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Prolonged Calf Cow Contact in Dairy Farming: Challenges and Opportunities

Written by:

Dr Saba Erum Amir NSch

October 2025

A NUFFIELD FARMING SCHOLARSHIPS REPORT

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ISBN: 978-1-916850-69-9

Published by The Nuffield Farming Scholarships Trust
Bullbrook, West Charlton, Charlton Mackrell, Somerset, TA11 7AL
Email: office@nuffieldscholar.org
www.nuffieldscholar.org

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

Date of report: October 2025

Title	Prolonged Calf Cow Contact in Dairy Farming: Challenges and Opportunities
Scholar	Dr Saba Erum Amir
Sponsor	John Old Acre Foundation
Objectives of Study Tour	• To explore management practices on calf cow contact (CCC) dairy farms • To learn about measures to mitigate challenges on CCC dairy farms • To learn about creating a retail market for CCC milk • To combine these aspects into creating a profitable model for farmers who may wish to pursue CCC dairy farming.
Countries Visited	i. UK ii. Turkey iii. India iv. USA v. Canada vi. Netherlands
Messages	• CCC dairy farming is an alternative way of farming and not a universal replacement to the conventional separation. • Despite the challenges, CCC is doable with the right motivation and modest adaptations in infrastructure but carefully planned and implemented management practices. • There is a huge potential developing CCC milk as a niche brand. • The introduction of a certification label that acknowledges the added value of the CCC system will open opportunities for taking this product to supermarket shelves.

EXECUTIVE SUMMARY

I began my Nuffield journey with the question: *Can calf–cow contact (CCC) become the future of dairy farming?* I visited conventional and CCC farms in the UK, Turkey, India, the USA, Canada, and the Netherlands and through my travels I have comprehended that CCC is not a universal replacement for conventional dairying but rather an alternative approach with distinct opportunities and limitations.

No two CCC farms looked alike. Management practices, infrastructure, and animal performance varied widely, reflecting each farmer's circumstances and resources. Yet some consistent themes emerged. CCC systems tended to be:

- Small to micro-scale organic enterprises
- Benefiting from faster calf growth rates and improved calf health
- More land availability per animal for grazing
- Operating with lower running costs
- Often limited in investment capacity
- Supported by diversified income streams beyond milk sales

On the other hand I saw conventional dairy farms focussing relentlessly on milk yield and efficiency, with close monitoring and rapid decision-making to safeguard performance and profitability. The volume of saleable milk in CCC systems is uncertain and substantially lower than in conventional organic or non-organic systems. This variability has led a few farmers to trial and then abandon CCC.

Despite these challenges, CCC offers unique opportunities. Calves reared with their dams (mothers) often display stronger health and vitality, and the system resonates with consumers seeking higher-welfare and farming practices that are natural. This creates scope for CCC milk to develop as a niche market in the UK, provided it is supported by effective branding, premium pricing, and strong supply chain relationships.

There are lessons conventional dairies can learn from CCC systems. Areas such as prioritising calf health by increasing the allowances of whole milk in calf feeding and diversifying business models could strengthen resilience even outside of CCC systems.

I have also realised that ethics in animal farming (the reason underlying my choice of this topic) is a highly complex area; for example, those who object to calf–cow separation often also oppose wider industry practices such as disbudding of calves and artificial insemination, which are common on CCC farms. And attempting to change these practices would mean challenging the very foundations of modern

dairy farming, with far-reaching implications for breeding, herd management, productivity, and ultimately the economic viability of the dairy sector.

Therefore the three central themes that I have explored in this report are

1. **Management and economics of CCC** – examining the practical strategies that make these systems viable and beneficial for those who may wish to consider CCC dairying.
2. **Opportunities for CCC milk as a niche product** - assessing the potential for branding and positioning within a targeted UK market.
3. **Lessons for conventional dairies** – understanding what CCC systems can teach us about calf health, welfare, and long-term sustainability.

Finally I emphasise that CCC dairy farming should remain a voluntary choice for farmers, not something driven by consumer pressure. It represents one strand of innovation within a diverse sector. The future of dairy will likely be plural, with conventional and alternative systems co-existing. By recognising the strengths and limits of CCC, and by harnessing consumer interest, the UK dairy industry can broaden its options for sustainable, resilient, and socially responsible farming.

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Published by The Nuffield Farming Scholarships Trust
Bullbrook, West Charlton, Charlton Mackrell, Somerset, TA11 7AL
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CHAPTER 1: INTRODUCTION

Figure 1: The author, Dr Saba Erum Amir

My path into agriculture has been quite unconventional. I come from a non-farming background and my first degree was not in agriculture. After working more than six years in food microbiology labs, I was awarded a fully funded PhD scholarship at Nottingham Trent University in 2017 to study gut health in chickens. This work utilised my microbiology skills and experience, introduced me to the poultry microbiome while also giving me valuable insights into poultry nutrition, challenges of the poultry sector and sustainability. It marked the beginning of a deeply rewarding career shift.

Following my PhD, I worked as a Knowledge Exchange Fellow for Farming Connect at Aberystwyth University, where I translated scientific research into farmer-friendly technical articles, fact sheets and e-learning modules. My writing spanned a wide range of agricultural topics beyond my poultry specialism and greatly expanded my knowledge of the agriculture sector. It also sparked a strong interest in dairy, which ultimately led me to apply for a Nuffield Farming Scholarship to study a dairy-related topic.

My next role was as a Livestock Consultant at ADAS, where I worked closely with farmers, shadowing senior consultants on farm advisory and technical visits. This gave me valuable working knowledge of government support schemes for agriculture, soil health, and nutrient management planning. I contributed to applied research projects through literature reviews and gained practical experience in carrying out farm carbon audits, which deepened my understanding of sustainability challenges at farm level. During this time, I developed a keen interest in agricultural sustainability and the opportunities for farmers to balance productivity with environmental responsibility.

Looking ahead, I wish to build a career in agricultural sustainability, supporting farmers and the wider industry to meet environmental goals while maintaining profitable businesses.

