

CASE STUDY – PURCHASING A MIXER WAGON

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The dairy industry in the Murray region is undergoing significant transition as businesses adapt to reduced water availability, a changing climate, higher input costs, policy and market drivers.

The last fifteen years has seen a steady change in the dairy feedbase in the region, with increased annual pastures, cropping and fodder conservation in the mix, and an evolution to partial and total mixed ration (PMR and TMR) systems.

The future operating environment is likely to be characterised by increasing variability and volatility, requiring adaptive management at all levels. Farm businesses in the Murray Dairy region are taking different approaches to managing these changes based on a range of factors related to the business and to the people behind it.

With the support of local dairy businesses, Murray Dairy has developed some case studies on aspects of system change occurring in the region. These are not intended to be a blueprint for change, rather to provide examples of the different strategies that businesses are using to manage risk and volatility in the current environment.

This case study looks at the Fitzgerald's purchase of a mixer wagon. It is focused only on the introduction of the mixer wagon and the extra benefits and costs this has delivered at this point in time, not the whole farm's profitability.



Scott, Anna, Amelia, Isla, Hamish & William Fitzgerald in one of their lucerne stands

Following the transition to feeding maize silage and vetch hay, building a gravel feedpad and purchasing a mixer wagon:

Cow production increased from
1.73 kgMS/cow/day to 2.1 kgMS/cow/day

Feed costs (including running costs) increased by 11%

Overall income over additional costs
per cow per day increased by 40%

Other additional benefits of the transition included:
Improving the drying-off process by
being able to mix cereal hay and straw
together in the mixer wagon

The ability to use alternative feed sources
such as urea to reduce feed costs

Introduction

In 2012 Scott and Anna Fitzgerald took over the family's farm of 108 effective hectares, milking 250 cows utilising a mixture of irrigated perennial ryegrass, annual ryegrass and lucerne pastures. In the early days, supplementary feed, round bale silage and hay was fed out using a bale feeder in the paddock.

Over the last eight years, the Fitzgeralds have grown the milking herd and are expecting to milk 460 cows in Autumn 2020. They are on track to be milking 500 cows in 2021.

With an increase in cow numbers and changes to water availability, the Fitzgeralds have looked at other options for their feedbase. Over the last six years, the farm's water use averaged around 1350 ML/year. The Fitzgeralds have a long-term lease of 636 HRWS and, in the past, have pumped around 250ML from a spearpoint bore, but this is less reliable in drought years.

The Fitzgeralds purchased a 50ha outblock in 2018 and installed a 28ha centre pivot on the new farm.

The farm came with a spearpoint bore that provides around 50 per cent of the water required to grow a summer crop under the pivot. In January 2019 they grew their first ever maize crop for silage and followed the maize crop with a cereal crop for silage.

In 2018-19, the Fitzgeralds began feeding out some of the hay and silage in "maxi feeders" hay rings in designated sacrifice areas, as they were irrigating less pasture and feed was expensive. During the summer, the cows were also grazing sorghum during the day and rotating around the dry pasture paddocks during the night to alleviate stocking pressure on the sacrifice areas. In April 2019, a basic gravel feed pad was installed, and the hay feeders placed on top of this.

The Fitzgeralds positioned their maize silage pit adjacent to the feed pad. The maize silage was fed out using a silage grab on the front of the tractor and placed in the hay feeders. Vetch hay was placed on top of the maize silage. Although there was some feed wastage with this system of feeding out, the Fitzgeralds felt it wasn't much and therefore not the highest priority for their next farm investment.



The Fitzgerald's 2019 Maize pit.

With the expansion of cow numbers, higher water prices and a change in forage types grown, greater volumes of conserved fodder will be fed in the future. The farm is unlikely to return to growing as much perennial ryegrass as it once did, and the Fitzgeralds will continue to make pit silage due to cost savings and efficiencies in feeding out.

The problem

The Fitzgeralds ran into a few problems with the introduction of the maize silage, larger quantities of conserved fodder being fed and increasing cow numbers.

