionally irrigated block.

Leaf sample taken in the trickle block (Figure 4) during March and April 2018 indicate all elements are above critical values as were the samples taken from the comparison block (Figure 5) during the same period.

The 2018 harvest (results in Table 1) showed varied yield results with the centre pivot irrigation achieving a higher PRS and lower yield compared to the trickle block which received a lower PRS and a higher yield.
It is important to note that due to the trickle irrigation system, nutrient management is also impacted on top of water management, so irrigation may not be the only factor influencing the yield results.

Table 1 – 2018 yield results from the two blocks

	Cane Yield (t/ha)	PRS	Sugar Yield (t/ha)
Trickle Block	127.2	11.28	14.35
Centre Pivot Block	87.3	15.04	13.43

When looking at the overall sugar yield, there was only 1.1 t/ha difference, which is a minimal improvement for the trickle block, considering the cost of installation.
If the PRS was improved, through nutrient management or harvest timing, this difference has the potential to be much larger.

Conclusions and comments

This system has successfully been utilised to irrigate the sugar cane crop and has not hindered the cane growth or operations in the paddock. Difficulties in pest control, namely rodents, have impacted the efficacy of the system and created more maintenance than originally expected. Yields over the past two seasons have been comparable to conventional irrigated paddocks, which creates hard justification for the extra expense of the trickle system. Benefits have been noted in practising fertigation, applying smaller amounts of nutrients more frequently, particularly on this type of sandy soil. This creates more ideal growing conditions, along with reduced number of passes over the paddock.

Advantages of this Practice Change:

More efficient nutrient placement and application.

Potential for more effective irrigation

Disadvantages of this Practice Change:

Cost of installation is significant. Pest damage requires significant repairs to equipment.

Will you be using this practice in the future:

If the price of implementing trickle decreases, it would be considered.

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

At this stage and cost it is not viable

Project site is complete