CHAPTER 2: BACKGROUND TO MY STUDY: A REVIEW OF ACADEMIC LITERATURE

2.1 Introduction

Freedom of expression, one of the Five Freedoms of Animal Welfare[1], highlights the importance of enabling animals to perform their natural behaviours, which for dairy cattle includes the cow's ability to nurture, groom, and bond with her calf, and the calf's instinct to suckle and seek comfort from its mother. In conventional dairy farming, this freedom is often compromised, as calves are typically removed from their dams within 24 hours after birth. This management practice is usually justified on grounds such as maximizing the amount of saleable milk, reducing the risk of disease transmission, and allowing for better calf management (Cantor et al., 2019). Yet, it fundamentally restricts the expression of natural maternal and social behaviours and contrasts sharply with a natural rearing environment, where calves would normally remain with their mothers for several months, nursing ad libitum, developing complex social bonds and engaging in behaviours essential to their welfare.

Public awareness of and opposition to early separation is increasing. Studies across multiple countries, including Canada, the United States, Brazil, Germany, and the Netherlands, consistently show that most citizens oppose the practice once informed about it (Neave et al., 2022; Ventura et al., 2013). Concerns are framed in terms of animal welfare, with the primary objection being the 'unnaturalness' of early separation and the perception that it compromises calf well-being (Neave et al., 2022).

Recent qualitative research in Australia found that while some citizens still support dairy, many expressed ambivalence or even "broke up" with the industry over ethical concerns, particularly around calf separation and treatment of surplus calves (Bolton et al., 2024). These findings highlight the role of moral values in shaping public perceptions. As public trust and the dairy sector's ***'social license to operate'*** depend on alignment with societal expectations, addressing the issue of calf–cow separation is becoming important to address (Cook & von Keyserlingk, 2024).

[1] Farm Animal Welfare Council / DEFRA (2022) *Farm Animal Welfare in Great Britain – Past, Present and Future*. Available at: [https://assets.publishing.service.gov.uk/media/5a7d89fe40f0b64fe6c24508/Farm_Animal_Welfare_in_Great_Britain_-_Past__Present_and_Future.pdf]](Accessed: 03/12/2025)

2.2 So, what is Calf–Cow Contact (CCC) Dairy Farming?

Calf–cow contact (CCC) dairy farming refers to systems where calves are not separated immediately after birth but remain with their mothers or foster cows for varying durations. These systems can involve **full-time contact** (continuous nursing), **part-time contact** (restricted to certain hours, such as post-milking), or **hybrid systems** that combine maternal nursing with supplemental feeding (Whalin et al., 2025).

Calf cow contact offers several welfare and productivity benefits. Calves raised in CCC systems typically achieve higher daily weight gains (~1.2–1.3 kg/day) than conventionally reared calves, largely due to unrestricted milk intake (Johnsen et al., 2021). They also exhibit more natural behaviours, such as play and affiliative interactions, and show reduced abnormal oral behaviours like cross-sucking (Cantor et al., 2019). Cows benefit from the opportunity to express maternal behaviour, which may improve their affective states.

Implementation methods vary widely. Some farms employ **dam-rearing**, keeping calves with their biological mothers, while others use **foster cow** systems, where one cow nurses multiple calves. Technological innovations, such as computer-controlled "smart gates," allow cows to regulate contact with their calves while maintaining milking routines in automated systems (Johnsen et al., 2021). These approaches illustrate the experimental phase of CCC adoption, as farmers explore ways to balance animal welfare with economic viability.

Although CCC is still uncommon globally, it is increasingly practiced in Europe, particularly in organic and niche dairy markets (Whalin et al., 2025). This diversity reflects both farmer innovation and consumer demand for more ethically aligned dairy production.

2.3 Methods of Separating Calf and Cow After Prolonged Contact

Separation following prolonged cow–calf contact presents specific challenges. Strong maternal and filial bonds develop, and abrupt separation can cause distress, manifested in increased vocalizations, reduced play, and behaviours suggestive of low mood (Cantor et al., 2019). Research has identified several methods to mitigate stress associated with delayed separation:

Gradual Separation (Step-Down Approaches)

Contact is progressively reduced, shifting from full-day to part-day access, or supplementing suckling with solid feed before removal. Such methods reduce calves' nutritional dependence on the dam and ease the transition (Johnsen et al., 2021).

Fence-Line Separation

Cows and calves are housed adjacently, allowing sensory but not nursing contact. This approach reduces the abruptness of separation while maintaining some social interaction (Whalin et al., 2025).

Foster Cow Systems

After initial bonding, calves may be transferred to a foster cow, preserving social and nursing opportunities while allowing the biological dam to return fully to milk production (Whalin et al., 2025).

Abrupt Separation with Nutritional Buffering

When immediate removal is unavoidable, providing high milk allowances or automated feeders can reduce hunger-related distress and abnormal oral behaviours in calves (Cantor et al., 2019).

Farmers often worry that delayed separation may increase distress because of stronger bonds (Neave et al., 2022). While behavioural signs of separation such as vocalizations may be more intense, prolonged contact delivers measurable benefits, including improved calf growth, social competence, and cow welfare, suggesting that the long-term advantages may outweigh the short-term challenges (Cook & von Keyserlingk, 2024; Whalin et al., 2025).

2.4 Benefits and Challenges of CCC dairy farming

The review of academic literature highlighted both the potential benefits and the considerable challenges. Calves reared with their dams achieve superior growth rates, improved immune function, and more natural social behaviours than those raised in conventional systems. They are also less prone to abnormal oral behaviours such as cross-suckling, and heifers raised under CCC often adapt more easily to the milking parlour. Cows may benefit too, with studies noting reduced incidence of mastitis and more complete uterine recovery in systems where calves suckle. However, CCC also presents substantial business and management challenges. Calves consume a significant share of milk, reducing volumes available for sale, and farms must either command price premiums or diversify into direct processing to remain viable. The management of colostrum, disease transmission, weaning, and housing all require careful adaptation (Meagher et al., 2019; Johnsen et al., 2016).

With this knowledge I set out to collect anecdotal evidence from dairy farms across the world who are experimenting with CCC systems. Learning from their experience I hoped to highlight both the opportunities and challenges of making CCC viable in practice and provide insights into how such systems could contribute to the future of dairy farming in the UK.