Once the maize silage was introduced, the cows self-selected the maize silage in preference to the other feeds on offer. This resulted in the diet becoming unbalanced, a rapid 20 per cent reduction in milk production and some cows began drying themselves off early. The high price of feed and tight cashflow meant that purchasing alternative feed sources was not possible, so the Fitzgeralds had to make do with the feed they had. Milk production did not recover until August, when pasture became a large part of the diet again.

The solution

Due to the water price and the spearpoint bore becoming less reliable, by November 2019 the cows were 100 per cent hand fed.

In November 2019, the Fitzgeralds purchased a secondhand Trioliet 15m³ vertical mixer wagon. The mixer wagon had been tipped over by the previous owners (written off by insurance company) meaning that the purchase price was low. It cost approximately \$25,000 for the purchase and repair of the mixer wagon. The Fitzgeralds also upgraded their 120hp tractor to a 190hp tractor to run the mixer wagon. It cost \$70,000 extra to purchase the larger tractor (compared to if they had purchased a smaller tractor).



The Fitzgerald's Trioliet vertical mixer wagon purchased secondhand in 2019.

On hot days (approximately 90 per cent days over the summer period) the cows are kept in a sacrifice paddock with good access to trees. The mix is fed out under a hot wire and extra water troughs have been installed. The paddock is harrowed daily with a tyre smudger and will be scraped to remove excess manure and waste annually.



The new water troughs being installed in the Fitzgerald's sacrifice area.

On cooler days (approximately 10 per cent of days over the summer period) the cows are fed in nearby paddocks to allow the sacrifice paddock to dry out, particularly around the trees.



A "mix" fed out under a hot wire on the Fitzgerald's farm in November 2019.

At night, the cows are on an 18-day rotation through the dried off pasture paddocks with a mix being fed out via the mixer wagon near the fence lines.

The results

Many things have changed on the Fitzgeralds' farm in the six months prior to the introduction of the mixer wagon, making it difficult to be able to conduct a "before and after analysis". The mixer wagon was introduced as the cows were being transitioned from pastures to a total mixed ration (TMR) meaning there isn't really a true before and after to compare with.

In December 2019, the Fitzgeralds sought advice from a nutritionist to help create a better-balanced diet, utilising the feeds they had. The diet consists of:

- Lucerne silage
- Oats/pasture silage
- Wheat and Vetch silage
- Maize silage
- Urea

The following table provides some snapshots in time of feed inputs vs. milk outputs on the Fitzgerald farm. The green columns were prior to the mixer wagon while the yellow columns are after the mixer wagon was introduced.

Date	30 Jan 2019	16 Apr 2019	19 Nov 2019	17 Dec 2019	20 Jan 2020
Litres per cow	22.0	21.5	26.3	25.4	27.5
Milk solids per cow	1.73	1.63	1.89	1.95	2.10
Kg of concentrates fed	5.5	6.0	7.0	7.5	7.0
Kg DM of fodder fed	7.4	14.0	14.4	18.0	18.5
Kg DM of grazed sorghum/pasture	12.0	5.0	3.5	0.0	0.0
Total Kg fed	24.9	25.0	24.9	25.5	25.5

The following is a list of estimated extra costs due to running the mixer wagon:

- 1.5 extra hours of work each day
- An extra 200 litres of fuel each week
- An extra \$10,000 per year in repairs and maintenance costs on things such as tractor servicing costs and replacing worn out or broken parts

The Fitzgeralds are now able to make pit silage instead of round bale silage. In 2018 it cost them an average of \$115/tDM to make silage in round bales. In 2019 it cost them an average of \$85/tDM to make pit silage. A total of 988 tDM of silage was made in 2019, meaning a reduction of \$29,640 in silage-making costs by converting to pit silage.

The table on the following page is a breakdown of the extra costs and income comparing January 2019 (no mixer wagon) to January 2020 (with a mixer wagon). The milk, fodder, concentrates and fuel prices used are all January 2020 prices to enable a side-by-side comparison. The Fitzgeralds are expecting to be operating the mixer wagon for around 250 days each year. For the remaining 115 days, the cows will likely be direct grazing pastures and will not require extra fodder fed. Therefore, this partial budget is only for the 250 days and is only focused on what has changed. It is by no means an indication of the whole farm's profitability.

