A Nuffield Farming Scholarships Trust

Report

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Cow Calf Contact: Dairy's Ethical Future?

Anna Bowen

June 2023

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ISBN: 978-1-912059-26-3

Published by The Nuffield Farming Scholarships Trust
Southill Farm, Staple Fitzpaine, Taunton, TA3 5SH
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Date of report: June 2023

"Leading positive change in agriculture. Inspiring passion and potential in people."

Title	Cow Calf Contact: Dairy's Ethical Future?
Scholar	Anna Bowen
Sponsor	Elizabeth Creak Charitable Trust
Objectives of Study Tour	• To understand how UK dairy farmers can produce dairy beef calves that meet the requirements of the red meat supply chain from farm to fork. • To understand how to manage cow calf contact (CCC) dairy farming and identify whether it is a feasible option for the UK dairy industry. • To identify social licence and ethical learnings from the racing industry that can be applied to dairy farming. • To combine these aspects with dairy beef marketing into a profitable and ethical future model for UK dairy farming.
Countries Visited	The United Kingdom, Denmark, Canada, Norway, Sweden, Finland, the Netherlands, Chile, United Arab Emirates, Australia and New Zealand
Messages	• Cow calf contact systems can be financially viable on commercial dairy farms but further research is needed. • There are different CCC systems and they have different challenges and opportunities. • CCC is not a silver bullet solution to dairy's social licence challenge. • CCC offers mental health benefits to animals and people. • The racing industry has taken financial and cultural ownership of ex-racehorses to drive demand and create a market, the dairy industry may need to accept the economic cost of dairy beef calves as part of its licence to exist.

EXECUTIVE SUMMARY

Dairy farming's social licence - its 'right' to be practiced - is challenged by the issues of surplus calf management and cow calf separation. Although the UK industry has effectively banned the euthanasia of healthy calves there remain difficulties in integrating dairy beef and bull calves into the red meat supply chain. While the industry has put significant effort into the bull calf issue, there is a growing public concern about the widespread practice of separating cows and calves. These social licence challenges may be dairy specific, but all industries that involve animals are being forced to acknowledge and address their own unique issues, which provides opportunities for cross-sector and cross-industry learning.

This study looked at the opportunities for dairy farms to transition to cow calf contact (CCC) systems through visiting farms and research stations. The farms ranged from micro-dairies selling their own branded produce to larger scale businesses selling milk direct to a processor for no added value. Some practiced dam rearing, others had foster systems, and the dairy management itself included robots, conventional parlours, and once a day, two in three, twice a day, and robot milking.

Visiting these farms showed that CCC farming can be viable across different systems, but it needs careful consideration of management and necessary investment. Further research is needed both in an academic and a farm setting.

CCC is not a silver bullet solution to dairy's social licence challenge. There will still be practices flagged as problematic and the industry will need to constantly adapt and improve to survive. Furthermore, CCC farming cannot rely on the practice alone to give it social licence and high welfare status; there has to be a focus on maintaining good core standards of dairy farming.

Surprising though it may seem, there are significant parallels between dairy farming's social licence challenges and those faced by the racing industry. Dairy can learn from racing the importance of being proactive in marketing animals exiting the sector through taking financial and cultural ownership of the issue.

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DISCLAIMER

The opinions expressed in this report are my own and not necessarily those of the Nuffield Farming Scholarships Trust, or of my sponsor, or of any other sponsoring body.

Please note that the content of this report is up to date and believed to be correct as at the date shown on the front cover.

Cow calf contact dairying is an under-researched management option with significant gaps in academic and learned experience. This report covers some aspects of technical advice but should not be taken as a 'how to' guide or as a recommendation that farmers implement the system without further research and consideration.

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Chapter 1 – Personal introduction

The author, Anna Bowen. Photo: Freddie Lawder

I grew up on a dairy farm in West Wales where my family have bred pedigree Holsteins since the 1920s. I never expected to work in agriculture, but always had a keen interest in and love for animals which, shaped by other influences, would have likely led to very different philosophies on food and farming.

In my mid-teens two things happened that laid the foundation for this Nuffield Scholarship; I started working part time for Cled Richards at AgriAngels (a dairy farm consultancy business) and took on my first thoroughbred ex-racehorse; Ribble Assembly. AgriAngels specialises in grass-based spring-block calving dairy farming, and the introduction to that system showed me that farming could be profitable, enjoyable, and environmentally sustainable. Over 15 years later and I have only ever owned other ex-racehorses, a decision driven by my personal morals as much as by my interest in the performance potential and aesthetics of the breed.

Following an enjoyable four-year stint at the Royal Agricultural College, Cirencester, where I followed my dual interests through a BSc (Hons) in International Equine and Agricultural Management and a MSc in Sustainable Agriculture and Food Security, I spent time working in fresh produce, beef and sheep genetics, a two- year term back at AgriAngels, and then worked as a dairy herd health advisor for AHDB Dairy.

Despite not anticipating a career in practical farming, today my partner and I manage 300 spring-block calving dairy cows through a contract farming agreement. This year we bred our first pedigree British Friesian heifer calf, Symbiotic Claudia, a direct descendant of the first cows brought to my family farm in 1924. Off-farm I am extremely lucky to have been given the opportunity to work as a consultant at The Andersons Centre, where I am able to learn from some of the best dairy farmers in the UK. I also work as a freelance journalist and an independent mobility scorer and enjoy showing young people the opportunities within agriculture through LEAF's FarmerTime and the NFU's Farmers for Schools initiatives. Farming has given me so much and I'd love for others to get the same experience.

My current horse, Woody, is of course an ex-racehorse, and we compete in affiliated dressage.

Travelling has taught me a huge amount about farming, business, and the environment. It's also highlighted that at heart I am driven by the same love of animals as I was as a child. This scholarship is for every cow, calf, and horse I met along the way. I hope that its legacy is better lives and prospects for you all.

Chapter 2 - Ethics and Social Licence: An Explanation

In livestock agriculture we hear a lot about animal welfare. It is a fundamental aspect of farming, without which most farms would be economically unviable as well as non-compliant. Welfare and ethics overlap and are at times used synonymously, but they are not the same thing.

The Cambridge dictionary defines welfare as *"physical and mental health and happiness, especially of a person"* and ethics as *"the study of what is morally right and what is not"* (Cambridge Dictionary, 2023a and 2023b). An early challenge to my Nuffield topic was presented as '*Isn't it better to shoot bull calves at birth than let them be raised in sub-standard housing with poor care?*' Given the UK's ban on euthanasia the argument is a moot point, but at core it deals with welfare rather than ethics. Poor calf management is both a welfare and an ethical failure, but to shoot a calf at birth is ethically wrong even if the alternative on some farms has been poor welfare. Similarly, I found through my travel that farms with high ethical standards can have poor welfare through failing to meet industry standards for body condition, lameness management, and udder health.

Throughout this report I will use both terms but will avoid using them interchangeably. There are already a number of Nuffield reports that look at welfare standards and issues in animal agriculture. This one focusses on ethics, and the work we can do over and above good welfare to maintain a concept that is being increasingly discussed not just in farming but in all industries that include animals; social licence.