CHAPTER 3: MY STUDY TOUR

My study tour began with the Nuffield Contemporary Scholars Conference in Brazil. I then travelled independently to farms and research institutes across the UK, Turkey, India, the USA, Canada, and the Netherlands. My aim was to understand how CCC is being implemented in practice, how it compares with conventional systems, and what lessons can be drawn for the UK.

When choosing locations, I wanted to visit farms where I could see academic literature in action: how cows and calves were being kept together, the methods used for separation after prolonged contact, and how the economics of these systems stacked up. Alongside CCC farms, I also visited conventional dairies to provide essential points of comparison and researchers in universities who were pushing boundaries in animal science, often with just as much passion as the farmers themselves. This mixture of systems offered valuable insights into both the practicalities and challenges of calf rearing in different cultural and market contexts.

Table 1. List of farms and research organisations visited

Type	Farms/Organisations	Why I visited & Farm highlights
United Kingdom		
CCC*	The Ethical Dairy, Scotland	First CCC dairy in the UK, started from scratch with no prior experience or model, initial failure but success, artisan cheese makers
	Mossgiel Farm, Scotland	Organic milk processor, own CCC milk brand
	Peckforton Dairy, Cheshire	CCC practices, CCC milk doorstep delivery
	Babbinswood Farm, Oswestry	CCC practices, community ownership, farm shop
	Pentrefelin Dairy, Wales	CCC practices, mixed livestock, regen agri, farm shop
Con†	Houghton Lodge Farm, Leicestershire	Large spring block calving herd, calf management practices, indoor & grazing system
	Meadowbanks Farm, Shropshire	High yielding milking herd, AYR calving, housed system

Type	Farms/Organisations	Why I visited & Farm highlights
Res#	Dr Annabelle Beaver, Harper Adams University	Researcher in CCC farming, discussing opportunities and challenges
Turkey		
Con	Uluova Farm, Çanakkale	Use of highly advanced dairy technologies, on farm research and testing lab, A2 milk brand, Turkey's first humane certified dairy, calf management
	Elta Ada Organik, Gökçeada	Organic cow and goat dairy, mixed livestock and arable, CCC in goats, on farm milk processing
	Kaanlar Dairy, Çanakkale	Large commercial dairy, own brand of dairy products
India		
CCC	Swarna Kapila, Delhi	Micro dairy, native Indian breeds, A2 milk, subscription model doorstep delivery
	Akshaykalpa Organic, Tamil Nadu	Demonstration farm for farmers of the Akshaykalpa Coop, pen design for CCC, native Indian breeds crossed with jerseys, Agro tourism
	Nandha Dairy, Tamil Nadu	Micro dairy, native Indian breeds, broiler farm
Con	Binsar Farms, Delhi	Medium scale commercial dairy
United States		
CCC	Hawthorne Valley, New York State	Certified Organic and Biodynamic Farm, hands on education, apprenticeships & youth Programmes, subscription box sales and on farm store
	Churchtown Dairy, New York State	Regenerative organic farming practices, on farm cheese making, medicinal gardens, farm stores
	Crosswinds Farms, New York State	Mixed livestock farming, on farm milk processing, cheese and ice cream making

Type	Farms/Organisations	Why I visited & Farm highlights
	Reverence Farms, Indiana	CCC practices, on farm training, farm stores
	Jordan Valley, Indiana	Ex camel dairy, CCC in non-ruminant farming
Con	Kuehnert Dairy, Indiana	Large commercial dairy, calf management, on farm milk processing and cheese and ice cream making, large investment in a modern farm store
Res	Dr Kate Creutzinger, Vermont University	Track record of research on CCC systems, on-going CCC research trials at the time of visit
	Dr Sabine Mann,Cornell University	
	Dr Heather Neave, Purdue University	
Canada (Ontario)		
CCC	VanStee Dairy	Conventional farmer with a small set up of CCC in an indoor system, fence line weaning
	Foxdale Farms	CCC practices
	Roesacres Organic	Tried and quit CCC
Con	Summit Station Dairy	Very large commercial farm, large investment on a modern on farm store, processing own milk for cheese and ice cream
	McPhardean Dairy	Aspires to become CCC dairy
Res	Dr Darek Hayley & Dr Anna Schwanke Ontario Dairy Research Centre (ODRC)	Animal behaviour scientists, discussions on CCC Most advanced dairy research technologies at ODRC

Type	Farms/Organisations	Why I visited & Farm highlights
Netherlands		
CCC	Boerderij Buitenverwachting, Hoogmade	CCC practices, goat dairy, cheese making
	Boterhuys Farm, Warmond	On farm milk processing, own CCC brand, on farm stores
	Burgerboerderij Osterwold, Zeewolde	Foster cows, community farm, circular systems
	Kamelenmelkerij Smits, Berlicum	CCC in camels, Camel milk products, Agro tourism
	Boerderij Ruimzicht, Halle	Biodynamic agriculture, CCC practices, mixed farming
	Gravestyn Farm, Pijnacker	Virtual fencing technology, mobile milking parlour, educational farm, experimental learning
	Niels Schulte, Lelystad	New CCC farmer, mixed dairy + arable
	Naoberhoeve Farm, Real	Biodynamic agriculture, CCC practices, care farm employing neurodiverse people
	Miedema Natuurlijk, Haskerdijken	Biodynamic agriculture, CCC practices, largest CCC farm, biodiversity
Con	Floating Farm, Rotterdam	Food production sustainably close to consumers, reduces food miles, educational centre, on-site milk processing , rainwater harvesting, using local food waste for feed.
	Heerlijkheid Linde, Schalkhaar	Agro tourism

*CCC – calf cow contact dairy, † - conventional dairy, #Res – research organisation

CHAPTER 4: HOW CALF COW CONTACT FARMS ARE MAKING IT WORK

4.1 The farmers

The farmers I met who embraced calf–cow contact (CCC) were primarily motivated by a belief that the ***'natural way of farming'* was simply the right thing to do**. For them, it came down to the idea that a cow produces milk first and foremost for her calf, and it didn't feel right to remove the calf entirely. Instead of seeing milk as something to be taken exclusively for people, these farmers focused on sharing it—ensuring that the calf had its natural share and then using the remainder for human use. That principle of ***shared milk*** was a clear motivation for most of the CCC farmers.

