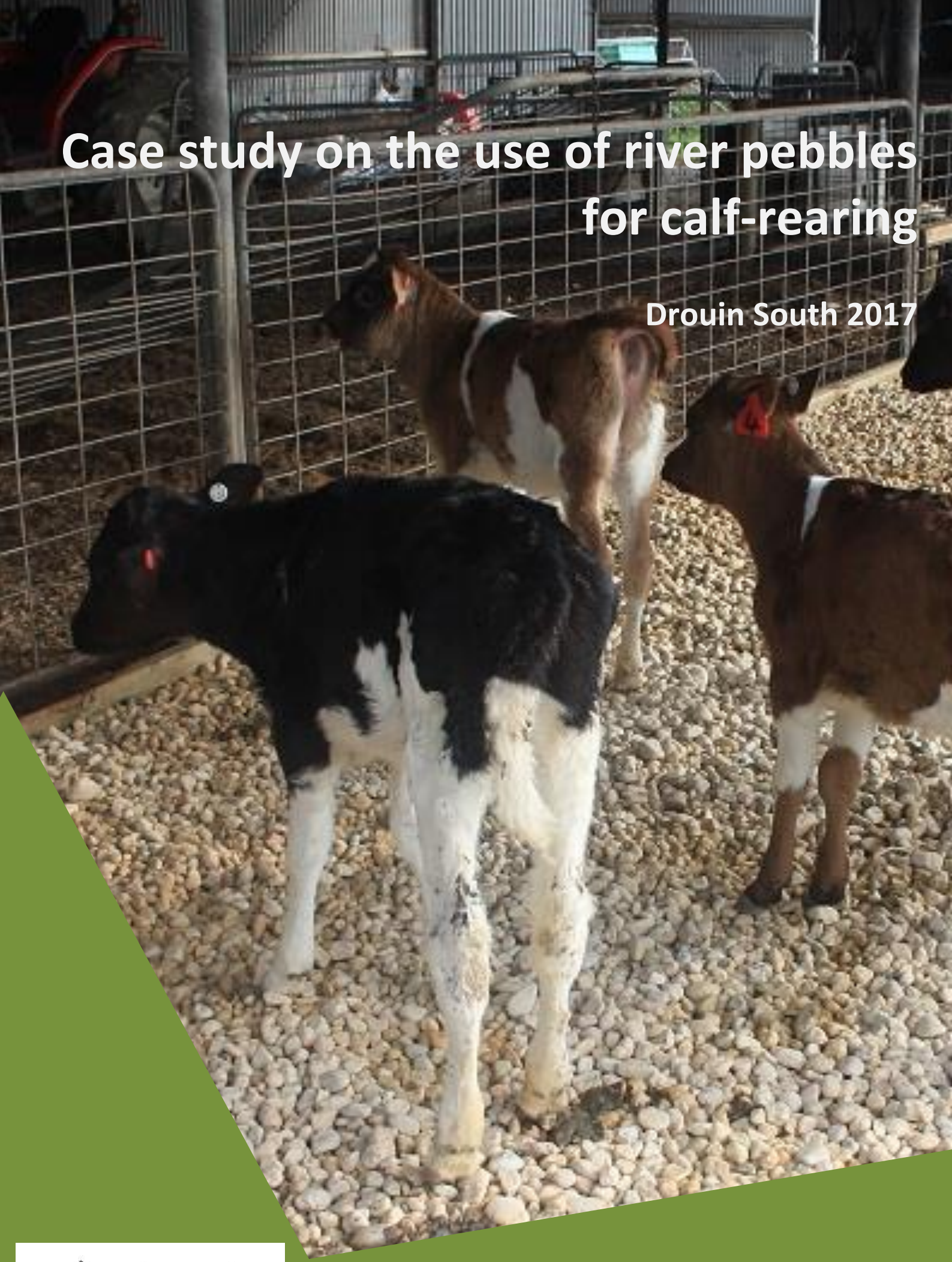
Case study on the use of river pebbles for calf-rearing

Drouin South 2017



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The Story: Trialing River pebbles instead of woodchips in the calf-rearing shed

Name: Trevor and Anne-Marie Mills

Farm: Minnieburn Springs, Drouin South

Overview

Trevor Mills, his wife Anne-Marie and their two children run a successful dairy and calf-rearing business in Drouin South. Trevor has always been willing to trial new farming practices to reduce costs and labour. One particular issue Trevor was experiencing was the regular replacement of the woodchips used on the calf-shed floor. It was a labour intensive exercise, which needed regular attention due to the quantities of calves Trevor was rearing and the woodchips retaining moisture and bacteria.

