Project Catalyst Trial Report

2 Year Fallow vs Traditional 1 Year Legume Fallow

Grower Information	
Grower Name:	Gerry Deguara
Entity Name:	Gerard Deguara Holdings
Trial Farm No/Name:	MKY-3556A
Mill Area:	Mackay Sugar
Total Farm Area ha:	43
No. Years Farming:	45 – 2nd generation
Trial Subdistrict:	North Eton
Area under Cane ha:	700 (combined total of operation)

Trial Status

Completed

Author: Zoe Eagger (Farmacist). For further information contact Zoe on Mb. 0436 004 437.

Background Information

Aim: To demonstrate that a diversified cropping system is the most economically and environmentally sustainable management approach long-term.

Background: (Rationale for why this might work)

Outcomes of the sugar industry's "Yield Decline Joint Venture" (1999 -2006) recommended that to maximise soil health and sugar cane production, long-term breaks from the sugar cane monoculture were required. To examine the influence of an extended fallow period on soil health, and on the following sugar cane crop rotation, a trial was established at Gerry Deguara's farm in the North Eton district in 2020.

Two treatments were chosen. The first reflected the grower's standard fallow practice and the second was an extended fallow treatment.

Treatment 1 (Grower standard practice): Plough out→ soybean→plant cane

Treatment 2 (Extended fallow option): Plough out→soybean→safflower→soybean→plant cane

A pilot trial was conducted between 2012-19 on another of Gerry Deguara's farm. The block started as a standard fallow of soybean. A second treatment was added, in randomised strips, the following season to which a further 12 months was taken out of sugarcane to grow grain crops. This resulted in the plant cane being planted in different years for the two treatments, therefore, comparison of sugarcane yield was conducted at different crop ages in the same year.

The extended fallow treatment did achieve between 1.5 to 2.2 tonnes of sugar per hectare (tS/ha) each season higher than the standard fallow. This benefit did not flow through to improve gross margin as the block was ploughed-out to suit the standard grower practice.

Gerry has been confident in the extended fallow farm management practice since this original trial and has put 22 hectares (ha) into an extended fallow. The 2020 season provided an opportunity to make improved comparisons as the two blocks are adjacently located and have been planted at the same time. One has had a standard soybean fallow and the other an 18-month grain crop period prior to plant cane.

In 2019, baseline data was collected from the site including EM data, soil sampling and analysis to determine Pachymetra spore levels, chemical, nutrient, and textural information.

The economics of the treatments over the entire crop cycle will be calculated at the end of the trial in 2022 to determine if extending fallow length by 12 months results in improved soil health and increased sugar yields, and whether income generated from fallow crops provides a business risk benefit.

Potential Water Quality Benefit: An increased nutrient use efficiency equating to a reduction in potential nutrient and sediment run off. Planting winter crops allows for new herbicide chemistry to be used, which can help control weeds that often require PSII herbicides in a straight sugarcane system. By reducing the use of PSII herbicide reliance there is a reduced risk of these high ecotoxicity chemicals entering local aquatic systems.

Expected Outcome of Trial:

Diversified cropping systems have improved soil health, nutrient cycling, yields outcomes and result in higher gross margins (increased profitability).

Service provider contact: Farmacist Pty Ltd

Where did this idea come from: Gerry Deguara

Plan - Project Activities		
	Date:	**Activities:**
Stage 1	**November 2019**	Sugarcane crop harvested T2- 2 year fallow.
Stage 2	**December 2019**	Soybean crop planted T2- 2 year fallow.
Stage 3	**May 2020**	Harvest soybean crop T2- 2 year fallow.
Stage 4	**June 2020**	Plant safflower T2- 2 year fallow.
Stage 5	**August 2020**	Harvest sugarcane off T1- standard practice
Stage 6	**August 2020**	Collect soil health measurements
Stage 7	**December 2020**	Harvest Safflower T2- 2 year fallow.
Stage 8	**December 2020**	Plant soybean both treatments
Stage 9	**May 2021**	Harvest Soybean both treatments
Stage 10	**August 2021**	Plant Sugarcane both treatments

Project Trial site details	
Trial Crop:	Sugar cane, soybean and safflower.
Variety: **Rat/Plt:**	T1 - Standard practice 2019 Class = KQ228 4R T2 – 2-year fallow 2019 Class = Q232 5R
Trial Block No/Name:	17-02 and 17-03

Block History, Trial Design

Figure 1 - 2020 Soybean crop ready for harvest.

