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Where to now for dairying?

Andrew Fisher
Chair of Cattle and Sheep Production Medicine, The University of Melbourne

The Australian dairy cow industry has been facing some tough times in recent years. The international wholesale milk price crash in 2016 damaged the incomes of Australian dairy farmers and their counterparts in other countries. In Australia, the milk price paid to farmers dropped from around $0.48 to $0.40 per litre[1] and it is estimated that most dairy farmers in the nation lost money in the 2016-18 period. Overall, based on farm numbers, the number of dairy farmers in Australia reduced by 9%, with 600 deciding to retire or otherwise exit the industry[2]. These effects were exacerbated by significant drought and feed shortages in 2018[3].

The raw economic figures, as always, do not tell the whole story. Milking the cows just to make a loss on every litre of milk sold – for cows still need to be milked and tipping the milk down the drain would result in even bigger losses – and the pressure of mounting debt bring consequences in terms of stress, family tensions, and flow-on effects through communities based around dairying.

The farm gate milk price has been increasing in recent months, and the forecast is for prices back around $0.51 per litre in the coming year[4]. Other pressures for dairy farming are not likely to be so cyclical. The issue of climate change, and the discussion on the contribution of livestock agriculture through methane production have been re-fuelled by the recent report of the IPCC on global land use and agriculture[5]. Although it is beyond the scope of this article to examine the long-term impacts of climate change on dairying, and how researchers may be able to reduce cow-derived greenhouse gas emissions[6], the debate around the role of cows in contributing to global warming must feel like yet another challenge for the industry to face.

Although biotechnology may assist in curbing cow greenhouse gas emissions, on another front advances in biotech may enable the commercial production of liquid analogous to milk through bioculture systems, without a cow or grass in sight[7]. This technology is currently feasible, but not yet on a commercial scale[8]. Elsewhere, the rise of plant-based milk alternatives derived through soy and other substrates threatens to eat into the market of traditional milk products. In the USA, legal action has commenced to define whether the word ‘milk’ on a food label can only refer to something produced by a lactating animal, or whether it can continue to be used for products produced by other means[9]. Similar action has been contemplated in Australia and New Zealand[10].

The increase in plant-based milk analogues is partly attributable to more people in countries such as Australia adopting a vegan diet, devoid of animal-derived products. Often this is driven by a concern for animal welfare. Even accepting that only a small minority of consumers are currently vegan, the general community increase in awareness of animal welfare issues is also presenting the dairy industry with some challenging considerations about its practices.

As in humans and other animals, milk production in cows is sensitive to the adverse effects of stress, poor nutrition or infectious disease. Accordingly, at the herd level, it is the dairy farmer’s interest to provide adequate feed, minimise animal stress and address disease conditions such as mastitis (infection of the mammary gland) and lameness. This is not to say that individual cows do not suffer from some of these conditions, or that all herds are perfectly managed, but it is the case on these issues that the interests of

the farmer and the industry as a whole are aligned with the wellbeing of the cows and the animal welfare expectations of the public.

It will probably be more challenging to balance the likely animal welfare expectations of the public with dairy industry practices around cow reproduction and calf management. In order for a mammal to produce milk, it is usually necessary to undergo a pregnancy. Hormonal induction of lactation in the absence of pregnancy is possible, but the use of hormone administration for this purpose in dairy cows is not practiced and would be deemed unacceptable to the consumer. Thus, dairy cows become pregnant – some through artificial insemination and others through the use of a bull – and give birth to a calf, in order to produce milk for human consumption. Female dairy breed calves are generally kept on the farm to provide a pool of replacement animals, but male dairy calves are typically sold at a young age.

If the male dairy calf is a pure-breed dairy animal, it is hard for other farmers to competitively grow the animal out for beef, as the body type of the dairy breeds do not naturally lay down a lot of muscle. On the other hand, the use of a beef bull to breed with dairy cows after an initial period of artificial insemination, produces beef x dairy bull calves (and heifers), and these animals can be successfully reared for beef. In some States in Australia, chiefly Victoria and Tasmania, there is a supply market for young male dairy breed calves to be consigned to the abattoir, typically between 5 and 30 days of age. The young age and relative vulnerability of these animals gives rise to welfare concerns and a need to carefully manage their handling, transport and duration of time without a milk feed. These animals, termed 'bobby calves' are a topic of criticism of the dairy industry on welfare and ethical grounds. Growing these animals out longer for beef would diminish these concerns, but it is hard to envisage a way that all of them could be farmed in this way on an economically viable basis.

One option to address concerns around bobby calves may be the increased use of so-called 'sexed semen'. This is dairy stud bull semen available for artificial insemination that has been laboratory processed so that the vast majority of sperm cells are carrying the x chromosome rather than the y chromosome. Cows inseminated with this semen will produce female calves. Currently, the use of sexed semen is limited because the sorting process reduces its viability, limiting conception rates. Improvements in technology may address this, and make the use of sexed semen more common for insemination of dairy cows.