Social licence essentially means the licence given to an industry or practice by society to exist eg the acceptance of how something is run and managed. It underpins the relationship between farming and our consumers, and any practice deemed unethical has the potential to harm it. Losing social licence can be extremely damaging to an industry, as explained by Martin, Shepheard, and Williams (2011):

"…if industry violates community expectations about how it ought to operate, it is within the power of society to harm industry by a variety of means including legal constraints, market penalties such as consumer boycotts or, even in the more extreme cases, by direct, sometimes violent, action."

If dairy farming is to maintain its social licence, then we must consider its biggest threats.

Chapter 3 - The Dairy Industry: Where Are We Now?

3.1 Bull Calves and Dairy Beef

On the 1 January 2023 the UK dairy industry's Dairy Bull Calf Strategy came into place, preceded by new Red Tractor regulations that banned the euthanasia of healthy calves. Arla – the biggest milk buyer in the UK - prohibit the slaughter of calves under the age of eight weeks by their suppliers, and other milk buyers have either followed suit or look likely to do so.

Unfortunately, the stigma of bull calf euthanasia still hangs over the industry, and many a critic of consuming dairy still brings up euthanasia as a reason not to drink milk.

In 2021 I carried out a survey of 409 UK dairy farmers about euthanasia, markets for dairy bull and dairy beef calves, and use of sexed semen. Of the farmers surveyed 85.8% had not euthanised any healthy calves in the previous 12 months. For the farmers that had euthanised calves, the main reasons were sales values being lower than the cost of rearing (65.6%), restrictions on housing (57.4%) and not having a market (55.7%). Eleven farmers added that tuberculosis restrictions impeded their ability to sell calves.

In the summer of 2022 the Agriculture and Horticulture Development Board (AHDB) (2022a) reported that sexed semen made up 76% of dairy sales, and its continued increase in popularity mean that the issue of dairy bull calves becomes less and less significant. However, this means there are more dairy beef calves being born, and the challenge to the industry is how to maximise their potential so that they don't become dairy's next 'wicked problem'.

My Nuffield study looked at ways to breed and manage dairy beef calves that met the requirements of the red meat sector, but as my travel progressed, I realised that many solutions were already out there but needed collaboration between sectors.

Results of my survey and case studies are available to read by request. For my written report I have chosen to focus on cow calf separation, and novel ways to improve dairy beef integration.

3.2 Cow Calf Separation

The vast majority of dairy farms in the world separate cows and calves for rearing, varying the point of separation from immediately post-partum (snatch calving) to hours or days later. This practice is defended for reasons ranging from welfare (preventing calves being injured by cows or contracting disease) to practicality (infrastructure not suitable for calves and cows) to economic (concerns about the volume of milk drunk by calves or impact on milk let down). Others believe that the modern dairy cow is either incapable of rearing her own calf or has so little maternal instinct that she does not mind the separation. And for many farmers and industry workers, cow calf separation is so ingrained a management practice that it is never questioned at all.

For the general public cow calf separation is often a factor that is not even realised until a farm visit or social media post alerts them to it. I confess that I had not considered the management of lambs and kids in sheep and goat dairies until I focussed my attention on this topic and found the notion of artificially rearing them while their mothers were milked uncomfortable.

Most dairy calves are separated from their mothers shortly after birth. Source: author

While calf euthanasia is now largely an issue of marketing dairy beef, cow calf separation remains a contentious issue that many in the industry do not take seriously as a threat, or do not engage with as a challenge for future dairy farm management. While I believe that cow calf contact (CCC) will play an important part in maintaining dairy's social licence, it is important to realise that it is not a silver bullet solution. Putting aside the many factors that still need to be researched, keeping cows and calves together does not solve all ethical concerns. As the Swedish University of Agricultural Sciences (SLU) in Uppsala found when they publicised their CCC trials, there are people who will still perceive dairy farming as unethical because of the milking of cows, the planning of pregnancies, or the links between the dairy and red meat industries.

3.3 Where does racing fit in?

Racing and dairy farming may seem unlikely comparisons, but my interest in the social licence of both led me to see significant parallels. Of all the equine sports racing is perhaps the most prominent in the public's consciousness; major races are shown on terrestrial television, attending a race day is a pastime undertaken even by those with no real interest in horses, results are reported in mainstream media, and the sport itself is relatively easy to follow and understand. It is a high-profile sport, and also one that is associated with wealth and privilege.

As a result of this racing has always been the main target for criticisms of equestrian sport, and as an industry it has examined its social licence risks for far longer. Arguably there are far bigger risks to social licence in other equestrian disciplines, but it is only in the last few years that I have noticed the wider equine industry start to consider the very real threats to horse riding as a sport.

Racing welfare also takes into account whip use, injury management, and handling of horses, but it is the management of ex-racehorses (racehorse aftercare) that has the greatest links to dairy farming.

Mystical Jadeite, the author's ex-racehorse competing at affiliated dressage. Photo: Simon Rees

Around 7,000 horses exit racing in the UK each year and 40% of them leave the industry entirely, destined for new lives in the aligned equine sectors (Retraining of Racehorses, 2023a). While the majority find new homes, historically the euthanasia of former racehorses has been a stain on the industry's reputation and remains a social licence risk. There are clear parallels between racing and dairy; how do the two industries manage animals that are no longer viable to the core economic

enterprise, develop a market for them within aligned sectors (beef and the wider equestrian community), and ensure that these animals are suited for their new lives? And crucially, how do they ensure that the animals are traceable and well cared for in their new lives, as any welfare issues further down the line inevitably impact the original- and higher profile- industry?

3.4 Where I went and why

I was awarded my Nuffield Scholarship in the autumn of 2020, when the country was slipping in and out of various stages of lockdown. International travel was off the cards and it would be over a year until I got on my first research flight. Due to this I spent the first 12 months speaking to farmers and researchers over Zoom and visiting farms in the UK when rules allowed. During this time the focus of my study shifted from dairy beef to cow calf contact, and I carried out a large-scale survey of UK dairy farmers for my Aberystwyth University accredited Nuffield report.

Country	Dates	Notes	Why
United Kingdom	2021-2022	• Godolphin Lifetime Care in Newmarket • Block calving dairy farmers in East Anglia making good use of sexed semen • Old Hall Farm in Norfolk • The Ethical Dairy in Dumfries and Galloway • Dairy farmer and Nuffield Scholar Robert Craig in Cumbria • Dairy farmer Ben Richards running a foster cow herd in Cornwall • Taw River Dairy in Devon	I wanted to get an idea of the UK context of my Nuffield study and develop my understanding of both the challenges and solutions
Zoom conversations	2021	• Nina von Keyserlingk in Canada to discuss social licence • Dairy farmers in British Columbia to	Imperative due to the delay in travel caused by the pandemic. These conversations

		learn more about Canadian dairy farming • Kerstin Barth in Germany to discuss cow calf contact research and commercial farming in continental Europe • Eliot Forbes in Australia on racehorse aftercare and agriculture's social licence • Virtually attended the International Forum for the Aftercare of Racehorses • Rob Daykin at the Anglo Danish Group • Australian Dairy Farmers Dairy Beef Forum	were also very important for gathering background information on the countries I would visit and building a network of contacts
Denmark	November 2021	• Viking Genetics and Viking Denmark • Danish Crown • SEGES • University of Aarhus • Commercial calf rearers and foster cow dairy systems	A very small proportion of beef eaten in Denmark comes from the beef herd. There is a well-integrated dairy beef system and the country is one of few to have branded CCC milk
Canada	May 2022	• Feedlot Health Management Services and client feedlots • Canadian Thoroughbred Horse Society	I wanted to visit feedlots to see intensive beef finishing. Alberta as a state was an opportunity to visit dairy, beef,