Interestingly, some farmers also stumbled into CCC by necessity. AJ of Peckforton Dairy (Cheshire, UK) mentioned that when her grandfather the main calf rearer could not continue due to health reasons, she found that allowing calves to stay with their mothers actually eased her workload. Joel Fox of Foxdale Farms (Canada) also said he lacked the motivation for the task (feeding calves). In these cases, the cow took on much of the responsibility of raising the calf, reducing the need for human intervention. So for some, CCC was not only an ethical choice but also a practical solution.

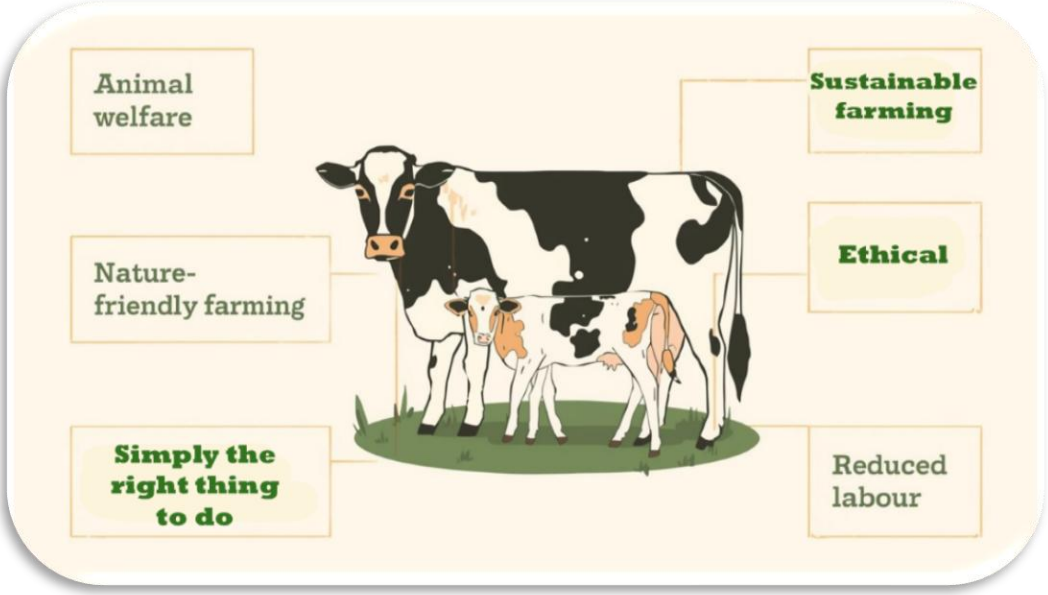

Figure 2: A pictorial representation of the farmers' motivation for CCC farming

In addition to their commitment to calf–cow contact, many of the farmers were deeply passionate about regenerative agriculture. They saw CCC as part of a broader shift toward more sustainable farming methods. This included reducing or eliminating synthetic fertilisers, enhancing soil health naturally, and prioritising biodiversity on their land. They believed that by nurturing both the animals and

the environment in tandem, they could create a more resilient and eco-friendly farming system.

For these farmers, the move toward CCC was not just about animal welfare; it was also about aligning their entire operation with principles of regeneration and sustainability. They felt that these efforts created a farm ecosystem that was not only better for the animals but also better for the planet. Thus, the motivation for CCC often went hand-in-hand with a commitment to regenerative practices.

4.2 The herd

Breeds

On CCC farms, the herd size tended to be highly variable, with the smallest herd I visited being just 12 milking cows and the largest around 160. Smaller herds made it more feasible for farmers to adapt infrastructure, observe animal behaviour closely, and experiment with management practices without the pressure of very high daily milk volumes.

Breeds also differed from the high-yielding Holstein Friesian dominance often seen on conventional units. Most farmers favoured dual-purpose or native breeds such as Ayrshire, Montbéliarde, Viking Red, Jersey, Brown Swiss, Normande, Meuse-Rhine-Issel (MRI). In Netherlands the Blaarkop, Fleckveih and Dutch Freseins varieties are also popular with CCC farmers. Most farms also used cross breeds of these varieties to ensure good hybrid vigour. These breeds, while producing less total milk, produce milk with higher solids content, for example, Jerseys average 5.4% fat and 3.9% protein compared to 3.9% fat and 3.2% protein in Holsteins (AHDB, 2022). Montbeliarde cows produce ~4.2% fat and 3.45% protein, with favourable casein profiles that improve cheese yield (INRA, 2020). Ayrshires also typically produce ~4.2% fat and 3.4% protein (FAO, 2021). MRI milk averages ~4.3 – 4.5 % fat and 3.6–3.7% protein (CattleGenie, no date). This higher solids content makes these breeds especially well-suited to cheese — an important part of the diversified business models common on CCC farms. Farmers also highlighted that such breeds were more robust, better suited to forage-based diets, and easier to manage in lower-input systems.

Figure 3: Native breeds: Left – MRI (Dutch Farm); centre – Red Poll & Welsh Black (Wales); Blarkop (Dutch).

Milk yields

Milk yield is naturally lower compared to cows in conventional or organic systems. While the cows are raising their calves, the amount of sellable milk often averages between 5 to 10 litres per day during the first two months. This volume is also highly influenced by the lactation number with cows in their first lactation giving milk around the lower limit of this range. Once the calf is weaned, this yield can increase up to 20 - 25 litres per day. However, it is important to emphasise the enormous variability in milk yield due to breed differences and individual farm practices. These dual-purpose or native breeds are inherently lower-yielding than Holstein Friesians. Consequently, total milk production per lactation typically varies from about 3,000 to 5,500 litres per cow.

Longevity

Longevity of dairy cows tends to be greater in CCC systems. Because these systems often rely on hardier, lower-yielding breeds, cows remain productive in the herd for more lactations. While it's challenging to provide a precise number since many CCC farms have only been using this model for a few years, early indications are positive. For example, at The Ethical Dairy, one of the most experienced CCC farm in the UK, some cows at the time of my visit were in their sixth and seventh lactations, significantly longer than the typical two or three lactations seen in conventional systems. Additionally, in CCC setups, older cows often become even more adept at raising the calf and sharing milk, making them particularly valuable to the system as they age i.e. the longer a cow remains in a CCC herd, the better she often performs as a mother and milk-sharer, further enhancing the overall stability and welfare of the herd.