In December 2019 a Kuranda soybean crop was planted , the crop was desiccated ready for harvest in May 2020. The Kuranda variety achieved 3t/ha on average across the 5ha block. This block was to become Treatment 2 (extended fallow) in the trial. A Safflower crop was planted into the block in June and harvested on the 5th November 2020 . The safflower yielded a 1.2 t/ha average. In November 2020, the block adjacent had its final sugarcane crop harvested and was established as the Treatment 1 block. Both treatments where then planted with Kuranda soybean in the first week of December 2020.

Figure 2 - Safflower being harvested December 2020

Figure 3 - Safflower sample direct from the header bin

Trial Layout

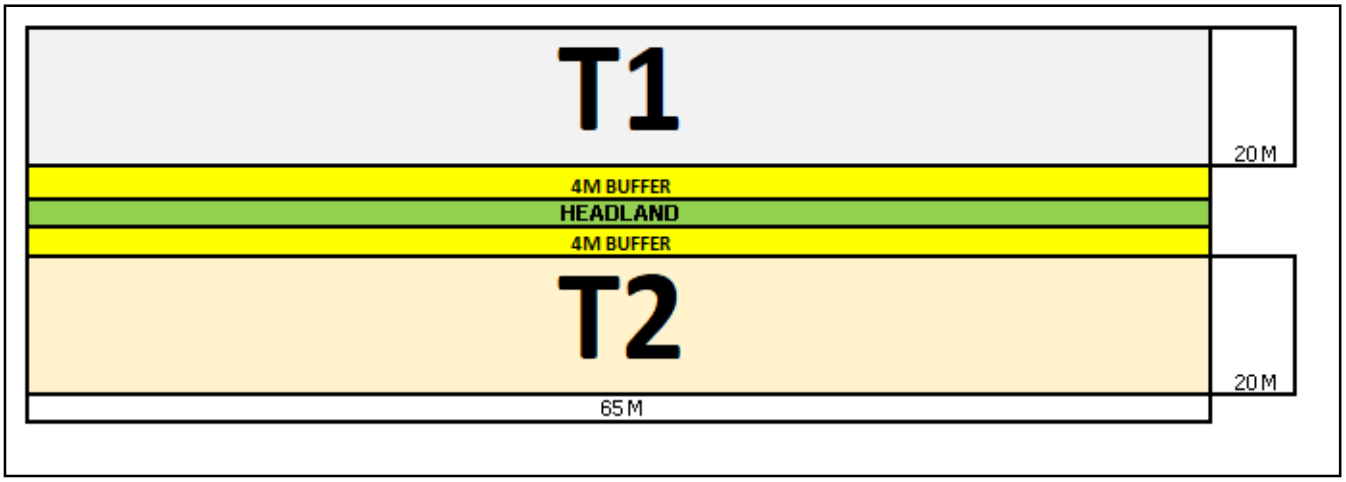

Figure 4 Trial layout for 2020-2021

Treatment 1 (Grower standard practice) – Plough out → soybean→plant cane

Treatment 2 (Extended fallow option) – Plough out→soybean→safflower→soybean→plant cane

Results

This is an early stage trial, supplementary to the main innovation program and will be completed subject to the programs future funding.

Conclusions and comments

N/A

Advantages of this Practice Change:
TBA

Disadvantages of this Practice Change:

TBA

Will you be using this practice in the future:
TBA

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