Trevor read an article from New Zealand about a farmer using river pebbles in his calf-rearing shed. The pebbles did not need replacing, were easier to clean, drained moisture and theoretically had lower bacteria. Trevor approached Western Port Catchment Landcare Network (WPCLN) about the research, pointing out that no one in Australia had trialed its use to date. After using the pebbles for two seasons Trevor and Anne-Marie found that they were not as easy to use as hoped. They were difficult and time-consuming to clean, and Anne-Marie has reservations about the calves' comfort. They believe that a few changes to the system may have improved the outcome but for now Trevor and Anne-Marie have decided to revert back to woodchips in their calf shed.

Trevor and Anne-Marie Mills on their dairy farm

Background

Trevor Mills is a second-generation farmer at Minnieburn Springs - a 122-hectare dairy farm in Drouin South, Gippsland that he own and runs with his wife Anne-Marie and their two children. The farm has been in the family since the 1950's when Trevor's parents bought the farm to run beef and dairy cattle. Trevor joined the family business after finishing school and immediately began to make his mark on the land.

After finishing school Trevor completed a number of farming courses, including beef management, dairy management and pasture management. In 1996 he joined the Warragul Beefcheque group, a move that contributed significantly to Trevor's understanding about pasture management practices. These groups, along with Trevor's own personal research, have driven him towards wanting to try new farming methods to improve the sustainability of the land and make efficiencies in his farming.

Trevor's connection to the farm has gone beyond running the business side of rearing and milking cattle. From as early as the 1980's, Trevor understood the importance of nurturing the land, and allowing the natural flora and fauna to flourish in order to keep the pasture in a good condition. A love of reading and research encouraged him to try new approaches, but it was his love of nature photography that really opened his eyes to what was happening right in front of him. He realised that the plants, trees and wildlife that he used to see around the farm as a young boy were slowly disappearing and if he didn't act soon that it might disappear forever.

It started with the planting of indigenous plants and fencing off a steep embankment. Then in 1997, when Trevor purchased the farm, he took the opportunity to re-shape the land forever. Trevor says '*I knew I could do a good job here and I just needed to opportunity to prove it'*. Trevor has always been the type of farmer to do things differently. While respecting the traditional farming methods used by his father, he's never been afraid to try something new. He commissioned an aerial photograph of the farm, which he transferred to his computer -*'not an easy job before digital photos and scanners!'* – then redesigned the farm to create more shelter, fences, laneways, drainage, water troughs and paddocks.

The motivation for the trial

During the trial Trevor was raising calves for the export market with an output of around 100-150 calves each year. The calves were kept in a rearing shed fitted with a robotic feeder with a floor covering of woodchips. Trevor was experiencing three main problems with the use of woodchips:

1. They quickly became wet and full of bacteria, which had implications for the health of the calves
2. It required a considerable amount of time and resources to clean and dispose of the woodchips
3. The woodchips needed clearing out approximately twice each season

It was from Trevor's research that he read about a farm in New Zealand that was using river pebbles in their calf shed instead of the conventional wood chips or sawdust. The New Zealand research showed that the pebbles were quick and easy to clean, didn't hold the same level of bacteria, and were reusable. The

idea of creating a drier, cleaner environment for the calves appealed to Trevor and Anne-Marie, and they hoped that in the long-term, there would be substantial cost efficiencies.

Trevor mentioned the idea of trialing river pebbles to the WPCLN. As there was no other farm in Australia trialing this method, they agreed it would be worthwhile study to pursue.

The Trial

The trial was to determine whether the calving shed at Trevor and Anne-Marie's farm would be easier to maintain and clean if the floor was covered with river pebbles as opposed to woodchips. The health and comfort of the animals would also be monitored and taken into consideration. The pebbles would be hosed down every few days to clear away the mud and manure, which would drain away to the effluent disposal system in the dairy yard. One pen was used for the trial, while the three remaining pens would be left with woodchips.

Preparing for the trial

Before the trial started one 20m x 4m pen in the calving shed was concreted to prepare the floor for the pebbles. Additional drainage was created to allow the waste to drain into the effluent disposal system in the dairy yard. The floor of the concrete pen was covered with quartz pebbles, while the remaining three pens were left covered with woodchips.

