

CASE STUDY – BUILDING A CONCRETE FEED PAD

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The dairy industry in the Murray region is undergoing significant transition as businesses adapt to changing climate, policy and market influences. The last 15 years has seen a steady change in feedbase species 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 this change 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.

This case study looks at the Gamble's construction of a concrete feed pad with a flood wash and manure loafing area. It is focused only on the introduction of the feed pad, and the extra benefits and costs this has delivered, not the whole farm's profitability.



Ashleigh, Colin, Karen and Chris Gamble on their Bamawm dairy farm
Image credit: Dairy News Australia

Following the transition to a concrete feedpad:

Cow production increased from 21.5L/cow/day to 25L/cow/day, a 16% increase in production

Feed wastage was reduced (wastage in paddock was >20%)

Hay in the diet dropped from 2000kgDM/day to 1600kgDM/day, a 20% reduction in hay fed (other feed inputs remained the same)

Feed costs (including running costs, interest and depreciation on the feedpad) dropped by 11%

Overall income over additional costs per cow per day increased by 26%

Other additional benefits of the transition to a concrete feedpad included:

A drop in cell count from 240,000 BMCC to 90,000 BMCC

Less lameness in cows

Reduced loss of pasture as a result of cows milling around feed out areas on hot days

Introduction

Colin and Karen Gamble used to run a perennial pasture-based system on their Bamawm dairy farm. They milked around 300 cows, directly grazing ryegrass and lucerne-based pastures and feeding out hay and silage in hay rings in the paddock. In addition to the hay and silage they produced on farm, they purchased around 320 tonnes of hay each season.

Starting six years ago, their children, Chris and Ashleigh, progressively came back to the farm so the decision was made to begin to grow cow numbers by rearing more young stock.

With an escalation in water and feed prices in 2015, the Gambles first leased a mixer wagon in November 2015 and, happy with the results, purchased their own three months later.

Seeing results from the introduction of the mixer wagon, the Gambles were confident that this was the type of farm system they wanted to establish, providing the feasibility to bring Chris and Ashleigh into the business.

The problem

When they first acquired a mixer wagon, the Gambles fed the mix under a hot wire and on the check bank out in the paddocks. During hot weather the cows had access to tree lines and sprinklers in the dairy yard.

As the herd grew and with water becoming less reliable, the percentage of conserved fodder in the cows' diet increased. By 2019–20, the only remaining fodder was approximately 25 hectares of lucerne. With increasing cow numbers, feed wastage also became a significant expense.

During the winter and spring of 2016, the Gambles' farm became very wet, increasing the wastage of feed from being fed out on the ground. Additionally, they were having issues getting the mixer wagon out to the paddock during wet conditions. These wet conditions meant the cows struggled with health issues such as lameness, and milk production dropped significantly.

Another ongoing issue was the damage to the pastures, particularly lucerne, being caused by larger numbers of cows going into existing paddocks. This was particularly a problem during hot weather when cows clumped together.

The solution

In 2017, the Gambles constructed a concrete feed pad with loafing areas on the sides close to the dairy. They were able to utilise a GMW Connections project to provide around 25 per cent of the earth and the rest came from digging an effluent pond alongside the feed pad for the flood wash system.



The 3ML effluent dam for the flood wash. The earth from digging this was used to build the base for the feed pad.

The feed pad is designed for 400 cows.

- It is 122 meters long and has a 1.25 per cent slope from top to bottom.
- The cow alleys are 5.5m wide.
- The central feed area is 6m wide.
- The cow alleys are washed down by a flood wash system.
- There is a sprinkler system that is designed to only wet the front half of the cows when they are feeding (to lower the amount of water running down the cows' teats, lowering the risk of mastitis).
- The loafing areas are 11.5m wide on each side of the feed pad. They were formed out of clay, but are being built up with a manure base (dry lot).



The Gambles' 122m long concrete feed pad looking from the south (low end) north. The dairy is 60m south of where this photo is taken from.

The costs to construct the feed pad were as follows:

- The earthworks forming the base cost around \$10,000.
 - The Gambles had their own earthmoving equipment and were able to complete the earthworks themselves at an estimated cost in labour, fuel, repairs and maintenance of around \$10,000, taking about 3 weeks to complete. This was a saving of around \$50,000.
- The concrete and metal works came out at around \$220,000.
- The water troughs, flood wash, pumps, pipes, sprinklers, etc cost around a further \$80,000.
- The total cost of the feed pad came out around \$310,000.
 - The Gambles did significant amounts of the work themselves and put extra efforts in to find cheaper alternatives to supplies and equipment, including the flood wash and the sprinklers, that would not compromise the overall quality and useability of the feed pad. This saved them approximately an additional \$50,000.
 - If the Gambles had completely outsourced the construction of the feed pad it would have likely cost around \$400,000 (\$1000 per cow).



The cow alley is lower (15-20cm) than the rest of the feed pad. This is to allow for more effective flood washing. It was not certain how the cows would handle stepping down into the feeding area. The Gambles have experienced no issues with it.

The feed pad was finished and first used in December 2017.

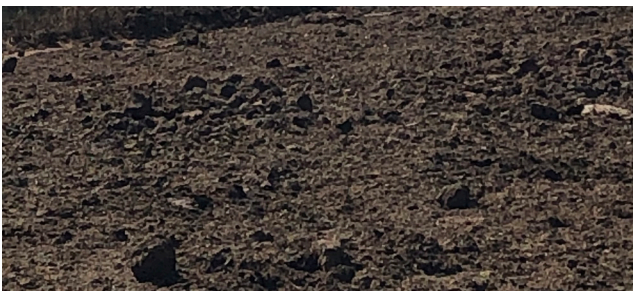
The effluent dam from the floodwash lasted two years before it required pumping out, at an estimated cost of \$10,000. The effluent water was sprayed out in the pasture paddocks.

