Scott and Maria Simpson

Skip row cane planting

REGION: Mackay Whitsundays | Bloomsbury

Scott and Maria Simpson live on a farm near Bloomsbury, around 90km north-west of Mackay. It is bordered by the beautiful O'Connell River, which is home to big Barramundi and the rare Jungle Perch, and flows into Repulse Bay and the Whitsundays. Scott helps to manage around 620 hectares of cane which is a mix of self-owned, family and partnership farms.

The partnership is called O'Connell Catchment Precision Services (OCPS) and was formed in the early 2000's bringing together the equipment and services of the Jeppesen, Considine and Simpson farming entities (all involved in Project Catalyst). The partnership helps overcome the economic challenges and deficiencies of adopting new management practices individually.

OCPS settled on a dual row 1.9 metre controlled traffic farming system using 2cm RTK GPS guidance. Scott's cane is grown in mounded beds following a legume fallow. "The legumes are sprayed out and we go through with a bed renovator and sometimes we use a trowel implement to smooth the beds to make sure the soil is all the same height for uniform set depth," explained Scott. Scott also lightly cultivates his wheel tracks as, while the controlled traffic system leaves his cane bed in great shape with excellent infiltration, the compacted wheel tracks can channel water off the blocks.

Nutrient management is done with Project Catalyst precision planning support. "A prescription nutrient blend is made for our property based on soil tests and EM mapping, the rates are changed by paddock," said Scott, who is trialling variable rate within paddock with his lime application, but feels it is still very complicated.

Scott and OCPS have utilised Reef Rescue (now Reef Programme) to help complete the transition to their GPS controlled traffic system, to help modify their high clearance spray equipment, to purchased a 6-row shielded sprayer unit to change their chemical management strategy and utilise more knockdowns and a bean planter to plant legumes in fallow blocks.

Issues being addressed

While Scott has been able to adopt new management practices that have helped to break the monoculture of cane and in time improve soil health, there are still issues around input management that he and OCPS are keen improve from both an environmental and economic view point. This includes maximising water use over a large area for the best return and reducing the costs of big operations such as planting, fertilising and harvesting by reducing inputs and improving efficiency.

Solution being tested

Project Catalyst supports OCPS to trial six hectares of a skip row farming system. This involves planting (dual row) the first 1.9m row of cane and then leaving out one "fallow" row (still 1.9m) before planting the next one. The fallow rows are retained for the entire crop cycle and if possible will be planted with a legume crop each year after harvest. Scott says he hopes this system will end the need for a whole block fallow; instead he will plant straight into the skipped rows, and plant legumes into the old cane rows. Simply put, each crop cycle the cane and fallow rows will alternate but the majority of land preparation happens during the first cycle.

Project results

Scott established his first plot in 2008 and after a successful harvest added another 5 hectare plot in 2009. He is happy with the trial and hopes that the skip row will yield an extra ratoon in the second cycle as the larger cane requires a low harvester speed which reduces stool damage. Other advantages are a reduction in cultivation required before planting reducing costs and soil losses.

It is expected that the legumes in the fallow rows will fix nitrogen in the soil benefiting the current crop and potentially reducing nitrogen required in the plant cane and first ratoon of the second cycle.

With only half the area planted, Scott is has noticed a big reduction in farm inputs and improved efficiency in harvesting, nutrient and chemical application. This gives water quality benefits, with only half of the fertiliser and herbicide applied compared to conventional block.

While only 50 % of the block is planted the cane grows larger than conventional blocks with reduced competition for nutrients, water and sunlight. Scott feels that there is no significant impact on economic returns

to the farming entity. "When the price of fertiliser goes up we do especially well, as the big advantage with the skip is the savings on inputs. This gives us economic and environmental advantage" he said.

Left and below: On the Simpson's property in Bloomsbury, Project Catalyst supports OCPS to trial six hectares of a skip row farming system. The fallow rows are retained for the entire crop cycle and if possible will be planted with a legume crop each year after harvest. Scott says he hopes this system will end the need for a whole block fallow; instead he will plant straight into the skipped rows, and plant legumes into the old cane rows.

Thanks to QDAFF and Farmacist for support with this case study.

Project results (continued)

In the second and subsequent skip row crop cycles, no land preparation is expected before replanting into the fallow rows.

The three harvests from the trial incorporated into this case study indicate that the tonnes of cane per row are higher than in conventionally planted cane as the stalks are able to grow taller and thicker due to greater access to water and sunlight. However, the tonnes of cane per hectare have been lower than when planted conventionally. Skip row yield for the remaining ratoons have been estimated.

The skip row planted cane is easier to harvest as the row is clearly defined, and the harvester speed is slower with a higher pour rate. The slower harvester speed reduces stool damage, and as a result Scott expects to retain skip row blocks for an additional ratoon than conventionally planted cane. This will allow one extra year of income from the crop before requiring replanting

Economic analysis by DAFF QLD shows that so long as the yield of the skip row does not drop more than 21 % below what can be reasonably expected from a conventional block Scott will reach break-even.