Financial impact

The area of the trial pen was 20m x 4m = 80m^2. Approximately 12m^3 of pebbles were spread at a cost of $1,128 (equal to $94 per metre). By comparison, wood chips cost $28 per metre, and so to cover the same area in woodchip would cost $336.

Calves on the pebbles

A financial comparison shows that woodchip is a considerably cheaper material to use, however there are other considerations to note. The pebbles can be cleaned and reused meaning they will last longer than the woodchip. Also, once the pebbles are laid they can remain in-situ whereas the woodchip needs to be removed and replaced on average twice per season. Using a reusable material saves on cost and time by not having to clean and replace it as often.

The results

The trial assessed two objectives – the ease of cleaning the pebbles and the health and comfort of the animals. The results were as follows:

Ease of cleaning

Trevor and Anne-Marie found that the pebbles were not as easy to clean as they'd hoped. There are a number of reasons behind this:

1. The type of pebble used. Trevor used quartz pebbles as it was a local stone and easy to source. Once the pebbles were laid, however, they found the quartz chipped easily and, over time, left a solid bed of smaller rocks under the larger pebbles. This formed like 'concrete' and prevented the water, mud and manure from draining away.
2. Drainage. The drainage system was not effective in washing the manure and mud away and allowing it to flow into the effluent disposal system. This meant that Trevor was still investing a considerable amount of time cleaning the pebbles.

Comfort and health of the calves

Initially the calves didn't enjoy walking on the pebbles and tended to stay on the concrete area. They walked tentatively on the pebbles but gradually got used to them and laid down. No key issues were noted in the health of the calves, although Anne-Marie expressed concern over using cold, hard pebbles for the young calves and was hesitant to put sick calves on them. She felt the pebbles were uncomfortable compared to the warm, soft woodchips. There was an assumption that the pebbles were a healthier material to use, although the pebbles were not tested to check the bacterial build-up compared to the woodchips.

Overall there was no loss to the productivity of calves, but no gain either. The pebbles were still difficult and time-consuming to clean and there were concerns with the calf comfort on the pebbles.

The calves pictured on the left are standing on pebbles whilst the calves on the right are on woodchips

What could be better next time?

Trevor and Annie-Marie believe that three main changes that could improve the success rate of the 'pebble system':

1. Using a larger stone that is not prone to chipping
2. Making sure that there aren't any fines in the pebbles
3. Implementing a better drainage system to allow the effluent to flow more easily into the drains. Trevor also suggested that to alleviate the problems of cleaning the pebbles, the calf feeders could be moved to a separate area to limit the spill onto the bedding

Other considerations

It is hard to accurately measure the comfort of the calves, however it would be interesting to test the temperature of the woodchips compared to the temperature of the pebbles to assess whether the pebbles really are a colder material.

What next?

Trevor and Anne-Marie have now stopped rearing calves due to a change in market prices. Trevor says he's not sure if the export calf rearing business will restart and may choose to focus on his dairy operation for now, with an eye on alternative business opportunities for the future.

Trevor is glad that he trialed the system and strongly believes with a few changes, the system could be successful in saving time and money. He says '*cleaning up is a big effort and if it had worked it would have been so worth it'*. After a busy year Trevor and his family are planning on taking a well-earned holiday…until the next idea comes along!

Conclusion

The trial showed that there are good alternatives to using the traditional woodchip flooring in calving sheds. The river pebbles were successful in the New Zealand model, so it is possible that a few changes to the system may make the model successful in Australia. Whilst Anne-Marie wasn't keen on using the pebbles from a comfort perspective Trevor could see the advantages in terms of better hygiene and ease of cleaning. As with all trials the first attempt isn't always successful. It would be interesting to see if any other willing farmers are willing to trial the method again using the lessons learned from this project.

Key learnings from demonstration

- There were too many fines in the pebbles which settled to the bottom and restricted good drainage.
- Ideally the pebbles should have been screened before they were spread
- The calves appeared to be uncomfortable for the first few days they were in the pebble pen
- The demonstration illustrated that there are alternatives to woodchip flooring in calf sheds
- Modification of the trial set up may have led to a more successful outcome

This project is supported by Western Port Catchment Landcare Network through funding from the Australian Government's National Landcare Program