		• Highfield Stock Farm and Bar None Ranches • Dairy farms running foster cow systems	and racehorse breeding operations in a comparatively small area
The Netherlands	June 2022	• Visited with my Nuffield mentor Jamie McCoy as part of her Farming Connect funded study tour • Kamelenmelk camel dairy • Fresh food vending machines and farm shops • Foster calf dairy with farm shop and café	Opportunity to see a country with a number of CCC farms
Norway	September 2022	• Norwegian Veterinary Institute near Oslo • Commercial cow calf contact herds (dam reared) across Norway	Norway is a leader in CCC research and has a strong history of commercial CCC farms
Sweden	September 2022	• SLU's research farm in Uppsala	Opportunity to visit the research centre and discuss commercial CCC farming and opportunities in Sweden
Finland	September 2022	• LUKE research centre in Kuopio	Research centre in the process of starting a new CCC project
Chile	November 2022	• INIAS • ABS- Genus and LIC breeding companies • Spring block calving dairy farms owned by the	A country that is slightly off the beaten track but is very relevant because of the prevalence of

		Byles and Cotter families • Other dairy farms' mixture of AYR, block calving, privately and corporately owned • Cooprinsem • Dairy farm finishing dairy beef • Lecheria sin Antibioticos, regenerative CCC dairy farm selling to Nestle and making their own cheese	block calving herds
United Arab Emirates	January 2023	• Dubai Retirement Centre owned by the Al- Makhtoum family • Meydan Racecourse • Life After Racing UAE	Home of some of the most influential businesses in racing
Australia	January and February 2023	• How Now Dairy • Nuffield Scholar Sarah Bolton • Racing Victoria • Roisin and Ron Powles's cow calf contact dairy • Matthew Harrison, University of Tasmania • Megan Verdon, University of Tasmania • AgriFutures • Grace Springs Farm • Vinery Stud with Nuffield Scholar Adam Williamson	Variety of dairy systems and both direct sale and conventional sale CCC farms. Racing industry has faced significant social licence challenges
New Zealand	February 2023	• Goat dairy	Block calving herds with

		• Mandi McLeod, Nuffield Scholar • Rachael Bryant, Lincoln University • Fonterra • Tracy Brown, Nuffield Scholar • Pukerua Farm, cow calf contact herd selling a small percentage of milk directly • Massey University	typically low value surplus calves. I was very keen to speak to Chris Falconer and to understand more about Happy Cow Milk

3.5 Cow Calf Contact: The Next Frontier?

In any discussion about the ethics of dairy farming the topic of cow calf separation while invariably arise. For those within the industry separating cows and calves is rarely questioned, even for those who also have experience of suckler beef systems. There are research trials in many countries looking at the impact of cow calf contact on everything from milk quality to cow and calf stress levels. While most of this research is in Northern Europe- predominantly Scandinavia- there are also trials in Australia and New Zealand which focus on the management of cows and calves together in grass- based systems.

Keeping cows and calves together is likely to become a bigger topic within the UK dairy industry in the years to come, moving from a discussion for activists and a management system for early adopters to being a more common sight across commercial farms. In the Appendix I have explained the different types of cow calf contact system seen on dairy farms around the world.

A Nordic farmer Facebook group focussing on cow calf contact has over 1,000 members, and research in Norway shows that 4% of herds there already practice this management system. For context, in the UK 4.5% of herds are split block calving, and spring and autumn block calving systems account for 6-7% each (AHDB, 2021). During my visit to Norway the dairy industry was gearing up for the phasing out of tie stall systems, with new sheds (mostly for robots) being built. According to the major installer of cattle housing, almost every new shed was being designed to be suitable for cow calf contact in the future.

A tie stall dairy in Norway practicing CCC, photo shows a calf kindergarten box. The farm had half-built a robot shed designed for CCC. Photo: Author's own

Researchers working in this field were quick to point out that there are still real gaps in knowledge around the implications of keeping cows and calves together. There are few commercial scale farms practicing it, with the majority of them in Scandinavia and Northern Europe and using robots. Early adopters face challenges around a lack of evidence-based knowledge and associated support. Interestingly, there were many farmers - mostly those outside of Scandinavia - who had no idea of the ongoing research or the number of farms using this management system. This led to further challenges as these farms viewed themselves as outliers and were unable or unwilling to access support, both with CCC and with best practice general dairy farming.

3.6 CCC Management

Modern dairy farms have been designed to keep cows and calves apart and many of us (me included) go to great pains to avoid cross-contamination between the two. Separate staff, changes of clothes, and foot dipping at calf shed entrances are all considered best practice, so the idea of keeping cows and calves in the same environment will sound alarm bells for many proactive farmers.

High standards of cleanliness are a basic requirement for CCC. Many of those I visited were small scale and so could be expected to have lower infection pressure, but they still maintained high levels of hygiene. Commercial farms in the Nordic countries tend to feed supplementary colostrum to ensure calf intake, while others relied on calves drinking enough from their mothers. Vivelstadsvea Farm was particularly careful to harvest colostrum from cows in the calving pen to feed to calves.

Norwegian research has highlighted that calves that start drinking quickly normally drink adequate colostrum, while slower drinkers miss out. It is worth noting that even in conventional farms which separate cows and calves it is not uncommon to see poor colostrum management and failure of passive transfer (Farming UK, 2023).

Calving pen in Norway showing cow and calf kept alone to bond. Source: Author's own

Equipment for harvesting colostrum to ensure gold standard management. Source: Author's own

Good colostrum management and environmental cleanliness are key to controlling many infectious diseases, but one that cannot be so simply managed is Johne's disease (paratuberculosis). The majority of milk processors in the UK require a Johne's Management Plan, and some stipulate that herd prevalence cannot exceed a specific threshold. Keeping cows and calves in separate areas and maintaining strict biosecurity between the two is fundamental to many control plans, so how do CCC herds cope?

The reality is that most commercial CCC farms are located in Nordic countries where Johne's has either been eradicated or has a very low prevalence. When I spoke to farmers outside these countries some were unaware of the disease's existence or believed themselves to be low risk because they had not seen clinical disease on their farms. Given the relatively young age of some of these herds and the time it takes for clinical disease to be seen, it could be expected that this will become a bigger issue in the future.

The UK industry needs to tackle and eradicate Johne's disease, and a failure to do so cannot be used as an excuse to avoid discussing CCC. Where prevalence is already low a culling regime, strict testing, and data analysis to identify any at risk cows would make the system manageable.