4.3 Infrastructure

Very few CCC farms had invested heavily in new infrastructure. The Ethical Dairy in Scotland was one exception, where significant changes were made to accommodate long-term cow–calf contact. However, on most farms, CCC was achieved by making adaptations to existing housing, pens, and grazing systems rather than large capital investments.

A common infrastructure on most farms was the use of dedicated calving pens, where a cow and her newborn calf could remain together for the first few days. The cow left this pen only to be milked before returning to the same space, ensuring continuity for the calf.

Figure 4: Calving pen at The Ethical Dairy.

On most farms the caving pens were designed to house one calf-cow pair to ensure bonding between the dam and her calf. Farms needed to ensure that the number of cows calving at the same time didn't exceed the available calving pens, so that each cow-calf pair had adequate space and time together without overcrowding. Once the pair re-joined the main herd, calves continued to remain alongside their dams in barns or on pasture with no special housing needs.

At the Van Stee dairy, Sanders Van Stee who was trialling a CCC in his indoor commercial dairy, there was a large pen with several cows close to calving, the calving pen and an adjacent housing pen large enough for 5 calf-cow pairs where they remained together with continuous contact for 2 months before weaning.

Fig 5: A picture taken at Van Stee Dairy showing calving pen on the left and an adjacent housing pen with calf-cow pairs on the right. The two pens are separated by fencing gates.

A few farms for example the Ethical Dairy (Scotland) and Foxdale Farm (Canada) had calf creep areas, and small fenced sections that calves could access but adult cows couldn't. These creeps allowed calves to feed or rest safely and play time with fellow calves.

4.4 Duration of contact and separation strategies

In the farms I visited, calves were generally allowed to suckle from either their biological mother or a foster mother for a substantial period. Most farms

maintained a minimum suckling period of at least 12 weeks, with about half of them extending that period up to six months. Notably, no farm completely separated calf- cow pairs earlier than two weeks of age.

Although the total length of time calves spent with cows was relatively consistent (3 – 6 months), there was considerable variability in the timing of partial separations, with calf age ranging from just a three-to six-days old (Reverence Farm, North Carolina) to around eight weeks (Van Stee Dairy and Foxdale Farm, Canada) or even up to three months in most cases. The final full separation, where the calf was completely weaned and removed from the mother, typically occurred at either three or six months of age.

Separation strategies typically involved a gradual increase in separation time, often using a combination of overnight separation and nose flaps. For overnight separation, either the calves or the cows were moved to a separate field or pen normally adjacent to each other where they could see each other but the calves could not nurse. This partial separation phase was sometimes followed by the use of nose flaps when calves were reunited with their mothers during the day, preventing suckling but allowing contact.

Fig 6: Cows and calves being sorted in different fields for overnight separation at the Ethical Dairy.

Fig 7: Use of nose flaps allows calves to stay with their mothers but restricts suckling, Peckforton Dairy, UK.

An innovative fence lining weaning approach was used at Van Steen Dairy in Canada (fig 8). A small, fenced area within the housing pen allowed calves to nurse through the fence, but as calves grew older, the mothers were less motivated to come to the fence which allowed for calves to be weaned off naturally.

Fig 8: Fence line weaning approach at VanStee Dairy, Canada

4.5 The challenges and benefits

In terms of challenges, two major issues stood out.

- First, there is the significant loss of sellable milk, as calves can consume an estimated 15 to 20 litres per day. This often means that during the first

lactation, farmers may barely get any milk for sale, and there's considerable uncertainty about milk yields.

- Another prominent challenge is the issue of milk let-down in the parlour, where cows may hold back milk or milk solids, including fat, leading to lower-quality or lower-volume milk. On some farms, solutions like bringing the calf into the parlour to nurse from one quarter while milking the others were used to encourage let-down, but this is not always practical.

Additionally, a few farms reported experiencing separation stress, in the form of increased vocalisations in cows, despite gradual separation methods and increased spread of mastitis due to calves suckling several cows.

On the benefit side, one standout advantage is the improved calf health. Calves in CCC systems generally show better growth rates, higher body weight gain, and fewer health issues. As discussed earlier, there's also the benefit of increased longevity of cows and decreased incidence of mastitis within the herd and reduced labour.

Fig 9: Calf allowed to suckle one quarter while milking the other quarters to improve milk let down in the parlour (Reverence Farms, North Carolina).

Overall, while CCC presents some unique challenges, the welfare and health benefits for the calves and the longer productive lives of the cows are compelling advantages.

4.6 Diversifying income streams

Most CCC farmers did not rely solely on the milk cheque. Instead, they diversified their income streams in a variety of ways. For example

- Use of semen from beef breeds like Angus to produce male calves that could be sold at a premium for beef. These calves can be taken to the market earlier given their faster growth rate and body weight.
- On farm milk processing like milk pasteurisation or making dairy products
- Mixed agriculture, mixed livestock or dairy and horticulture operation
- On-farm stores selling own farm produce.
- Direct milk sales to local consumers and coffee shops.
- Acting as educational hubs, hosting school visits, training programs, and knowledge exchange events for other farmers.

Thus, these farms have created resilient business models that were not solely dependent on milk sales.

Fig 10: Income streams other than milk sales for CCC farms.

4.7 Creating a CCC business model

So far, this report has touched on several adaptation practices on CCC farms but often these strategies are too complex to examine in isolation. What stands out most is how interconnected these adaptations are across the whole farm system, and how essential it is to align business decisions with the realities of geography,

market access, and consumer expectations in order to build resilience. While many farms could serve as examples, I have selected two case studies to illustrate how farmers combine diverse strategies, from breed choice and milk processing to direct sales and education into integrated business models that make CCC systems viable.

