

Finding efficiencies with loose housing

Farm systems transition case study

Farm location

Nundah Pastoral, owned by the Redgrove family, is located on alluvial flats within a horseshoe-shaped bend of the Hunter River at Scotts Flat, near Singleton in New South Wales.



Farm history

John Redgrove and his wife Allison operate the farm with their son Daniel and his wife Sarah. John's great-grandfather arrived at Scotts Flat in 1882 and worked a tenant block for the Scott family. In 1913, he purchased his own 26-hectare block, built a house and commenced dairy farming. Since then, the farm has increased progressively to a total area of 485 hectares with the acquisition of neighbouring properties.

A set of photos proudly displayed by the Redgroves in their dairy parlour's viewing room shows the development of the farm and its milking and feeding infrastructure since World War Two. In 1998, John and Allison constructed a 600-cow concrete, dry-scraped roofed feedpad, feed mixing centre and facilities for storing feed. This bold move set the Redgroves on a path of dairy intensification that has led to the transformation from grazing animal production to intensive animal production, with loose housing facilities supported by a large cropping enterprise.



Timeline



Consider phase

A trip to the US in 2009 sparked Daniel's interest in contained housing systems. When he returned home, Daniel was very keen to share his ideas with John.

Daniel treaded carefully when he sounded out John one afternoon during milking about possibly cutting the roof off his much-loved feedpad. John wasn't keen, but encouraged Daniel to share his thinking, as they have always worked extremely well together.

Daniel explained to John that with its roof removed, the feedpad could serve as the centrepiece of a freestall barn, with rows of stalls built either side of it and a new pitched roof spanning the entire facility.

However, when Daniel visited freestalls in Australia, he became concerned about potential lameness issues and the need for regular hoof trimming. So he turned his attention to loose housing facilities already operating in Australia.

"I saw a couple of sheds that had failed, but the ones that were done right, under the right management, were really good," Daniel says.

Daniel was particularly impressed by David Altmann's loose housing facility at Murray Bridge, South Australia. Like the facilities that Daniel was contemplating, David's facility was built next to an existing feedpad.

David kindly provided Daniel with some very helpful recommendations based on his knowledge and experience. This helped Daniel to develop his design concept with John for two loose housing facilities, one on either side of the existing feedpad.

In 2015-16, the Redgroves then proceeded to obtain planning approval.

"Dad's roof stayed on his feedpad," says Daniel.

Invest phase

Loose housing facilities

The Redgroves built two identical loose housing facilities in 2017, either side of the 1998-built roofed concrete feedpad. The facilities, dubbed 'shed one' and 'shed two', were built by Tech Span, a shed company in Armidale.

The sheds have an east-west orientation and each measure 105m long and 36m wide, totalling 3,780m². The structures are widespan, with an open-web truss, portal frame and a corrugated iron roof with an 18° pitch and central ridge vent and cap.

To minimise rain entering and wetting the bedding, each shed has a 1.5m eave extending along each side and each end is clad from the top of the pillars to the centre ridge vent. Hardwood wood chips were used as the bedding material and maintained at a depth of 400 to 600mm.

To ensure good airflow over their compost bedded packs, the sheds have precast concrete side wall panels only 800mm high, with four cables fitted above them to keep cows in. Each shed has ten large overhead fans which run continuously to help keep cows cool and keep the bedding dry.

"I like these fans because it doesn't matter which way the breeze is blowing – a southerly, easterly, whatever – they force the air down onto the pack," says Daniel.

Cows access the central roofed feedpad's four metre wide feed alley on their side of the five metre wide drive alley through three 7.5m wide entrances. Each shed has a 2.2-hectare loafing paddock which cows may use if the weather is fine.

"The cows are not locked in the shed. They can come and go as they please," John explains.

The Redgroves sized their loose housing facilities to accommodate a group of 300 cows each.

“300 cows is a nice sized group to move around the farm. It also means that each group only stands in the dairy holding yard for 45–60 minutes before each milking.”

While Daniel had seen a few loose housing facilities with their resting area stocked at 10 to 12 square metres per cow, he noted that they were located where the climate was much drier. The Redgroves chose to be a little more generous to reduce the risk of wet bedding, stocking their resting area at 14 square metres per cow.

After operating the two loose housing facilities successfully for close to four years, the Redgroves decided to build a third one to enable them to increase their herd by a further 300 cows. Shed three – commissioned in late 2021 – is larger than sheds one and two at 160m long and 30m wide, providing 16 square metres of resting area per cow. As per sheds one and two, the shed is 5.6m high at the sides and has 1.5m eaves. Under a nine metre skillion on the side of the shed is a floodwash feedpad, with a 4m wide feed alley and five metre wide drive alley. Cows access the feed alley through four eight metre wide entrances. Large floodwash tanks are fitted for high volume flushing as the feeding table’s slope is only 0.5 per cent.