Having a separate area - often referred to as a 'kindergarten'- for calves is common across CCC systems. At housing these range from simple creep areas set up so that calves can duck under a bar and cows cannot, to areas accessed by segregation gates opened by electronic ear tags. Some CCC research trials include cow motivation in their methodology and so the calves live in their kindergarten with cows accessing them to feed; in these set ups contact is facilitated either by manually letting the cow in or a segregation gate operated by the cow's collar or tag. At grazing cows and calves tend to remain together in the paddock, but a kindergarten may be set up near the collecting yard where calves receive supplementary concentrate feed and can safely wait while their mothers are milked.

Kindergarten area at the Danish Cattle Research Centre in Aarhus, Denmark. Photo: author's own

Robot systems offer an easy way to manage cows and calves; the cow accesses the robot as she pleases, and while she is milked her calf can play with other calves, access the kindergarten, sleep, or wait for her outside the robot. Farms without robots do have more challenges at miking time; the ideal situation is that calves wait in the kindergarten, but some farms make allowances for calves accessing the parlour. The Ethical Dairy in Scotland has a tandem parlour which has space for calves to walk through next to the milking cows. Some herringbone parlours can have space in front of feed troughs where calves can walk. The general consensus was that calves would avoid the parlour and the bustle of the collecting yard wherever possible, although some farms experience difficulties with some cows letting down milk unless their calf is nearby.

Tandem parlour at The Ethical Dairy in Scotland. Photo: author's own

The biggest challenge on CCC farms is usually identified as weaning. In conventional systems weaning from milk is regarded as a stress event and farmers are advised to avoid tasks such as disbudding or mixing social groups at the same time. In CCC systems calves are not only being weaned from milk but also weaned from contact with their mother, and that separation necessitates a change in environment. The compounding of these factors means that weaning can be a stressful event for cows and calves in CCC systems, resulting in growth loss. One farm in Norway gave up CCC because the vocalisation at weaning was unbearable.

Moving to half-day contact to phase weaning is commonplace but can be labour intensive as cows and calves must be manually separated once a day. For twice a day milking herds the milking process makes this more practical, but grazing farms may find it challenging to implement if they want cows and calves to have contact - but no suckling - along a fence line.

Gradual reduction in contact can be done through separating cows and calves for increased periods of time, often with the calves being put in a pen where cows can visit and touch them but they cannot drink. This separates the milk and the contact aspects of weaning into two events.

Nose flaps, as seen in suckler beef systems, can also be used to stop calves losing milk and dam contact in one event. They are commonly seen in extensive CCC farms, especially those that wean calves at a similar age to suckler beef systems - some of this is likely driven by the practical aspect of the nose flaps being the correct size because of the age of the calf.

Older weaned calves wearing QuietWean flaps in Chile. Photo: author's own

In Norway several of the farms had the same system; calves were separated from their mothers at 6-10 weeks of age and then reared on milk until 10-12 weeks. The farmers noted that it could be difficult to train calves to a teat at this age, but as the average herd size in Norway is just 30 cows there is significantly less labour requirement than may be expected in a bigger herd. In order to maintain social contact farmers aimed to have more than one calf ready to wean at one time. This method also allows controlled intake of milk - which may have economic benefits.

There is no standard rulebook for CCC - with little historic research and relatively few examples of knowledge exchange many farmers learn as they go or adapt what they have seen on other farms to suit their system. In Australia I met Roisin Powles who had spent years incorporating aspects of CCC into her farm before taking the plunge into a full CCC approach.

3.7 Case Study: Chris Falconer, Pukerua Farm

UK Nuffield Scholar Chris Falconer owns Pukerua Farm in the North Island of New Zealand and runs it as one of the only cow calf contact dairy herds in the country. A portion of his milk is pasteurised through the Happy Cow Milk processing system and sold as branded Pukerua Farm milk to a local school. This represents a small volume and Chris's business is designed to be profitable without added value sales. Most of the milk is sold on a standard milk contract and a percentage of the profit from the direct sales is donated to the local Maori community. In addition to this Chris has a focus on environmental sustainability and is engaged in planting native flora and managing the farm holistically.

Happy Cow Milk processing equipment. Photo: author's own

The farm is based on the traditional Kiwi system; cross bred cows produce milk from grass on a carefully managed grazing system. They are outside all year round and some paddocks are at a considerable walking distance. However, the business has several key differences; the herd calve in three blocks, it is a flying herd, and the Hereford calves stay with their mothers for 11-12 weeks. Calves are weaned in two batches and have full day contact on the once-a-day milked herd.

Chris's model is based on his personal values; one of which is choice. The calves choose where they go; some will stay in the collecting yard all day rather than follow their mothers to the field, and nobody stresses about them walking on farm tracks. The collecting yard has been designed with a gap under the gate for calves to get out, and a grassy area where they can wait.

Chris Falconer with his adapted collecting yard gate. Photo: author's own

Five to ten per cent of calves each year are hand reared because of poor mothering, not suckling, or the cows being dangerous to humans or other cows. Chris will intervene with colostrum when needed and freshly calved cows stay in a group close to the parlour for the first week.

On OAD milking the cows produce 330kg MS/cow eating around 150kg of concentrate feed. The farm is run with 1.4 full time equivalent labour units and the cows are bred to AI for 20 days and then served with bulls.

Chris's system was exceptional and his close financial monitoring gave me confidence that this system could be profitable and practical for similar farms. Some of his key points and recommendations were:

- You can't expect all calves to behave the same.
- No impact on somatic cell count, mastitis, or teat ends.
- Calves form their own social groups which are key to their development.
- Always have CHOICE at the front of your mind and think about its application to cows and calves.
- Complete monthly costings monitoring actuals against budget.
- More interested in achieving personal values than metrics.
- Cow reared calves weigh 17kg more than those hand reared when sold and achieve a better price based on appearance.
- Don't compromise the calf for the system.
- Heifers have social and performance benefits when reared this way.
- Don't take anything from the cow upstream as its all accrued downstream; the cows will give it to you.
- Cows have the right to exist without humans and are more than just a number.
- Make your business easy to run.

Chris's farm was the final dairy herd visit of my scholarship and the one that had the biggest impact on me both from a cow calf contact perspective and as a model of best practice dairy farming. By focussing on cow welfare in a different way and respecting the farm's cultural and environmental heritage he manages to run a profitable and resilient dairy farm that is a great place to live and work- for humans and animals.

Chapter 4 - Cost Model

The feasibility of cow calf contact on a commercial scale comes down to its practical and economic viability as much as its attraction to farmers as a system. There are very few economic models of cow calf contact systems because research has typically focussed on management and health markers, and many of the farms operating CCC effectively subsidise the dairy enterprise with added value sales.

Berge and Langesth's master's thesis (2022) looked at the economic impact of CCC in Norway and concluded that a 30-cow herd would reduce milk sales by 8,256 litres from CCC. This is equivalent to one cow's yield based on Norwegian milk yields. However, this must reflect either a low calving interval or high calf losses through either mortality or sale or reflects a period of CCC followed by manual feeding, as for 30 calves fed for 10 weeks this is equivalent to just four litres a day.

German research indicates a 27.5% reduction in yield while cows are suckled whereas other studies put it at 35%. The SRUC suggests that cows with bull calves at foot give two litres/day less in the parlour than those with heifer calves, suggesting that use of sexed semen may be beneficial for CCC systems.