Another issue gaining greater public awareness is the separation of cow and calf not long after birth, typically within the first 12 to 24 hours. This is the common practice on dairy cow farms in developed countries, including Australia. The calves are reared together in a shed and fed milk or milk replacer, before being weaned and then grazed at pasture. The industry rationale for the practice is based on maximising the amount of saleable milk as well as minimising the risk of disease transfer from cow to calf, particularly Johne's Disease[11].

Recent systematic reviews have examined the evidence base for the practice. In relation to calf health, one report found that there was a lack of evidence that prolonged cow-calf contact increased the risk of Johne's Disease, although limited data meant that this could not be unequivocally ruled out[12]. Similarly, evidence for adverse effects on cow saleable milk production was variable[13]. If whole milk is being fed to calves anyway, then the cow productivity effects may be largely related to greater milk 'let down' and higher fat content when suckling the calf, as opposed to being milked by the milking machine[14].

From an animal welfare perspective, concern around early cow-calf separation is mostly focussed on the possible distress this could cause to the animals, and implications that may arise from the absence of direct maternal care. In relation to cow and calf distress, it has been shown that separation in the first day of life

causes lower distress than abrupt separation at a few weeks of age or older, when the cow-calf bond has been more strongly established. This is not to say that early separation is not a concern, but rather to highlight that simple fixes may be hard to implement. Staged separation, such as 'fenceline weaning' [15], or strategies involving the prevention of suckling while maintaining cow-calf contact, may limit the distress caused by weaning after extended cow-calf contact.

The biggest barrier to adopting extended cow-calf contact practices in dairy farming may well be practical. In pasture-based dairy systems such as in Australia, the distance walked by cows from the paddock to the milking facility and back again twice a day is probably too long for young calves to follow. Cows under natural conditions will often hide their young calves in tall grass before going off to graze, but human intervention may be necessary to ensure temporary cow calf separation twice a day for milking. Some small dairy farming operations are utilising extended cow-calf contact, and using this feature in the direct marketing of their milk. However, however with the typical Australian herd size now around 300 cows, the logistics of doing this at a large commercial scale are yet to be worked out.

This is not to say that extended cow-calf contact on commercial pasture-based dairy farms is not possible or will never happen. Initially there were concerns about managing laying hens at a commercial scale in free range systems rather than conventional cages, and yet there are now commercial-scale well-managed operations fulfilling consumer demand for free-range eggs. Rather, the issue is about consumer demands for dairy products produced to certain ethical standards being accompanied by a willingness to pay for what it costs to produce the goods, combined with value chains that ensure that farmers receive a fair price back at the farm gate. Some of the challenges for the dairy cow industry described in this article are not going to go away, and some are going to take time and effort to address. Simply adding another burden to domestic dairy farmers will only increase the rate of exit from dairy farming, and solve little.

1. https://www.dairyaustralia.com.au/industry/prices/farmgate-milk-price

2. https://www.dairyaustralia.com.au/industry/farm-facts/cows-and-farms

3. https://www.theguardian.com/food/2019/feb/24/drought-and-low-milk-prices-push-dairy-farmers-to-the-brink

4. http://www.agriculture.gov.au/abares/research-topics/agricultural-commodities/sep-2019/dairy

5. https://www.theguardian.com/environment/2019/aug/03/ipcc-land-use-food-production-key-to-climate-crisis-leaked-report

6. http://www.bbc.com/future/story/20190806-how-vaccines-could-fix-our-problem-with-cow-emissions

7. https://theconversation.com/lab-grown-dairy-the-next-food-frontier-117963

8. https://www.nationalgeographic.com/news/2014/10/141022-lab-grown-milk-biotechnology-gmo-food-climate/

9. https://www.nbcnews.com/business/business-news/fake-milk-real-news-synthetic-alternatives-threaten-traditional-dairy-farms-n973236

10. https://theconversation.com/almonds-dont-lactate-but-thats-no-reason-to-start-calling-almond-milk-juice-121306

11. https://www.animalhealthaustralia.com.au/what-we-do/endemic-disease/johnes-disease/jd-and-dairy-cattle/three-step-calf-rearing-plan/

12. https://www.sciencedirect.com/science/article/pii/S0022030219304175 Beaver A, Meagher RK, von Keyserlingk MAG, Weary DM. Invited review: A systematic review of the effects of early separation on dairy cow and calf health. Journal of Dairy Science 2019.

13. https://www.sciencedirect.com/science/article/pii/S0022030219304369 Meagher RK, Beaver A, Weary DM, von Keyserlingk MAG. Invited review: A systematic review of the effects of prolonged cow–calf contact on behavior, welfare, and productivity. Journal of Dairy Science 2019.

14. https://www.sciencedirect.com/science/article/pii/S0168159115003159 Johnsen JF, Zipp KA, Kälber T et al. Is rearing calves with the dam a feasible option for dairy farms?—Current and future research. Applied Animal Behaviour Science 2016;181:1-11.

15. https://www.progressivecattle.com/topics/herd-health/fence-line-weaning-a-healthier-way-to-break-the-bond