4.7.1 Case Study 1: The Ethical Dairy, UK

The Ethical Dairy, run by David and Wilma Finlay in Dumfries and Galloway, Scotland, is a leading example of cow-with-calf (CCC) dairying. Their system allows calves to stay with their mothers for six months, prioritising welfare and natural behaviour while still aiming for economic viability.

The Finlays view CCC dairying as part of a regenerative farming model that addresses ethical, social, and environmental issues. They believe the image of a cow suckling her calf is powerful for building consumer trust and differentiating dairy products in premium markets.

Figure 11: David and Wilma Finlay, Founders of The Ethical Dairy with the author's sons at their residence on Rainton Farm.

The farm moved from Ayrshires to a three-way cross: Holstein (milk solids), Montbéliarde (beef and temperament), and Viking Red (resilience). This balance supports both milk and beef production. Artificial insemination and block-calving in spring and autumn help manage workloads and improve efficiency.

Animal welfare underpins the system. Calves have full contact with their dams for three months and during this time these cows are milked once a day. Stress-free handling is essential. At three months, calves begin overnight separation to allow milk collection, with full weaning around six months using nose flaps to reduce stress and cows moving into twice a day milking.

The farm uses a five-a-side auto-tandem parlour that allows cows to remain calm and close to their calves. Twelve calving boxes with soft mats, sawdust bedding, drainage slopes, and CCTV monitoring support safe calving and cow comfort.

Initially, calves feeding large amounts of organic milk seemed unviable. However, suckling stimulated higher yields, and faster calf growth improved beef and dairy replacement performance. Male calves reach 350–400kg at 8–10 months (16 months earlier than conventional) and are targeted to the rose veal market and heifers join the herd eight months sooner. Herd numbers increased from 100 to 125–130, with annual milk sales rising from 410,000 to around 450,000 litres.

Figure 12: The Ethical Dairy's Premium cheese varieties. Source: The Ethical Dairy

A crucial part of the model is value-adding. All milk is sold to the farm's on-site cheesemaking business, which operates as a separate entity. By processing their own milk into organic artisan cheese, the Finlays capture additional margin and access premium ethical markets.

4.7.2 Case Study 2: Boerderij Boterhuys (Warmond, Netherlands)

Boerderij Boterhuys is an organic, nature-inclusive farm committed to combining animal welfare, biodiversity, and local food systems owned and managed by Gerard and Mieke Mull. Since January 2022, all calves at Boterhuys have stayed with their mothers for three months (the full suckling period) before any separation occurs, ensuring that calves first *'get their share'* before milk is redirected to

Figure 13: Gerard and Mieke Mull with the author on their farm

human consumption. Their stated philosophy emphasises welfare ('gelukkige koeien en kalfjes') and maintaining a natural, integrated farm ecosystem.

The farm keeps ~65 milk cows (mostly Blaarkop) and an inventory of ~90 youngstock, across 68 hectares of grazable land. Gerard emphasised that local breeds and genetic resilience, partly to align with their vision of “happy cows and calves” and ecological integration.

Boterhuys operates as more than just a dairy, it is also a visitor and community destination. It features a farm shop selling its own branded ‘Blije Koe’ milk and other dairy products, such as yogurt and ice cream, as well as meat. The farm is also set up as a picnic and meeting place, combining visitor experiences with its agricultural identity.

Their ‘Kalfvolle’ (calf-full) concept is central to their brand which sells at €2.30 per litre (compared to organic milk selling at €1.45 per litre). The idea is that calves remain with their mothers during the suckling phase, and only afterwards is the milk harvested for human use. They proudly communicate that calves drink first, then the farm collects surplus milk.

Figure 14: Kalfvolle (English: Calf Full) is Boerderij Boterhuys’ own brand. The farm processes its own milk to make yogurt and ice cream. Milk is available to buy from local stores @€2.30/litre.

CHAPTER 5: THE OPPORTUNITY FOR A CCC MILK BRAND IN THE UK

5.1 Recognising CCC via certification schemes

While most of the CCC farms I visited are certified organic, calf–cow contact is not currently a requirement under organic standards. As a result, CCC farms cannot differentiate themselves in the marketplace solely on the basis of calf–cow contact practices. There is therefore a strong case for creating a dedicated CCC certification scheme that would allow farmers to communicate clearly with consumers and be rewarded for higher welfare standards.

A CCC certification scheme would need to establish clear and measurable criteria. At present, there is no standardised definition of what counts as CCC. Should it be based on the length of time calves are kept with cows, or on developmental milestones such as calf weight, rumen development, or socialisation? Without this clarity, comparisons across farms and research trials remain inconsistent. Certification would help provide a baseline definition, ensuring that consumers can trust the label and that farms are recognised for genuine welfare practices.

The governance of such a scheme is equally important. It could be overseen by existing certification bodies (for example, those managing organic or biodynamic standards) through the addition of a CCC module, or by an independent animal welfare organisation with credibility in the public eye. Another option would be a farmer-led cooperative, giving producers direct ownership of the standards and the assurance process.

Milk processors also have a critical role to play. Just as premiums are paid for organic or pasture-fed milk, processors could offer a CCC premium to cover the additional costs and lower milk yields associated with calf–cow contact. Furthermore, processors could support on-farm branding, marketing campaigns, or supply chain partnerships to make CCC milk more visible to consumers. In this way, certification and processor support together could provide the financial incentives and credibility needed for CCC to expand beyond niche markets

5.2 Creating the brand: Case Study Kalverlifede, CCC milk processor in the Netherlands

Kalverliefde, which translates to ‘calf love’ in Dutch, is a unique dairy brand that has carved out a niche in the Netherlands by embracing the principles of CCC. The brand was founded by Janina van der Drift, who was motivated by a desire to produce milk from farms where calves are not separated from their mothers immediately after birth.

Janina envisioned a brand that would allow calves to stay with their mothers longer. Her journey began by partnering with a few small-scale, biodynamic farmers who were already experimenting with keeping calves and cows together. This approach not only aligns with biodynamic and organic values but also serves as a unique selling point.

Over time, Kalverliefde has grown and gained recognition in the Dutch market. By collaborating with a network of biodynamic farms, the brand has been able to ensure that all its milk comes from cows and calves kept together. This model has allowed them to stand out in a crowded dairy market and appeal to consumers who are increasingly concerned about animal welfare.