It is important to note that this is the highest milk price this farm has ever received. If the milk price wasn't as high, the results would not have been so positive. Using the average milk and feed prices for the Fitzgeralds' farm over the last six years, the annual extra profit calculates out at \$76,820. However, as can be seen by the results, the purchase costs of the mixer wagon and upgrading to a larger tractor will have been paid back in a single year.

It is likely that some of the extra milk production is due to the nutritionist's advice. Not all the nutritionist's recommendations would have been possible without the mixer wagon, but by altering the diet where possible without a mixer wagon, it would likely to have provided some milk production increase.

Other benefits

Whilst it is difficult to calculate an economic benefit, introducing the mixer wagon has had other benefits that have not been calculated. Some examples are:

- Improved the drying-off process by being able to mix cereal hay and cereal straw together. This has reduced the number of days it takes to dry cows off without adverse animal health effects.
- Allowed for alternative feed sources to be used such as urea to reduce the overall diet cost without reducing milk production.
- The introduction of the mixer wagon also provides more flexibility in managing each season. The wagon allows the Fitzgeralds to choose the best feed scenario in accordance to water, feed and milk prices along with seasonal conditions.

Table 1 Comparison of costs and income before and after the Fitzgerald's investment in a mixer wagon

400 cows	Before	After
Income		
Milk production kg MS per cow	\$1.73	\$2.10
Milk income	\$12.91	\$15.68
Costs		
Feed costs		
Concentrates fed kg	5.5	7.0
Concentrates \$ kg	\$0.40	\$0.40
Fodder fed kg DM	7.4	18.54
Fodder \$ kg DM*	\$0.35	\$0.32
Grazed fodder kg DM	12.0	0.0
Grazed fodder \$ kg DM	\$0.30	\$0.30
Total feed costs \$ cow	\$8.39	\$8.73
Running costs		
Extra labour (1.5 hours x \$33 hour)		\$0.12
Extra fuel (29L x \$1.10L)		\$0.08
R&M (\$10,000 per year divided by 250 days)		\$0.10
Interest on extra machinery (\$95,000 @ 4%)		\$0.04
Depreciation (\$25,000 per year)		\$0.25
Total cost \$ per cost per day	\$8.39	\$9.32
Income over feed related costs per cow per day	\$4.52	\$6.35
Annual extra profit due to the change		\$182,749

* Lower fodder costs due to \$30 per tonne saving on silage making costs by converting to pit silage

Key learnings

Some of the key things the Fitzgeralds have learnt are:

- A good nutritionist is very important to getting the best out of this system.
- Feed test all fodder.
- Mechanical skills are important or else you will be frequently using trades people. For example, blades do come off, shear bolts do get broken.
- Effectively using a mixer wagon is a new skill for staff to learn and it is very costly if things go wrong due to user error.
- There is less flexibility around when feeds are mixed and fed out, meaning timing of when tasks are done is very important.

Where to in the future

The Fitzgeralds are planning to purchase some concrete feed troughs to help reduce feed wastage. They have begun to research this. Their research so far has uncovered the following:

- They will need around 0.9 metres per cow of trough space. Because the cows can access both sides of the trough, this halves the overall trough space needed.

- For 500 cows they will need 225 metres of troughs.
- The troughs are estimated to cost \$160 per metre, or \$36,000 for the full 225 metres.
- The concrete troughs would be placed on the ground in the sacrifice paddock.
- Expected feed savings would be around 10%.
- It is likely that the Fitzgerald's will be feeding around 1,500 t DM of fodder per year.
- If the fodder is valued at \$300 tDM, a 10% feed saving would be \$45,000 saving per year.

A telehandler is also on the Fitzgeralds' wishlist to help free up a tractor and save time with loading the mixer wagon, unloading trucks, etc.

A concrete feed pad is in the early stages of planning. It is likely that at some point this will be built. The main reason this is being considered is to help manage wet conditions.

FOR FURTHER INFORMATION

Visit dairyaustralia.com.au/murray-dairy or call Murray Dairy on (03) 5833 5312