SRUC's cow calf contact prospectus suggests that conventional farmers moving to CCC will need a 36ppl milk price and premium beef prices to make a comparable profit, whereas organic farmers require 40ppl and premium beef prices. Note that these milk prices are from pre-2022, suggesting that the current requirement would be higher.

There are of course other variables to consider when costing CCC. Calf sales prices are often much higher, and there are savings in milk powder and calf rearing costs. There is no need for separate calf housing or feeding apparatus, and money is saved on hot water, electricity, fuel, and cleaning. Research also suggests that there may be benefits from lower somatic cell count, improved or comparable fertility, and better cow and calf health.

Assuming that calves consume an average of 12 litres a day through the suckling period (assuming a step down of contact and a final weaning age of 12 weeks) each calf will drink 1008 litres. Some of this will be non-saleable milk (e.g. colostrum and transition milk). Different systems may be able to reduce this as Tasmanian research showed that 10-week-old calves on half-day contact drank just under 10 litres a day.

For a 180-cow herd, with an average calving interval of 387 days 169 cows would be expected to calve in a year. Taking an 8% mortality before 24 hours/stillborn figure, there are 155 calves to rear. Some of these may die before weaning, but assuming zero mortality the volume of milk consumed by calves is 156,240 litres. At a milk price of 35ppl this is a cost of £54,684 or 4.04ppl (assuming a yield per cow of 8,000 litres). If all calves were reared conventionally and fed an average of six litres per day the cost would be £22,785. Milk powder for 41 heifer calves (assuming a 23% replacement

rate) would cost £3,772 at £2,000/t and 46kg per calf fed. Assuming whole milk feeding the extra cost to the business of CCC is £31,899 or 2.36ppl.

The figure above is fairly high, assuming that all calves are fed to 12 weeks. The reality is that on many farms bull and beef calves will be sold off-farm earlier, reducing the milk fed. This would also reduce some of the added value from better calf sales. One option could be to wean bull and beef calves at eight weeks and then sell, which would capture growth rates better than selling pre-weaned calves that haven't been suckled but reduce some of the milk consumed by calves.

The following additional savings/extra income could be made:

- £5,475 saving in labour (one hour a day at £15/hour).
- If mastitis could be reduced by 20% there would be a saving of £2,440 (£244/case, an average mastitis incidence of 30 cases per 100 cows as a starting point).
- A modest increase in calf sales of £20/calf would give an extra £2,280 of sales.

These savings total £10,195, reducing the overall impact of CCC to £21,704 or 1.61ppl. The figures quoted above are modest, and I think it could be possible to narrow that gap. There are also other benefits that are harder to exactly quantify, such as better heifer growth reducing heifer calf mortality, reducing age at first calving, and improving lifetime production and longevity. Of course, depending on the infrastructure available there may also be an initial capital outlay and potential interest costs.

Several of the farmers I spoke to highlighted the benefits to the calving heifers of having already experienced the adult cattle housing, milking parlour, and herd dynamics. With the failure of heifers to reach second calving being a challenge to the industry, any factor that improves heifer retention will have additional benefits to the farm's economics.

The following also needs to be considered:

- Later weaning or 12 weeks of full contact may lead to increased losses in milk volume.
- Some calves will have to be artificially reared due to dam rejection or calf suckling behaviour.
- The herd has to be carefully managed to avoid other issues such as infectious disease spread.
- The same principles of good colostrum management and cleanliness of the calving shed apply as in conventional systems.
- Infrastructure spending will vary from very low (creation of a creep area and adjusting gate heights) in a herd where the timing of calving allows all calves to be reared at pasture to potentially very high where cows are fully housed and there is a requirement to kit out sheds with calf areas and adapted cubicles.
- Seasonality of milk contracts could reduce the value of milk consumed by calves e.g. spring calvers may receive a lower milk price at peak production and see a lower financial cost of leaving calves suckle than an autumn calver where the same volume of milk is worth more.

Chapter 5 - Future Research and Opportunities for CCC Systems

CCC remains a novel system and there is a dearth of peer reviewed research as well as practical on-farm case studies. Anyone attempting it will have an element of learning as they go, and different herds and individual cows react differently.

Further research is needed about CCC on commercial pasture-based systems. There is also a need for economic modelling in UK farms, and longitudinal studies of the impact on cows throughout their lives.

With foster systems the industry needs to be careful that they will be accepted by the consumer and aren't simply developed as an 'easy route' that is ultimately rejected because of the continued separation of cows and their biological calves.

Adopting CCC does not need to be an all or nothing approach. Farmers can experiment with small batches of calves at particular times of the year and look at different management approaches before implementing it on a larger scale.

In countries where Johne's disease is endemic the industry will need to make a concerted effort to eradicate the disease, as well as continued efforts to improve colostrum management and general calf health. Through my career I have been made acutely aware that many farms still fail to meet basic standards of good practice, even when they have the option of snatch calving, measuring and feeding colostrum, and rearing calves in a specialist environment.

CCC on its own is not a cure all. It does not negate the need to follow industry guidelines of good animal welfare, and keeping cows and calves together will not 'make up' for high levels of mastitis or lameness caused by poor technical knowledge. I have seen farms selling branded milk making money from their ethical credentials - because cows and calves are kept together - but having poor welfare standards driven by ignorance or the blind assumption that having a headline practice like CCC must make up for any other issues.

In the future I believe that CCC will become more common, and milk buyers will reward farmers with premium contracts, as seen in Denmark and Germany. In the meantime it is important that conventional farmers are open-minded about CCC and its application, and that the industry avoids a 'them and us' pitting of systems against each other.

Chapter 6 - The Future for Dairy

Across the world attitudes to dairy social licence are changing. From bans on tie stall housing to milk processors stopping bull calf euthanasia, the way we farm is becoming more ethical. The rate of change varies between countries, but there seems to be a general positive trend. In the UK it feels inevitable that the focus will shift to cow calf separation.

Cow calf contact systems require new skills and a shift in mindset. It will be a challenge to implement them on a wider scale and will rely on processor support and knowledge exchange. There is a real risk that the industry gets caught up in foster systems without considering public perception; our focus needs to be on dam reared systems.

Dairy farming doesn't exist in a vacuum; other animal industries are also experiencing scrutiny and challenges to their social licence. There needs to be cross-industry collaboration and learning. Racing is far ahead of most other animal industries because its platform has opened it up to scrutiny. There are lessons to learn from the models seen across the racing industry, but particularly that of Racing Victoria with its focus on integrating aftercare into the primary industry and on targeting actions to animals with different prospects. A similar approach to dairy beef would help market dairy beef.

To retain our social licence we as dairy farmers and industry professionals have to work to raise our standards. We cannot ignore the issue of cow calf separation or make excuses about mothering ability. Now is the time to act to learn how CCC can be implemented on a commercial scale, and start making it possible for the industry as a whole.

Chapter 7 - After Nuffield

I finished my Nuffield travels in February 2023, returning from the bright sunshine of New South Wales to the cold of West Wales and the start of our calving season. I'm writing this on the final day of our 12-week calving block, and from the kitchen table I can see the 'colostrum' group - the seven cows that have calved in the last fortnight - walking in to be milked. With them walk four fat black Angus calves, and another three have been left sleeping in the field. The group would be better dubbed the cow-calf group, as this year we made the decision to rear the calves born in the final three weeks on their mothers.