Fig 15: The author with Janina van der Drift at the Transform Dairy Network project meeting in Greece

Importantly, Kalverliefde also illustrates the potential for CCC milk to gain mainstream recognition. The brand has contributed to broader discussions in the Netherlands about higher welfare standards. For example, the Dutch 'Beter Leven' (Better Life) 3-star label has started to recommend calf–cow contact as a welfare measure, partly inspired by the visibility of brands like Kalverliefde.

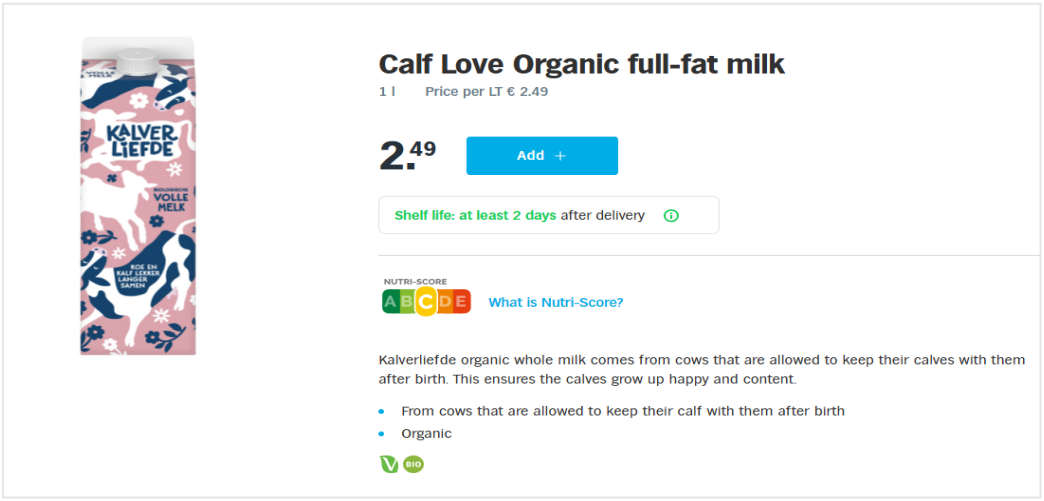

Figure 16: A screenshot from Albert Heijn website showing Kalver Liefde's retail sale price and unique selling point being CCC. Source: Albert Heijn accessed 02/10/2025

A crucial part of Kalverliefde's strategy has been its retail positioning. From its early days, the milk commanded a price premium over organic dairy. In 2022, Kalverliefde milk was retailing at around **€2.00 per litre** (various outlets), compared to about €1.45 for store-brand organic milk. By 2023, supermarket

listings showed **half-volle (semi skim) milk at €2.39** at Albert Heijn and **Plus** and **volle (whole) milk at €2.19–2.49 per litre at Albert Heijn**, with some retailers such as **Jumbo** charging up to **€2.49**. Recent reports confirm that Kalverliefde farmers now receive a **€0.12 per litre premium above biodynamic prices**, themselves already about €0.05 above organic. These figures demonstrate the brand's ability to sustain a higher market value, reflecting both the additional costs of CCC and the willingness of consumers to pay more for higher welfare.

CHAPTER 6: DISCUSSION

6.1 Improving calf health on conventional dairy farms: lessons from CCC

During my Nuffield travels, I visited both conventional and CCC farms. One stark difference between the two systems was calf health. On CCC farms, calves generally exhibited higher weight gains, better overall health, and more vitality. In contrast, calves on conventional farms, fed on milk replacers, tended to be smaller and had a higher incidence of health issues.

Dr. Heather Neave at Purdue University pointed out that many conventional farms underfeed calves often providing less than the recommended 8 to 12 litres of milk or milk replacer per day. She said *"2L twice a day is gross underfeeding"*. By contrast, CCC calves have ad libitum access to whole milk from their mothers, leading to better growth and health outcomes (Johnsen et al., 2016).

One lesson conventional dairies can take from CCC is the importance of increasing milk allowances. While colostrum feeding is standard, conventional farms could consider extending the use of transitional milk and, where feasible, incorporating some whole milk into calf diets. Even a partial shift away from exclusive milk replacer can improve calf vitality and growth.

Research supports this approach. Studies have found that calves fed whole milk tend to have better growth rates and immune function compared to those fed only replacer (Khan et al., 2011). While challenges like Johne's disease may limit the use of whole milk on some farms, there are still steps that can be taken to increase overall milk allowances and improve feeding methods. For instance, investing on a milk pasteuriser on farm for feeding pasteurised whole milk where the disease risks are high and ensuring that calves fed from multi-teat buckets are monitored so that all calves receive adequate amounts of feed (comptetion between calves feeding on multi teat buckets can lead to underfeeding in some calves).

While full CCC might not be feasible for all conventional farms, adopting some of its principles like increased milk allowances and improved feeding protocols can lead to healthier, more resilient calves.

6.2 Motivation for CCC

An important reflection from my study is that CCC cannot succeed without the right mindset. The motivation for CCC must come from the farmer and their team. Moving into CCC is not just a step towards better welfare but a move into a more ethical and regenerative farming driven mindset. It requires genuine belief in the system because it's not always easy to implement unless you truly believe in the principles behind it. Therefore for CCC to work well, the drive and commitment have to come from the heart of those running the farm.

6.3 CCC is an alternative and not a replacement

A clear lesson from my study tour is that CCC systems are best understood as an alternative pathway for dairying, not a replacement for conventional production. While CCC can deliver tangible benefits in terms of calf growth, animal welfare and consumer trust, it is not universally applicable or economically feasible across the diversity of dairy farms.

The farms I visited highlighted to me that CCC requires smaller herd sizes, adapted infrastructure, and, crucially, direct market outlets such as on-farm processing or niche branding. Without the ability to capture added value, most farmers would struggle to absorb the reduced volume of sellable milk. This stands in contrast to conventional systems, which are geared towards efficiency, scale, and integration into commodity markets.

However, positioning CCC as an alternative rather than a replacement strengthens its credibility. It offers a viable model for farmers motivated by welfare values, local food systems, or consumer engagement, while leaving space for conventional systems to continue serving mainstream markets. In this sense, CCC broadens the spectrum of dairy farming rather than narrowing it.