The loafing area is scarified every second day to help it stay dry, break the bugs down faster and keep it soft. Ideally it should be scarified every day. A metal shield is about to be installed on the cow loafing side of the water troughs (the water troughs are installed on the edge of the concrete cow area) to stop the cows spilling water into the loafing area.



One of the water troughs that are placed on the edge of the cows' concrete feeding area and the loafing area. A solid back will be made behind the water troughs to stop cows from spilling water onto the dry manure.

Before the manure built up in the loafing areas, the cows were not spending much time sitting, laying or relaxing, however since the manure has built up the cows are very happy to lay on it.



The dry manure base of the cows' loafing area.

Running the feed pad will incur some extra expenses for repairs and maintenance (although there have been none yet), as well as extra electricity to run pumps (e.g. to fill the flood wash tank), which are currently tracking at about \$1500/year.

The results

While many things have changed on the Gambles' farm since 2015, this case study only focuses on the introduction of the feed pad in December 2017 (not the mixer wagon component as they started using this well before the feed pad was built).

In the Gambles' system, the cows still graze pastures when they are available, but all the hand feeding is done on the feed pad. Prior to the feed pad the hand feeding was done in the paddock on the ground.

Prior to first using the feed pad:

- The cows were being fed five bales/day through the mixer wagon, estimated at 400kgDM/bale or 2,000kgDM/day.
- The remainder of the diet was 9kg/cow/day of grain mix fed in the dairy and grazed pasture.
- The cows were producing an average of 21.5L/cow/day or 1.69kgMS/cow/day.

Once the concrete feed pad was in use, and the feeding was adjusted:

- The cows ate four bales/day, or 1,600kgDM/day, plus 4kg/cow/day of grain mix fed with the mixer wagon.
- The remainder of the diet was 5kg/cow/day of grain mix fed in the dairy and grazed pasture.
- The milk increased to 25L/cow/day or 1.97kgMS/cow/day.

This equated to a 20 per cent feed saving and a 16 per cent increase in milk.

Part of the increase in milk is likely to have come from an even larger feed wastage saving. It is likely the cows were wasting greater than the 20 per cent of feed in the paddock and could have eaten more feed if it were offered.

Cow comfort, less walking, better access to the feed for the whole herd and better cow cooling (allowing them to eat for a greater length of time each day) are also likely contributing factors to the increase in milk production.



The cows have just started returning from afternoon milking to a fresh mix. The Gambles use a blade on the tractor to keep the feed within reach of the cows.

Table 1 Breakdown of the Gamble's feed costs before and after the feed pad was installed

400 cows	Before	After
Income		
Milk production kg MS per cow	\$1.69	\$1.97
Milk income	\$12.57	\$14.66
Costs		
Feed costs		
Fodder fed kg DM	9.0	7.2
Fodder \$ kg DM including mixing costs	\$0.36	\$0.36
Total feed costs \$ cow	\$3.24	\$2.59
Running costs		
Electricity and R&M (\$1,500 per year)		\$0.01
Pumping effluent systems (\$10,000 every 2 years)		\$0.03
Interest on feed pad (\$310,000 @ 4 per cent)		\$0.08
Depreciation (over 10 years worth \$100,000 at the end)		\$0.14
Total cost \$ per cost per day	\$3.24	\$2.87
Income over additional costs per cow per day	\$9.33	\$11.79
Annual extra profit due to the change		\$358,855

Over the last two years, as the Gambles have refined their management of the feed pad and feed rations, the cows' milk production has risen around 1000L/cow/year (79 kgMS/cow/year). They have also been able to reduce the average cost of some of their feeds by purchasing the protein meals and minerals separately rather than as a pre-made mix.

The above partial budget compares the economics of feeding on the ground verses on the feed pad, assessing the changes listed in this case study. It is by no means an indication of the whole farms' profitability.

As with any budget, figures will change with time. This budget is based on the 2019–20 milk and feed prices and information provided by the Gambles. Feed figures have been averaged across the year (the amounts vary at times of the year, sometimes more, sometimes less depending on pasture availability).

The high feed and milk price of the 2019–20 season favours the feed pad investment. When the same calculations were made using the average milk and feed prices of the last 10 years, the annual extra profit reduces to \$273,708.

Other benefits

The Gambles have noticed additional benefits of the feed pad, that have not been included in the economic analysis, including:

- A drop in cell count from a long term average of 240,000 BMCC prior to the feed pad, to 90,000 BMCC in the 2018–19 season.

- Less lameness in cows, probably due to less walking and less bullying from the dominant cows (better access to the feed by all the cows).
- They are no longer losing sections of pasture to cow's milling around feed out areas or on hot days.
- Grazing management can be more difficult at times. They need to pre or post top pastures more often.

Key learnings

Some of the key things the Gambles have learnt include:

- A good nutritionist is very important to getting the best out of this system.
- Feed test all feeds.
- Mechanical skills are important or else you will be frequently using trades people or paying higher prices for things that could be done more cheaply.
- Dry Manure is very important on the loafing area.

Where to in the future

At some point in the future, the Gambles plan to put a shed over the feed pad and loafing areas. They are in the process of costing this out.

If they decide to grow cow numbers in the future, they will build a second 400 cow feed pad next to the current feed pad.

FOR FURTHER INFORMATION

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