Cows and calves managed together on the author's small scale CCC trial. Photo: Author's own

Our cows aren't turned out to graze until late February/early March, therefore a full CCC system would require cows and calves to be managed together at housing. The farm's infrastructure includes slats, a feeding passage utilised as a collecting yard, and outdoor cubicles. It would need significant investment to work and, as a contract farming business, that isn't feasible. At some point in the future I would like to manage a whole herd as CCC, but this won't happen in the short term.

Calves accessing the milking parlour on the author's farm. Photo: Author's own

My Nuffield Scholarship has given me a unique opportunity to visit CCC farms around the world- a privilege that few others have had. I've seen how this system can work, but also its specific challenges.

On the subject of dairy beef, my professional work has led me to see that the suckler beef industry in the UK needs to be radically overhauled if it is to survive in a world post-subsidies. The focus on GHG emissions means that dairy beef will look increasingly attractive from an environmental as well as a profitability perspective, and breed and end market selection could allow dairy beef to be reared across all systems and landscapes.

Outside of the subject specific lessons, I've learnt to look at how things *can* work instead of how they *can't*, I've started to challenge what we do as dairy farmers and how our industry would work if we set it up today- with the best outcomes for animals at the forefront- rather than carrying on as we always have done.

Nuffield has re-confirmed the importance of learning from other farmers and other industries, and the benefits of being curious and open-minded. Travelling the world has (ironically) shown me the serious impacts of climate change and made me more conscious of what we can do as farmers to mitigate it.

As a farm consultant I hope to help other farmers who want to try CCC, and I believe that one day UK milk processors will want an understanding of the system in order to market added value products. I hope to deepen my knowledge of CCC through engaging in further study alongside learned experience.

Chapter 8 - Acknowledgements

My Nuffield Scholarship wouldn't have been possible without the support of my generous sponsor, the Elizabeth Creake Charitable Trust. My heartfelt thanks to them for supporting my travel.

I also need to thank my fiancé and business partner Freddie, who has been left responsible for the cows and our terrier while I travelled and attended training events.

The references for my initial application were provided by Cled Richards and Tony Evans, both of whom have been integral in shaping my dairy career as well as writing references which brought me to Nuffield interview.

Jamie McCoy is my friend, neighbour, and Nuffield mentor, and inspired me to make my application in the first place. Her help and guidance throughout are hugely appreciated, and it was great fun to travel with her to the Netherlands in June 2022.

During the pandemic Nuffield International assigned us international 'partners' and I was lucky enough to be paired with Australian scholar Lucy Collins. My thanks to Lucy for being a support and sounding board through the whole process, for hosting me in Victoria, and for being the best travel companion in New Zealand.

I also need to thank Sarah Bolton for the Zoom and in-person discussions of CCC and her own Nuffield and post-Nuffield research, Nina von Keyserlingk and Kerstin Barth for academic foundations and giving me contacts across the CCC research world, and Viking Danmark for the contacts in Denmark. The Early Careers CCC Scientists WhatsApp has been a source of discussion, links to the most recent research, and introduced me to PhD candidates and post-doctoral researchers who I was lucky to visit across the Nordic countries.

Steve Houston, David van der Jagt, Allan Cooper, and Daire Brady were invaluable in arranging visits in Chile, and Glynn Byles, John Cotter, and Jordan Sotelo kindly gave me their time and translation skills to visit Spanish speaking farmers and organisations.

For hosting me so graciously I thank: Steve, Vanessa and family in Canada; Glynn, Eve and family in Chile; and Mandi, Wayne and their gang of wonderful animals in New Zealand.

My cohort of Nuffield Scholars have had a challenging experience navigating an extended scholarship term, a global pandemic, and rampant inflation. They have been a brilliant group of people to share ideas and contacts. My special thanks to Aisla Jones for not only motivating me through the process of completing an accredited Nuffield but also sharing my obsession with cute dogs and setting up the *Dogs of Nuffield* Twitter account which has been a source of joy throughout my travels. I have indeed met many wonderful dogs while travelling and those interested can meet them online!

And, finally, thanks to my colleagues at The Andersons Centre, especially Ollie Hall, for working around my travel commitments and to my commissioning editors and account managers who put up with me filing copy from ferries, trains, and airport terminals.

Author with Mandi McLeod and Lucy Collins in New Zealand

Appendices

Appendix A: Types of CCC

Cow calf contact can be split into two broad categories; dam reared and foster reared. As you'd expect, dam reared means that the calf suckles their own mother, and foster reared means that the cow is not the calf's biological mother.

Foster Reared

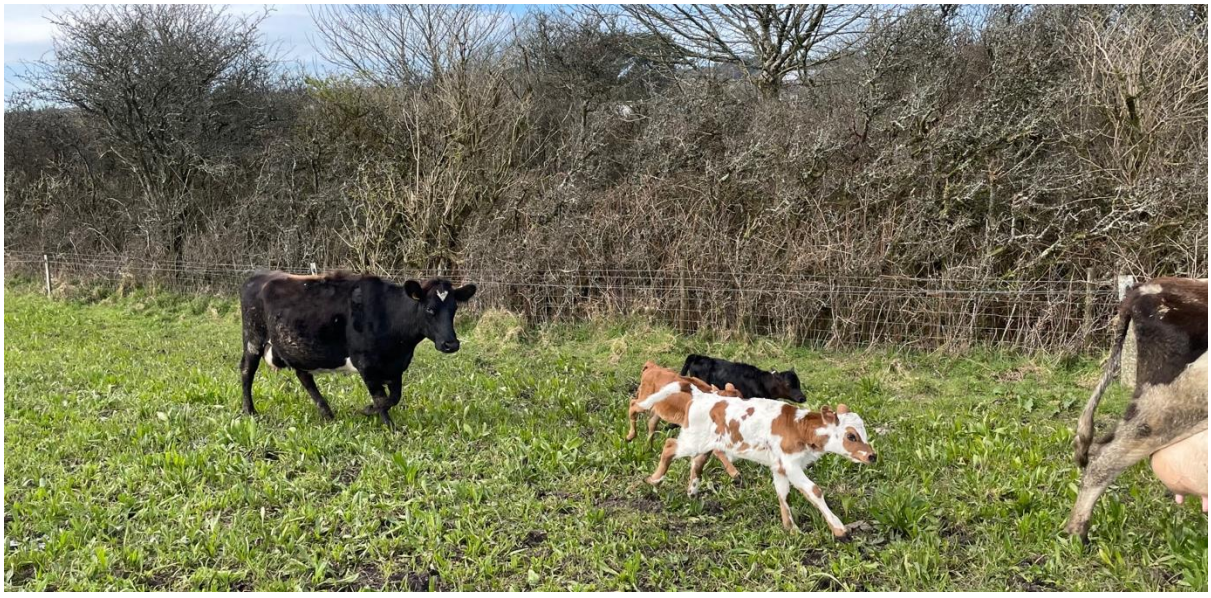
There are many farms that already implement a form of foster rearing, with the majority of calves artificially reared and a few put to suckle specific cows. Often this is because the cow has a high cell count and her milk isn't desirable in the tank, or because she has some issue which means she is kept out of the collecting yard/milking parlour. Neither option is a great management decision, but shows that foster rearing is not an alien concept even to farmers who would never consider cow calf contact as a viable option.

