

Chris Hesp

Mill Mud Application Trial

REGION: Burdekin Dry Tropics | Mulgrave - Burdekin River Irrigation Area (BRIA)

Annual average rainfall: 882.3 mm
Property size: 606 ha

Family History

Chris completed his trade as a fitter and turner and spent time working at Mulgrave mill before moving onto the family farm in Gordonvale. Chris and his wife Sonya then moved to their farm in Clare.

Originally from the Gordonvale district, the Hesp family were attracted by the opportunity to acquire affordable land when the Burdekin irrigation area opened up and purchased a scrub block and water allocation in 1991 and now have four adjoining farms in the Mulgrave area in the BRIA.

Moving from the Wet to Dry Tropics was a steep learning curve, but 23 years on, Burdekin farmers Chris and Sonya Hesp have no regrets. Innovative by nature. "The shift has taken me out of my comfort zone and challenged me to adapt to new and very different surroundings," Chris said.

Practices

The family partnership now has 606 ha in cane production with about 120 ha normally fallowed at any one time and has grown more than 60,000 tonnes of crops supplied on tramline to Invicta mill.

Typically in the past approximately 30% of the farm was under green trash blanket and every second row was raked clear of trash to improve efficiency in furrow irrigation. As a result of a number of wet harvesting years, Chris has chosen to return to cultivation to address soil compaction from harvesting. Once compaction is resolved, Chris wants to return and potentially expand on his green trash system.

All irrigation water is captured on farm and recycled. Farming in the heavy cracking clays of the Mulgrave area, and trying to balancing irrigation to meet the crop requirements is a constant challenge. Water-logging and subsequent loss of nutrients from the green trash system is a concern when managed poorly.

The opportunity arose for Chris to purchase his own harvester which allows him to manage both his own harvest schedule and performance. Apart from his own Chris also harvests his neighbor's crop which combines to a group tonnage of approximately 70,000 tonne. "Since we have had our own

harvester, speed has not been an issue and the quality of the job is pleasing," Chris said.

Chemical practices

Knockdown herbicides are predominantly used in ratoons and bare fallow management. A high clearance spray tractor allows extended time to access the crop, minimising the need to use residual PSII's herbicides. When using the green trash blanketing system a significant reduction in herbicide applications and rates has been achieved, as only every second row is sprayed with an irvin boom. Broad acre herbicide application is used for any vine pressure in the trash blanket.

Nutrient practices

A one shot fertiliser is predominantly applied with a stool splitter after the first watering across the majority of the property. However the 'Overhead' irrigation blocks have Phosphorous, Potassium and Sulphur applied with the stool splitter and the application of Nitrogen applied through fertigation. Soils test are done after every crop cycle and these results form the basis of future nutrient plans.

Motivators to change

Chris and his wife Sonya have a reputation for trialling innovative practices on their farm and their problem solving approach combined with incentive funding when appropriate has ensured consistent practice change. "Funding stimulates growers to undertake change sooner and to try something new, or higher risk," said Chris.

Challenge

Mill mud typically has not been economical to apply to the Mulgrave farm, purely on the basis of distance to Invicta mill. Chris can see the potential benefits of improvement in crop yields, soil health from mill mud applications and the potential to place the product on the hill may improve water quality outcomes if proven to be viable.

Distance from Invicta Mill is the biggest challenge as this significantly increases the cost to have the mud transported to the farm. To address economics, the rate/ha of the mill mud is needed to be reduced and an alternative method of placement of the mill mud in the furrow irrigated system.

Local mill mud contractors typically didn't have suitable machinery to apply the mud strategically and needed to be

Right (from top):

Sonia and Chris Hesp have chosen to return to cultivation to address soil compaction from harvesting.

Middle: Water quality monitoring.

Bottom: Trial site - banded mill mud.



NQ Dry Tropics Sustainable Agriculture

The NQ Dry Tropics Sustainable Agriculture program offers information, training and support to agricultural producers in the use of best management practices for resilient landscapes and productive enterprises. Within this program, the Sugarcane Innovations Program delivers a number of projects that support innovative farmers with opportunities to trial their practice ideas with the assistance of technical experts.

engaged to be able to provide the service. Nutrient rates and management for the new system also needed to be addressed to maintain and not decrease crop yield.