The Redgroves have recently built a smaller loose housing facility measuring 30m by 48m for use as a maternity shed for 130 cows. However, it is initially to be used to house milkers until the next shed (number four) is commissioned in about a year’s time. When the maternity shed can be used for its intended purpose, transition cows will be moved into it 14 days before their due calving date and calve on its compost-bedded pack. A set of small yards along one side of the shed will be used to pen selected cows and keep them under close observation while calving.

The Redgroves have estimated that the current capital cost per cow for a loose housing facility may be about A\$1,000 less per cow than for a freestall – but is still close to A\$10,000 per cow. They have done most of the construction of their facilities over the years themselves. Having purchased a concrete plant, they have been able to lay their own concrete slabs and have their own moulds for making pre-cast wall sections.

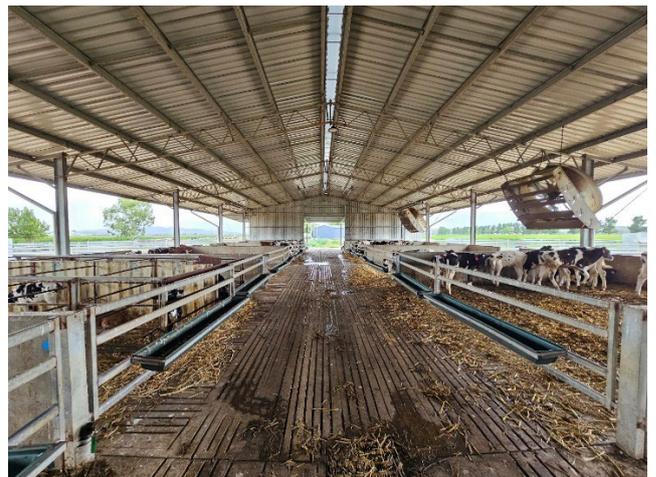
Calf rearing facility

Before building shed three, the Redgroves realised that they needed to invest in a calf rearing facility to support further growth in cow numbers. John and Allison visited calf facilities in the US in 2019, and this helped them finalise design specifications for a new calf rearing facility, which they built in 2020. It accommodates calves up to weaning at 100 days. The shed is widespan, with an open-web truss, portal frame and a pitched corrugated iron roof with central ridge vent and cap.

It comprises eight concrete floored pens measuring six metres by 6 metres on either side of a wide central alleyway.



Each pen accommodates 10 calves. They are kept in individual crates for the first 10–14 days. These crates are then removed, and the 10 calves are cared for as one group. Each pen opens into a grassed, outdoor exercise yard. The shed is open sided to ensure good ventilation and is equipped with temperature-controlled fans which pull air across the facility.



The ends of the shed are clad. Partitions between pens are precast concrete for ease of cleaning between batches and to minimise disease transmission from pen to pen.

While straw has been used as bedding, to provide calves with better insulation this winter, the Redgroves plan to put a 300mm layer of woodchips under the straw. At one end of the shed is a crush for performing dehorning and other procedures, and storage facilities for feed, bedding, colostrum, blankets and equipment.

Milking facility

The farm has had a series of milking facilities over the years. In 1945, a six-bail walk-through dairy was built. In 1987, when the herd had increased to 120 cows, this was replaced with a 20-a-side herringbone. This was operated until 2007, when – with 200 cows in the herd – it was replaced with a 24-a-side rapid-exit dairy. This facility served the farm well for ten years as the herd increased to 400 cows.

However, with a throughput of 200 cows per hour and requiring three operators, it became the farm's greatest limitation following the change from a grazing system to a contained housing system in 2017. Cow numbers increased to 550 cows in 2018 when sheds one and two were commissioned, and progressively to 900 cows in late 2021 when shed three was added in late 2021.

The Redgroves wanted a milking facility that would enable them to increase cow throughput and labour efficiency. This would free up staff members to do other work, milk cows three times a day to further increase daily milk production, and more closely monitor and manage each cow's performance and health.

In 2018, Daniel visited dairies in the US to help develop design specifications for a new milking facility with a 60-stand rotary dairy parlour built in 2022-23. This was equipped with:

- Milk meters to monitor each cow's daily milk yield and milk conductivity.
- Automatic cup removers and teat sprayer to eliminate the need for a person at cups-off.
- Automatic draft.
- Dual cow entry onto the platform and four-stall wide exit from the platform to enhance cow flow.
- Fans above the platform.
- Cow monitoring system (collars and reader) for tracking each cow's health and reproduction.
- Rubber flooring at platform entry and exit.