Calves learning adult cow feeding behaviour at a foster system farm in Denmark. Photo: Author's own

Foster cows can rear single or multiple calves, and different systems will match calves with cows at different lactation stages. In Canada I visited two farms who had implemented foster rearing and were keen to continue with it after changes in infrastructure. Both were using cull cows as foster mothers, but one was rearing heifer calves and only used foster mothers who were culled due to production issues or non-infectious health concerns (such as recurring lameness) while the other was foster rearing beef calves and was less selective about cow health.

In Denmark I saw a system where cows on a robot system were used as foster cows before culling. Their milk yield in the robot was used to determine the number of calves they could foster, and they were fed a milking cow ration to ensure that they maintained production. When the first calf was weaned, some cows would foster a second calf before being culled. A foster system trial had recently been concluded at the University of Aarhus when I visited and they referred to these cows as 'suckler aunts'.

Closer to home I visited an excellent spring block calving herd in Cornwall where all heifer replacements were reared in a foster system. Cows were selected as foster mothers who the farmer thought could do with a break from milking. Once calved they were taken to a separate block of land and kept in a straw yard with their calves to bond. Cows and calves were then turned out in small groups based on calf age, and after weaning the cows returned to the milking herd. As non-foster cows were being milked there was transition milk produced, which was used to feed bull and beef calves.



Foster cows and calves grazing in Cornwall. Photo: Author's own

All of the foster systems I visited reported that the calves showed better growth and were hardier in subsequent years as they laid down fat reserves during the milk drinking period. After the initial bonding period the system is relatively low labour although care needs to be taken that all calves are

suckling. And the most interesting finding was the farmers' belief that older cows had a 'second life' through their role as suckling mothers and were happier and more productive as a result.

Pros

- Can be selective about which cows are used for fostering.
- Cows that don't take to it can be taken out of the system and a new foster mother found.
- Easy management because foster cows are typically not milked so managed as a separate mob; no issues with calves in the parlour.
- Foster cows and calves can utilise off-lying ground and sheds.
- Psychological benefits for the cow.
- Calves learn behaviours from the cows
- Ad lib milk promotes good calf growth.
- Multi suckling matches cow yield to calf numbers and prevents calves gorging.

Cons

- Canadian research has shown that consumer perception of foster rearing is as negative as cow calf separation because the biological mothers are separated from their calves, therefore foster rearing can't be seen as an answer to dairy's social licence challenges.
- Not all cows will foster a calf and the early stages need to be managed carefully to ensure that calves have sufficient care and milk.
- Health considerations such as transmission of Johne's disease.
- Where cull cows are used as foster cows, they must be managed to avoid loss of condition.
- Running an additional management group can result in extra work.
- Challenges when calves are different ages and sizes; can mean running additional groups or pens.

Dam Rearing

This system is the practice of each cow rearing her own calf to weaning. In most commercial CCC dairy farms calves are weaned at the same age as they would be if they artificially reared; 10-12 weeks. In the UK, where all of the dam reared systems I visited sell direct to the consumer, weaning tends to be older. Where there is a market for pre-weaned bull and beef calves these may be sold

earlier.

A commercial dam reared CCC farm in Northern Victoria, Australia. Photo: Author's own

Dam reared systems exist in a range of farming models. Their prevalence appears highest in Scandinavia, and many are robot herds. In Germany there is a 1,000-cow herd running CCC on a robot system. In Australia, New Zealand, and Chile I saw CCC on grass-based systems. There are different options for managing dam reared systems, the main ones are outlined below.

Full Contact

Cow and calf are together at all times, potentially separated at milking time through the calf having access to a creep area or separate waiting area. In a robot system or during housing it is common for calves to have a 'kindergarten' which the cows cannot access. In this area they may receive supplementary concentrate feed and forage. Freshly calved cows and calves may be kept away from the main herd in a separate pen or paddock to facilitate bonding and in grazing systems to prevent newborn calves from having to walk long distances. Some herds will bottle feed colostrum to ensure adequate intake. In the systems I saw milking frequency ranged through once a day to three times in two days, conventional twice a day, and robot milking. Through the weaning process the farm may adopt half day contact to manage stress and milk intakes.

Half Day Contact

Cows and calves have contact for half the day, usually between two milkings. While separated the calves may be offered supplementary milk as well as forage and concentrate feed. This system can reduce milk intakes leading to additional milk sales, facilitate human-calf interaction to ensure calves are used to being handled, and give cows an opportunity to graze pastures that aren't easily accessible by small calves.

Partial Contact

Uncommon outside of research trials; calves have access to cows for a short period of time, usually directly before milking. This system means that there are none of the infrastructure and management challenges of cows and calves sharing a living space, but the farm does need a suitable area for them to meet and feed.

Pros

- Cow and calf are able to express the freedom of having a relationship with each other.
- Calf can drink as little or as much milk as they like.
- Typically excellent pre-weaning growth rates in the calf.
- Calves learn adult behaviour from cows.
- Early life exposure to the milking cow environment means that there is potentially less stress when the calf enters the milking herd as a heifer.
- Positive public perception and opportunities for added value dairy product sales.
- Reduced labour need for calf rearing.
- Can be done with fairly minimal infrastructure adaptations on grazing farms.
- Cow calf contact can be managed to keep milk losses to a minimum and in- line with milk volumes taken out for calf rearing.
- Evidence of improved health outcomes for cow and calf.

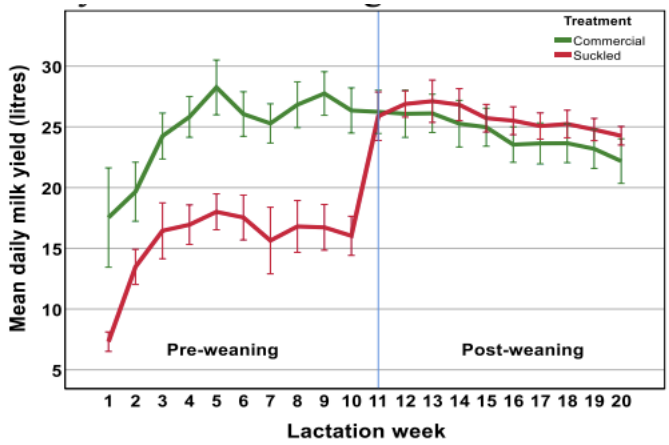


Figure 1. The mean daily milk yield per week (litres) produced for commercial and suckled cows across the 10 weeks pre-weaning and 10 weeks post-weaning. Error bars are +/- 95% confidence interval. The blue line indicates the start of post-weaning lactation period.

Graph showing saleable milk from cows milked conventionally and in a CCC system before and after weaning (source: Ospina Rios et al., 2022)

Cons

- Some cows will reject their calves – if the calf is not adopted to another cow or the farmer doesn't want to allow cross suckling, these calves will need to be artificially reared.
- Some cows will struggle with milk let down in the parlour when they are suckled by calves.
- Reduced volume of saleable milk; this is difficult for commercial dairy farms.
- Uneven quarter fill due to suckling can be a challenge during milking.
- Evidence of reduced health outcomes for cow and calf.
- Disease challenges, especially with Johne's disease.
- Impact on milk solids balance.