The challenge going forward is to support CCC without over-claiming. Recognising it as one of several legitimate models allows farmers, consumers, and policymakers to embrace diversity in dairying. Rather than displacing conventional milk, CCC has the potential to complement it by offering choice, transparency, and trust.

CHAPTER 7: RECOMMENDATIONS

Based on observations of my study tour I recommend the following areas for research and improvement:

- In my study tour I saw that CCC can take many forms, from full contact to part-time or foster-cow systems with variability within each of these. However, the lack of a standardised approach, and the diversity of practices makes it difficult to evaluate outcomes consistently. At present, there is no clear definition of what qualifies as calf–cow contact. **A standardised approach is needed to establish how long a calf must nurse from the cow for the system to be classed as CCC**. This could be framed in terms of time of contact or calf development milestones such as body weight or rumen maturity (**My personal recommendation would be till the calves reach 90 kg body weight).** Without such standards, comparisons between farms and research studies remain difficult, and we cannot reliably communicate the practice to consumers.

- Milk processors could play a crucial role in supporting CCC by introducing a dedicated price premium, similar to organic or pasture-fed schemes, to reflect the higher welfare standards and reduced saleable milk. Establishing a separate CCC-certified milk stream, marketed under a distinct label, would enable processors to capture added value from ethically conscious consumers and channel it back to farmers. Beyond pricing, processors could also assist through co-investment in on-farm processing, branding, or facilitating supply chain partnerships with premium retailers and foodservice outlets. Finally, long-term contracts and support for data transparency or R&D would reward innovation, provide stability, and help CCC farmers manage the additional risks of operating outside conventional systems.

- One of the most pressing challenges of CCC is milk ejection in the parlour and impact on milk quality. The farmers I surveyed frequently reported that cows nursing their calves can “hold back” milk, particularly the fat-rich fraction. This results in milk with markedly lower fat and, in some cases, lower protein levels, while the calf continues to access milk with higher solids. Controlled studies (Meagher et al., 2019 and 2020; Sirovnik et al., 2020; Barth et al., 2008; Johnsen et al) confirm this phenomenon but a way to overcome this challenge is yet to be determined and more academic research is needed. Addressing this issue is crucial, as reduced fat and protein can not only affect farmgate returns but also the viability of CCC

systems where value-added processing (e.g. cheese or yoghurt) depends on solids content.

- Alongside technical research, there is a clear need for consumer-focused studies. Consumer surveys should explore how much the public understands about calf–cow separation, whether they support keeping cows and calves together, and what premium they would be willing to pay for CCC milk. Previous studies indicate that many consumers are willing to pay more for higher-welfare dairy products, with premium ranging from 10–30% depending on the country and production system (Wolf et al., 2016; Maynard & Franklin, 2020; Spooner et al., 2014). However, UK-specific evidence is lacking, and research should also explore obstacles in the supply chain: what infrastructure, certification, and assurance schemes are required for CCC milk to reach supermarket shelves. Without this, CCC will remain confined to niche outlets rather than developing into a recognised product category.

CHAPTER 8: AFTER MY STUDY TOUR

Even after completing my Nuffield travels, my journey with CCC farming is far from over. I am committed to continuing my research and involvement in this field. I began volunteering with the Transform Dairy Network project since April 2025. Transform Dairy Network project focuses on knowledge exchange and upscaling CCC systems. Through this project, I have had the opportunity to share insights and experiences with other CCC farmers.

In April of this year, I also attended the first European Calf–Cow Contact Conference held in Greece. This event brought together a diverse group of researchers, farmers, and industry stakeholders from across Europe. It was an inspiring experience that reinforced the importance of international collaboration in advancing CCC practices. I am looking forward to attending the next meeting in Romania next year, where I hope to deepen these connections and bring back further insights to share with the UK farming community.

My goal is to remain engaged not only with farmers but also with other stakeholders who may be interested in developing standards and best practices for CCC. While milk processors and certifying bodies will play a key role in shaping the future of CCC milk, I see my role as helping to facilitate these conversations and supporting farmers who want to make the transition. Whether it's through ongoing advice, sharing resources, or simply being a point of contact, I am dedicated to supporting the growth of CCC farming well beyond my study tour.

I believe my Nuffield experience is just the beginning of a longer journey. I am excited to continue contributing to this evolving field and to see how CCC practices develop in the coming years.

CHAPTER 9: ACKNOWLEDGEMENT AND THANKS

I want to thank my sponsor, the John Oldacre Foundation and co-sponsor Euro Quality Foundation, without whose financial support this scholarship would not have been possible. This journey has been immensely rewarding both professionally and personally. It allowed me not only to investigate calf–cow contact systems in depth but also pushed me outside my comfort zone through travelling to new countries and building connections with a global community of farmers and researchers. These experiences have broadened my perspective on dairy farming, challenged me to think differently about the role of ethics in our industry, and encouraged me to consider opportunities that I might never have explored otherwise. It has been a journey of both professional growth and personal development.

I want to thank all the people I met, the farmers, academics and industry contacts including people within Nuffield. Thank you to those who opened their doors to me, welcomed me onto their farms, and few even allowed me to stay with them. Your generosity and willingness to share your experiences have been invaluable.

I cannot thank my family enough particularly my husband, Amir, without whose support this journey would not have been possible. He took on the main parenting responsibilities while I was away. On the trips he was able to join, he became my driver and personal photographer. Without his unwavering support, none of this

would have been possible. I also want to thank my children, Ahmed and Ali, for putting up with my absence. I managed to take them with me on some visits and I hope I hae inculcated the love of farming in their young minds.
I want to thank my mentor, Jo Speed, for her constant encouragement and for pushing me to complete this project. Lastly, I extend my gratitude to everyone I met along the way. Without your contributions, this journey truly would not have been possible.

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ISBN: 978-1-916850-69-9

Published by The Nuffield Farming Scholarships Trust
Bullbrook, West Charlton, Charlton Mackrell, Somerset, TA11 7AL
Email: office@nuffieldscholar.org
www.nuffieldscholar.org