"When you have big, heavy cows in contained housing systems, they get lazy. So, with a single entry – onto the rotary platform – cows can stand there and block other cows. With a dual entry, cows are a little more competitive," says Daniel.

The new facility also has a 40,000-litre vat, a comfortable office, toilets and shower room, an upstairs glassed viewing room, lunch room, sound-proof engine room, chemical storage room. The area previously occupied by the rapid-exit dairy has been remodelled to create a larger roofed holding yard able to accommodate 500 cows. An automatic backing gate enables groups of 300 cows to be brought up to the dairy, one immediately after the other.

Operate phase

Loose housing facilities

With the commissioning of sheds one and two, the Redgroves ceased grazing.

"It was a big change for me," says John, who was still tempted to let cows out of the sheds each day to graze some pasture.

Any concerns that the Redgroves had about how easily their cows would adapt to the contained housing system were quickly dispelled.

"We let them in, they played like kids for the first few hours, and that night we went and shined a light on them

at nine o'clock and they were all sitting down resting and milk production was up the next day," says Daniel.

"It was literally overnight. And then the next day we fed them and put them back in the sheds. They were all lying down again – it was like the cows had been here forever."



The Redgroves are currently milking 1,000 cows. They breed for a medium-sized frame, sound feet and legs and high production, calving year-round except for three weeks over the Christmas-New Year period. Fresh cows are all placed in shed three because there are more staff in the dairy when these come through to give them any extra care they may require. After they have been mated and confirmed pregnant, they are randomly placed in shed one or two.

For simplicity, a single Total Mixed Ration (TMR) is prepared, which is fed to all cow groups in the three sheds four times per day. The first batch of TMR – prepared the previous afternoon – is delivered to cows at 6.00am. Further batches are then mixed and fed out at 9.00am, 11.00am and 4.00pm.



The Redgroves have two twin screw vertical mixers on the farm for preparing mixed rations– one for regular use and one as a back-up. Feed is also pushed up four times per day with a blade fitted to a tractor. The Redgroves ensure that there is five per cent of feed left in front of the cows at all times, except when the drive alleys are scraped on Thursday mornings. The diet formulation is important for maintaining dry bedding.

"We tend to keep the TMR on the drier side which makes it so much easier to manage the compost," says John.

The Redgroves always feed equal proportions of corn silage and ryegrass silage in the TMR. Cows only receive 0.3kg grain mix in the bail during milking.

The Redgroves started with 400 square metres of hardwood sawdust as bedding material. Over six years, the bedding in sheds one and two has built up by about 150mm. They have never been topped up or cleaned out. The pack in each shed is cultivated twice each day, during morning and afternoon milkings.

During winter, the pack is also rotary hoed once every fortnight. Every day, if it is not raining, the gate into each shed's loafing paddock is opened and the cows are free to come and go as they please. On a hot day, they may go outside but will all be back inside by 9.00am. In winter, on foggy days, the cows won't venture outside until the sun comes out.

The Redgroves have grown all their own forage on farm for many years and survived many years of low milk prices by supplying hay to racehorses and other dairy farmers. Their cropping enterprise comprises 445 hectares of river flats, all irrigated from the Hunter River.

Since ceasing grazing, the Redgroves have adopted a double cropping system. In summer, corn is grown on 205 hectares for conserving as silage, and on an additional 40 hectares for grain. In winter, the 245 hectares is used to grow ryegrass, which is ensiled.

Lucerne is grown on the remaining 200 hectares. Each stand of lucerne is maintained for four to five years and then replaced with corn/ryegrass crops for the same number of years. All feeds are stored on concrete in pits/bunkers with concrete walls to reduce waste. The Redgroves usually have seven to eight months of forage in inventory, which they find is sufficient as they have a reliable water source. They also have a further 3,000 tonnes of corn silage in reserve. Any surplus forage is sold.

"We are probably more 'farmers' than 'dairy farmers' so to speak. We like milking cows, but we are probably better at cropping."

The Redgroves obtain strategic advice from an agronomist and a nutritionist but make many decisions themselves. They do not use any contractors, preferring to do all the cropping tasks themselves, so that all tasks are done at the optimal time. They have challenges finding staff as they compete with coal mines in the area. However, they have a very good farm team, and tend to retain their staff as their work environment is good. One staff member, Trevor, has been with the Redgroves for 25 years. Allison does the payroll and all the bookwork.