Appendix B: The Racing Industry

Who Owns the Issue?

One of the key challenges identified in the racing industry, which overlaps with dairy, is *who owns the issue*? Horses can pass through many hands through their lives, and it is difficult to determine at what point the racing industry's responsibility ends, especially as any mistreatment or poor welfare of thoroughbred horses is associated with the industry, regardless of where and when that bad treatment happened.

Across countries the racing industry has taken the view that the challenge of racehorse aftercare belongs to them, and rather than pass on that responsibility to the rest of the equine industry they have been proactive in making financial and strategic investments in marketing ex-racehorses. Additional support includes help for hard to home horses, recognition for elite horses, and resources for new owners.

Often the dairy industry takes the view that the beef sector needs to accept beef and bull calves, although recent initiatives such as the GB Bull Calf Strategy have put the onus on the dairy sector to breed and manage good calves. By taking ownership of the issue racing has made ex-racehorses into a 'product' that is desirable by the rest of the industry, rather than demanding that the rest of the industry take on these horses with little consideration of how they fit their requirements.

A string of racehorses in Newmarket. Photo: Author's own

Crucially the racing industry across the world has taken financial ownership of the issue. The care of ex-racehorses and their promotion is now seen as a social licence cost, and racing stakeholders put time and effort into horses that will never bring a return to the primary economic enterprise. This ranges from individual trainers carefully matching horses to new homes, through industry support of initiatives such as Retraining of Racehorses, through to policies such as that seen in Hong Kong, where all racing owners pay a deposit to transport their horses off the island at the end of their racing careers.

On the other side, I have come to consider whether the racing industry will one day look at the post-racing viability of horses when making breeding decisions. In the same way that we are reducing the Jersey breeding in our cows to breed animals with a better frame, will the day come when racing looks at temperament and physical longevity when matching mares and stallions? Not all thoroughbreds make money on the racetrack, but all horses leave it. Whether it will ever be viable to focus on these traits when there is so much economic potential from racing achievement is debatable.

If dairying is to retain its social licence, then it will have to take ownership of bull and beef calves and accept that the industry will likely pay a financial price to breed and rear calves that meet the specifications of the red meat sector. The racing industry has done this, but has also worked to increase demand for ex-racehorses in the general equine industry. It shows that the dairy industry could also do both.

Creating a Market

In Canada I was told that there was little need to build a market for ex-racehorses, as they were seen as an aspirational breed by general equestrians. Coupled with falling foal crops the demand for former racehorses more than kept up with supply.

The author with a mare and foal at Highfield Stud Farm in Alberta, Canada

In situations such as that the focus falls on matching the horses with the right homes and providing support for owners as they transition horses away from racing. In other countries part of the challenge is to create demand for ex-racehorses, so that there are homes for all of the horses leaving racing. This has to be coupled with resources and education, so that ex-racehorses aren't simply taken on for being 'fashionable' and then suffer from unsuitable handling and management.

In the UK Retraining of Racehorses (RoR) has driven demand for ex-racehorses. They offer training and competition opportunities for horses from novices to elite competition as well as supporting new owners with resources and having schemes for vulnerable horses. Over the last couple of years the demand for ex-racehorses has increased, with more and more retrainers selling horses with

‘added value’ and more people considering a former racehorse when deciding to buy a horse. Undeniably the work of RoR has facilitated this by showcasing what ex-racehorses are capable of and giving new owners support.

At a more individual level racing giants such as Godolphin have set up their own schemes for aftercare. I visited Godolphin Lifetime Care in Newmarket in June 2021, and the Dubai Retirement Centre’s (DRC) aftercare programme in January 2023. Both funded by the al-Makhtoum family, the former deals exclusively with Godolphin horses, whereas the latter now rehomes horses from other racing stables in the UAE.

Life after Racing UAE has individual shows and competition leagues for ex-racehorses and organises social events for their owners. This photo is from a grassroots dressage competition held in Dubai. Photo: Author’s own.

Both carefully manage aftercare; Godolphin Lifetime Care sell the horses for a minimal fee but retains the right to buy back animals that can no longer be cared for, whereas the DRC retain ownership and new carers agree to home visits as well as meeting certain welfare requirements such as air-conditioned stables. For a new owner the association with the famous racing stable adds to the desirability of the horse, as well as the work that both organisations put in to preparing horses for a riding career and matching horses and riders.

At the DRC, manager Heather Copland told me that the demand for thoroughbreds in the Emirates comes down to people seeing ex-racehorses in a non-racing context, being rideable and enjoyable.

Life After Racing UAE organises shows and competition leagues which highlight the success of these horses, and that encourages others to take them on. Rather than telling general riders that they need to take horses out of racing, rather than buying those bred and trained for general riding, they *show* what these horses are capable of and that drives demand.

Perhaps with dairy beef the dairy industry needs to not only put in the work with beef calves to give them the best start in life, but also find a way to highlight those animals that perform well as beef animals, and let the red meat sector follow.

Case Study: Racing Victoria

Of all the racehorse aftercare programmes I visited or spoke to through my travels, the one that I felt was the most powerful in terms of cradle to grave care, social licence, and pragmatic welfare was that of Racing Victoria in Australia.

Victoria is the only state in Australia that still practices Jump racing (although it is small compared to the Flat industry) and has faced public scrutiny on racing's social licence, potentially making this part of the world aware of social licence earlier than other countries. Around 3,000 horses leave racing each year in Victoria with around 500 destined for breeding. Equine traceability in Australia is poor and one of the aims of the aftercare programme in Victoria has been to track horses leaving racing.

Two per cent of the racing levy in Victoria goes to welfare and there are seven people working on the strategy. It is a big area for the industry and is integrated into other areas; there are aims that stable staff and trainers receive training in horse handling as well as on physical and behavioural standards that result in improved post-racing outcomes.

Table: Racing Victoria's Classification System for Ex-Racehorses

Category	Description
A	Physically and psychologically sound, with good prospects in the equestrian industry and perceived high market value and return on investment. These horses define themselves by finding their own pathway.
B	Physically and psychologically sound, perceived low market value and return on investment. For example, over 10 years old, scarring from old injury, not flash.
C	Physically unsound but with short term (3-6 months) time off or rehab can become Cat A or B. Psychologically sound.

D	Physically unsound with low or no prospects of entering equestrian. Psychologically sound, companion type.
E	Physically and/or behaviourally unsound with no prospects for second career or dangerous.

The strategy is integrated across racing from breeding to aftercare, but the aftercare services are tailored to the classifications seen above. There is funding available to ensure humane euthanasia of Category E horses before they exit the industry whereas for Category A horses there is no need for marketing- the focus is simply on gathering data and traceability.

I found the classification system and the targeted actions a particular cross- industry learning; can we classify dairy beef on their prospects and bring together a whole industry strategy to find their fit in the red meat sector?

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Cow Calf Contact: Dairy's Ethical Future?

Published by Nuffield Farming Scholarships Trust
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