Variety: KQ228
Class: 2R
Treatments:
 T1- CONTROL @ 0t/ha
 T2 - CONVENTIONAL @200T/HA
 T3 - CONVENTIONAL @100T/HA
 T4 - BANDED @65T/HA

Monitoring

Water quality is being measured using auto-flumes catching the first 10 runoff events from the trial areas. Both irrigation and rainfall (comparing both wetting mechanisms) are being monitored to track the loss of nutrients from the full set of treatments (1 in 3 replicates).

All samples are being sent for analysis by the Department of Science, Information, Technology, Innovations and Arts (DSITIA) to identify the rate of release of nitrogen from applied fertiliser and flux of phosphorus from the varied application rates of mill mud.

Economic Analysis

The economic analysis will compare the profitability of various mill mud treatments on Chris's farm. Key factors to examine include crop growing expenses such as fertiliser costs, mill mud expenses and machinery operation costs over a crop cycle. In addition, yields and commercial cane sugar will be examined to compare the overall profitability of each treatment. The graph below examines the cost for mill mud, fertiliser and cultivation for each treatment in Chris's

second ratoon cane crop. The total cost is located above each bar. A comparison of the treatments highlights a substantial difference in costs. The conventional treatment with 200 tonnes of mill mud applied per hectare (t/ha) has almost double the cost of the banded treatment.

Notably, an analysis of cost only tells part of the story, the inclusion of yield results from the trial will better articulate the relative profitability of each treatment.

Expected results

Using the banded mill mud on the hill is expected to improve soil health and yield when compared to the control.

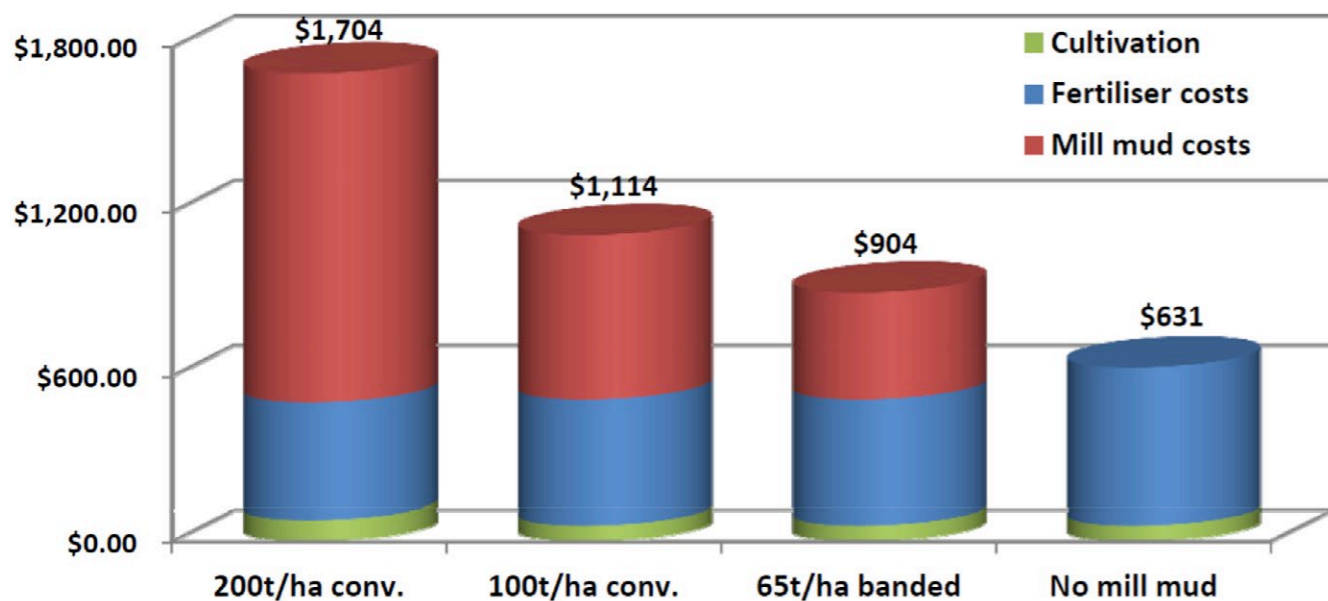
Using the banded mill mud is expected to improve water quality leaving the farm when compared to the conventional application methods as well as improve economic returns through reduced application rates.