Economic results

This economic analysis has been created by QDAFF economists and the grower, using individual grower information and standardised input prices in the Farm Economic Analysis Tool (FEAT). The change in gross margin "before" and "after" was used along with capital costs to conduct an investment analysis. This analysis is case specific, in regard to soil type, scale, and production system. Therefore, growers seeking to uptake similar changes should seek individual advice.

Key assumptions

- Conventional planting: land fallowed before replanting
- Skip row planting: no fallow blocks, mulch crop planted in fallow rows each year
- In 2nd crop cycle, no land preparation before planting into fallow rows
- Additional ratoon expected due to reduced stool damage
- First 3 skip row yields are actual, remaining ratoon yields have been estimated
- In 2nd crop cycle, no yield increase included (although it is potential – similar to new ground)

Capital investment and salvage values

	Capital investment	Salvage value in Year 10
Purchase quad bike	$11,000	$0
Purchase single row legume planter	$6,000	$1,800

Yield data and expectations (t/ha)

	Plant	1st ratoon	2nd ratoon	3rd ratoon	4th ratoon	5th ratoon	6th ratoon
Conventional yield expectation	120	105	88	78	67	67	-
Skip row yield data/ expectation	101*	80.6*	68.1*	60.1	51.6	51.6	51.6
% difference	-16%	-23%	-23%	-23%	-23%	-23%	100%

* Data based on seasonal conditions in 2009, 2010 and 2011

Results

- Gross margin decreases by $1/ha from conventional to skip row planting in 2nd crop cycle
- Plant cane and ratoon costs decrease (reduced plant cane, fertiliser & chemicals used)
- Reduction in costs insufficient to offset lower yield (despite no fallow blocks & extra ratoon)
- The annual change in gross margin is discounted at 7% over a 14 year investment period, resulting in a net present value (NPV) of -$31,373 or -$270 per hectare over 14 years
- Risk analysis indicates this property has a 0.3% chance of receiving a negative gross margin in any year with conventional planting. This chance is 0% with skip row planting.

	1st crop cycle	2nd crop cycle
Change in gross margin ($/ha)	-$29/ha	-$1/ha
Net Present Value ($)	-$31,373	
Net Present Value ($/ha)	-$270	

Breakeven Analysis

- What reduction in yield can be sustained before the skip row system ceases to be viable?
- For this property, if tonnes cut from the property do not reduce more than 21%, the project will be viable

Conclusions

- Based on data obtained so far, skip row does not improve the property gross margin
- However, skip row yields are "actual", conventional yields are "expectations"
- Currently this does not appear to be a good investment at a property scale
- However, further work is needed (ideally proper replicated trials)
- Other benefits include: more leisure time for grower, less harvester wear, etc
- Potential problems if fallow rows do not break nematode and pachymetra populations

Note: Scott has planted soybeans into his skipped area and will plant sugarcane into those rows in 2015. This case study will be updated following this event.

Syngenta is a global leader in grower-focused innovation, investing over US1.4billion in agricultural research and development annually. In Australia, we are committed to leveraging the best of our global biotechnology and crop protection innovations to deliver solutions that enable growers to better manage risk, improve farm productivity, realise their crops full potential and minimise potential impact on the environment.

Innovation is at the heart of what Syngenta does, however we recognise innovation matters most when it is utilised on-farm to drive productivity, enhance sustainability and improve routines.

We also understand that the challenges facing the planet are huge. Each day a billion people go to bed hungry, and by 2050 there will be two billion more mouths to feed.

Never before has the need to do more with less been so important. The resources required to grow our food – including land, water and energy – are already overstretched. Every year, millions of hectares of land are lost to erosion, degradation and urbanisation. We are losing biodiversity and farmland which is critical to food production. In many parts of the world smallholders are trapped in a cycle of poverty.

Syngenta supports Project Catalyst's focus on trialling and validating innovative practices that are good for farmers and good for the environment. Our Syngenta business and the world's food security depend on sustainable natural resources, healthy ecosystems and thriving rural communities. To play our part, we are making six specific commitments (see opposite).

We call this **The Good Growth Plan**. Working with farmers, governments, NGO's and others we aim to make a deep, lasting and positive impact on the world's food security and the planet's long-term sustainability. Project Catalyst helps us work towards our Good Growth Plan goals.

Innovation and a deep commitment to product stewardship and sustainability will be essential in ensuring the future success of the Australian cane industry. Syngenta looks forward to partnering with growers, including through Project Catalyst, to help realise some exciting opportunities and scale this up throughout the world.

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The Good Growth Plan.

By 2020 we want to partner with a range of stakeholders to:

1) Increase the average productivity of the world's major crops by 20 percent without using more land, water or inputs

2) Improve the fertility of 10 million hectares of farmland on the brink of degradation

3) Enhance biodiversity on 5 million hectares of farmland

4) Reach 20 million smallholders and enable them to increase their productivity by 50 percent

5) Train 20 million farm workers on safety practices, especially in developing countries

6) Strive for fair labor conditions throughout our entire supply chain network

Project Catalyst helps us work towards our Good Growth Plan goals, working with farmers, governments, NGO's and others to make a deep, lasting and positive impact on food security and the planet's long-term sustainability.