Calf rearing facility

Sarah manages the Redgroves' calf rearing program. Calves are bottle fed colostrum between two to four hours after birth. Each day, calves are transported to the calf shed, where they are individually penned in groups of 10 per pen and receive a further two bottles of colostrum before being changed to milk in a bucket.

At 10-14 days of age, the individual pens are removed, and the 10 calves are free to move around, feeding from troughs. Calves are de-horned at six to eight weeks of age, vaccinated, and weaned at 100-110 days of age. Calves are fed a mix of grain, canola meal and lucerne hay. No other forages are added. Water is offered through pig nipple drinkers. Calves born during winter tend not to grow as well as those that calve in warmer months. During winter, coats are put on calves and fans are turned off.

After weaning, calves are fed a mixed ration prepared in a mixer wagon for three to four months until they are transported to the Redgroves' outblock at Scone. They are mated there and return to the home farm eight weeks before calving at 24 months of age. They are managed as a separate group from dry cows for the first four weeks, and then combined with the dry cows in a close-up paddock and fed a transition diet until calving.

Milking facility

In the new milking facility, two operators are able to milk 400 cows per hour (one at cups-on and one yarding cows). This is a vast improvement over the old rapid-exit facility. Collars enable monitoring of each cow's activity and rumination. The extended roofed holding yard holds each group of 300 cows comfortably. The dual cow entry onto the platform is working well.

The Redgroves changed from milking two times per day to milking three times per day in August 2023, soon after the new milking facility was commissioned.

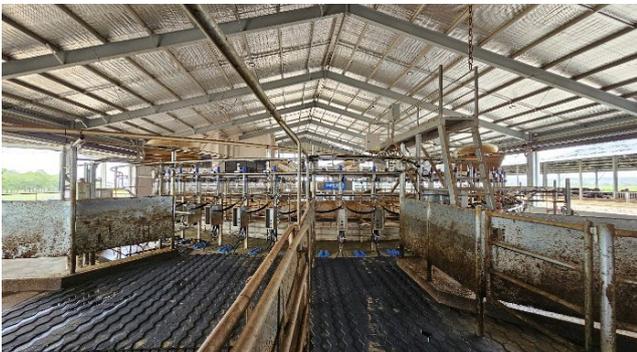
"All the cows were nice and close, they were giving a lot of milk – cows were dripping milk in the holding yard – and mastitis wasn't a big issue," says Daniel.

Daily milk production has increased by 15 per cent, and should increase further as two herds recently purchased to fill shed three and the future maternity shed settle in.

Cups on is at 3:30am, 1.00pm and 9.00pm. Full-time staff do the morning milkings and then work elsewhere on the farm for the rest of the day. Casuals mainly do afternoon and night milkings. Daniel likes to do morning milkings so that he can keep in touch with how the herd is performing.

Cows are currently averaging 35 litres per day with a 3.2 per cent protein and 3.4 per cent fat – the fat was four per cent before changing milking frequency.

The Redgroves expect to gradually increase average per cow production towards 40 litres per day as cows purchased from other farms settle into the herd. They are on a three-year supply contract with their processor and despatch a full semi-trailer load of milk every day.



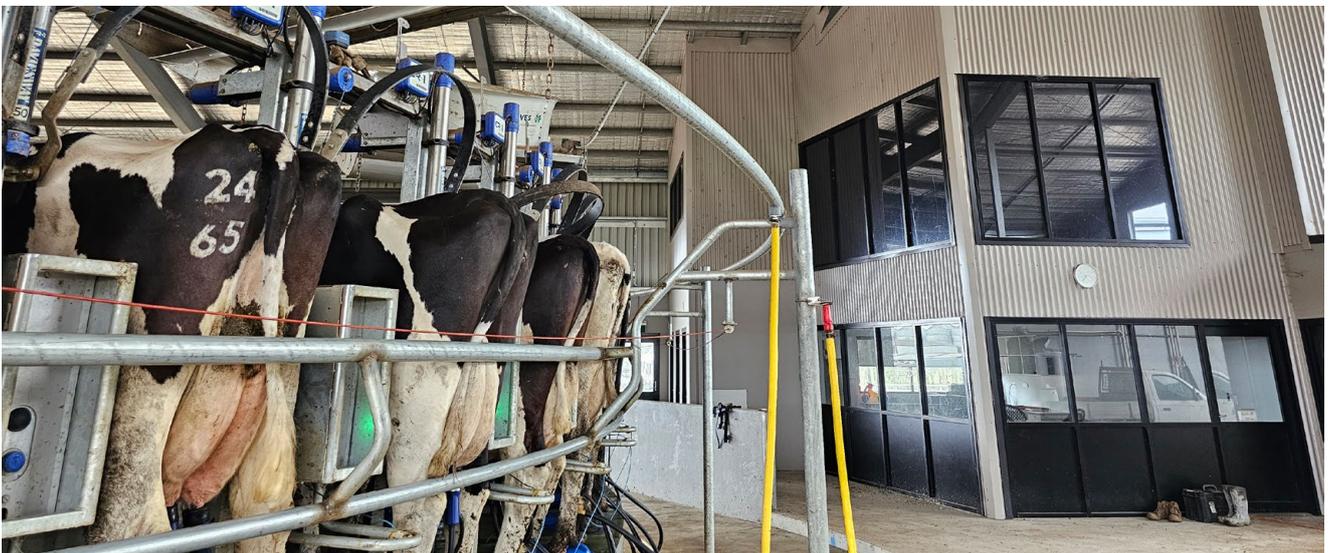
"We work as a team. Our biggest strength is our family. Everyone gets on really well."