When combining these factors, a positive outcome for water quality and production could be expected when comparing the banded mill mud application method to the current alternative practices.

Showcasing to broader community

Chris is a member of the award winning Mulgrave Area Farmers Innovative Action (MAFIA) group. In 2007 Chris was part of a team that won the 'Sugar Research Development Corporation Excellence in Regional Innovation Award' for the Burdekin. Evaluating alternative irrigation for a greener future, by comparing furrow, overhead low pressure (OHL) and trickle irrigation.

Figure 1: Comparison of mill mud, fertiliser and cultivation expenses



SUGAR GROWING TRENDING TO DRIP FOR HIGHER YIELDS, WATER SAVINGS



The increasing area of drip irrigated sugar in the Burdekin region is part of a global trend in this method of growing sugar, according to Yoram Krontal, agronomist in charge of sugar cane crops for Netafim globally.

"I believe that the rate of growth for drip irrigated sugar cane globally is about 20,000 Ha per year. Some of the larger projects are in South America – Peru and Brazil. Also there is a very nice project in Swaziland, in Southern Africa" he said.

In the Burdekin, one of the major drip irrigated sugar projects is the 350 Ha Oaky farm, owned by Davco farming. Evan Shannon, who has worked closely with Davco since the installation of their drip system, said there was more potential for drip irrigation in sugar in the region, particularly in newer developments or farms that needed reworking.

"In this area there are certainly blocks that are under furrow irrigation which are having problems now – some of them need levelling. If you have got an alluvial soil in the

delta of the Burdekin and you have got to open up top soil and level sub soil you could spend \$6,000/Ha -7,000/Ha easily. In a situation like this (drip irrigation) you are going to spend about that – so it's the same cost but you can do things in a very precise manner".

Mr Shannon is a grower with an eye to sustainable production.

"As our environmental stewardship is going to be looked at more and more closely, and I think we can move drip irrigation into some examples where we shouldn't be using our current irrigation systems"

Aaron Linton is another grower who feels that there is much potential for drip irrigated sugar in the Burdekin. He converted a 40 Ha furrow irrigated block at Home Hill to drip irrigation last year.

"This whole farm was 5 blocks flood irrigated through plastic fluming. It was very inefficient" he explained, looking over his drip irrigated sugar crop. "The whole farm drained to the middle. I thought that this was

unmanageable - I had to do something. We did a few calculations of different ways we could laser the block for furrow irrigation with infrastructure for pipelines and recycle pits, and it didn't come out too much less expensive than drip, if at all. By the time I lasered the ground properly for the right grade for the proper soakage it would probably work out a lot more expensive"

For Mr Linton, there are other significant benefits to his irrigation system. "I can run the system on my phone from wherever I am– just the other day I was sailing – we had a minute so I started my pump and checked all my moisture probes while I was out on the water."

One of the pioneers of sugar on drip in the Burdekin area was Paul Villis. With a background in vegetable growing, Mr Villis was no stranger to drip irrigation. Mr Villis' first drip irrigated block was installed in 2008. He has compared the furrow and drip irrigated blocks on his farm, and found with drip a consistent yield increase of

around 25% more cane, and 21% more sugar. In addition, the amount of nitrogen fertiliser applied has been cut back from 188 kg/ Ha to 84 kg/ Ha with no reduction in yield.

"We are still progressing the with the drip, but we have had some very positive results so far with around 30 tonnes/ha increase in cane yield over the flood irrigated blocks; this has been consistently replicated over 4 years" Mr Villis said

Yoram Krontal has been impressed with the Burdekin region, and he has pointed out that the Burdekin growers are not alone in their results.

"We find that, around the world that with drip irrigation we can save about 30-40% of the water that is applied and that the yield is increased by approximately 20-30%. Another benefit is the extended ratoon life. When carrying out feasibility studies for drip irrigated sugar cane, we allow for 8 ratoons. I think these three reasons; saving water, increasing the yields and saving the re-establishment in the field are very good reasons to go for drip."