What would you do differently?

The Redgroves are very happy with their facilities. With the refinements they made when building shed three, they now have a template for future sheds.

"Shed three is our perfect shed. If we are going to build more sheds, we'll just keep building like number three," said Daniel.

When sheds one, two and three were first commissioned – with sawdust as the bedding material – the Redgroves encountered some mastitis in cows from day 20 to day 100 post calving. These issues went away once the sawdust had heated up and begun composting. To avoid this issue, when shed four is commissioned, the Redgroves will fill it with surplus composted material from their other sheds rather than sawdust.



Where to from here?

The Redgroves are aiming to produce a million litres of milk every 30 days.

"That's what we want to get to really soon", says John.

"It's the best thing we have ever done. It is a brilliant way to farm."

For further information

Visit dairyaustralia.com.au and search 'National Feedpad and Contained Housing Guidelines'

Visit dairyaustralia.com.au and search 'Farm Systems'

Visit dairyaustralia.com.au/farmsystemevaluator

Acknowledgement

Thank you to the Redgrove family for agreeing to share their knowledge and experience.

Overview

| Farm | | | |
|---|--|------|------|
| Farm size (ha) | 485 | | |
| Grazing area (ha) | 0 | | |
| Cropping area (ha) | 445 | | |
| Production system | Loose housing facilities with compost bedded pack | | |
| Dairy type | 60-stand rotary | | |
| Climate (BoM historical data for farm locality) | | | |
| Mean annual rainfall (mm) | 724 | | |
| Mean no. rain days/year | 116 | | |
| Mean no. days/year $\geq 35^{\circ}\text{C}$ | 18.2 | | |
| Mean no. days/year $\geq 40^{\circ}\text{C}$ | 2.8 | | |
| Mean annual daily solar exposure (MJ/m^2) | 21.8 | | |
| Conditions over summer | | | |
| | Dec | Jan | Feb |
| Mean temperature ($^{\circ}\text{C}$) at 3:00pm | 27.3 | 28.7 | 27.3 |
| Mean Relative humidity (%) at 3:00pm | 46 | 46 | 53 |
| Mean Temp. Humidity Index at 3:00pm | 74 | 76 | 75 |
| Mean wind speed (km/h) at 3:00pm | 18.3 | 18.5 | 17.3 |
| Mean daily solar radiation (MJ/m^2) | 23.7 | 23.2 | 20.2 |
| Herd | | | |
| Milking cow numbers | 1,000 | | |
| Breed | Holstein | | |
| Calving pattern | Year-round | | |
| Production per cow per year (L) | 10,500 | | |
| Infrastructure and equipment | | | |
| Infrastructure | <ul style="list-style-type: none">• 4 loose housing facilities• Flood-washed feed alleys and stall alleys, sprinklers and fans• 60-stand rotary dairy with fans• Roofed dairy holding yard with sprinklers, fans and rubber flooring in high-traffic area | | |
| Equipment | <ul style="list-style-type: none">• Mixer wagon and tractor• Tractor for push-ups• Manure separator• Electronic collars and milk meters for monitoring each cow's rumination, activity, milk yield and cell count | | |
| People | | | |
| Full time equivalents (FTEs) | 11 | | |
| Cows per FTE | 90 | | |

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Disclaimer

The content of this publication is provided for general information only and has not been prepared to address your specific circumstances. We do not guarantee the completeness, accuracy or timeliness of the information.

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