



Interrelationships between cows, calves, and humans in cow-calf contact systems—An interview study among Norwegian dairy farmers

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ABSTRACT

In recent years, the common dairy farming practice of early separation of dam and calf has received increased attention. Our aim was to explore how Norwegian dairy farmers with cow-calf contact (CCC) systems apply these systems in practice, and how they experience and perceive the interrelationships between cows and calves and humans within these systems. We conducted in-depth interviews with 17 farmers from 12 dairy farms and analyzed responses inductively, inspired by the grounded theory approach. The farmers in our study practiced their CCC systems differently from each other and had varying as well as common perceptions about these systems. Calves' intake of colostrum was not seen as a challenge, regardless of practice. The farmers generally perceived that any aggression shown by cows toward humans was merely an exhibition of cows' natural protective instinct. However, when the farmers had good relationships with their cows and the cows felt safe around them, the farmers could handle the calves and build good relationships with them as well. The farmers experienced the calves learning a lot from their dams. Most of the farmers' dairy housing systems were not adapted for CCC, and CCC systems could require modification in terms of placing greater emphasis on observing the animals and making adjustments in the barn and around milking. Some thought having CCC on pasture was the best and most natural, while others were reluctant to have CCC on pasture. The farmers encountered some challenges with stressed animals after later separation, but several had found methods to minimize stress. Generally, they had different opinions about workload, but agreed they spent less time on calf feeding. We found that these farmers were thriving with their CCC systems; they all described positive emotions around seeing cows and their calves

together. Animal welfare and natural behavior were important to the farmers.

Key words: semistructured interviews, dam-rearing, farmers' perceptions

INTRODUCTION

Separating dairy cows from their calves immediately or shortly after birth is a common practice in dairy farming (Hötzel et al., 2014; Pempek et al., 2017; Abuelo et al., 2019). For many decades, most farmers have not questioned the practice. They base their arguments mostly on lower volumes of saleable milk (see review by Meagher et al., 2019), more stress around separation after more time together (Weary and Chua, 2000; Berge and Langseth, 2022), and potential risk of transmitting infection between cows and calves (see review by Beaver et al., 2019). Others have argued that calves would become “wild” when in the cow group and not fed by humans (Vaarst et al., 2020). Another concern has centered on possible aggressive behavior of mother cows as they attempt to protect their calves, thus creating a less safe working environment (Berge and Langseth, 2022; Neave et al., 2022). Last, the adaptations required to create housing systems that would allow accommodating calves together with dairy cows can be costly (Knierim et al., 2020; Berge and Langseth, 2022).

However, the early separation of dairy cows and their calves has received increased attention recently from stakeholders concerned about this practice (Busch et al., 2017). This concern is apparent from animal welfare organizations' emphasis on this topic (Dalgaard, 2020; Dyrevernalliansen, 2022), and within the scientific community, for example, in the article by Brombin et al. (2019), with the title “Are we ready for the big change in dairy production?” The big change they refer to is stopping early separation of dairy cows and calves. Surveys carried out in different countries show that many citizens' knowledge about common animal husbandry practices, such as the early separation of a cow and her calf, is limited (see review by Placzek

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et al., 2021). When given this information, including the rationale behind it, most citizens do not support this practice. Generally, Western concern regarding food origin is increasing (Boyle et al., 2022), and so is knowledge about and expectations for farm animal welfare (Bock and Buller, 2013). According to Fraser et al. (1997), the concept of animal welfare contains 3 dimensions: normal biological functioning, emotional state, and ability to express natural behavior. Social groups outside agriculture often tend to value natural living as the most important for animal welfare (e.g., Prickett, 2008; Vanhonacker et al., 2008). When early separation is rejected, it is usually on the grounds that it is unnatural and stressful for the animals (see review by Placzek et al., 2021).

Over the past few years, more farmers have become interested in keeping dairy cows and calves together for a longer period and have therefore tested and developed different cow-calf contact (CCC) systems (Vaarst et al., 2020; Lehmann et al., 2021; Neave et al., 2022). Research has been initiated to investigate CCC systems in countries such as Norway, Germany, Canada, and the United Kingdom, using different approaches (see reviews by Johnsen et al., 2016; Beaver et al., 2019; Meagher et al., 2019; Barth, 2020; Placzek et al., 2021). Experimental studies have been conducted to investigate cow and calf production and the animals' health and behavior, and some qualitative and quantitative studies have been conducted to investigate people's perceptions and experiences. Recently, 2 survey studies about CCC were carried out, one with 104 CCC dairy farmers from 6 different countries (including farmers using foster cow systems or having CCC for only 7 d) (Eriksson et al., 2022), and another with 1,038 Norwegian dairy farmers including 31 CCC farmers (CCC for >2 wk) (Hansen et al., 2023). The CCC farmers in the first study perceived building constraints and animal stress around separation as the main challenges with CCC systems (Eriksson et al., 2022), similar to farmers practicing early separation in the second study (Hansen et al., 2023). Among the 31 Norwegian farmers practicing CCC, separation distress was also the prominent challenge, and one of the main advantages was the farmers' own well-being with having these systems.

However, relatively few qualitative interview studies with CCC farmers have been carried out. Exceptions include the studies by Vaarst et al. (2019, 2020) and Lehmann et al. (2021). Farmers from 4 European countries were interviewed in each study, and they showed that CCC was practiced in a wealth of different systems. Vaarst et al. (2020) found that CCC farmers expressed satisfaction and pleasure from having CCC systems. The cows were able to care for and protect their calves, and the calves' needs for nutrition, care, protection,

and learning in early life were met (Vaarst et al., 2020). Another study was by Neave et al. (2022), who interviewed farmers both with and without these systems to contrast their perceptions and experiences; however, only 4 CCC farmers participated in that study. Neave et al. (2022) noted that it would be valuable to conduct more interviews with farmers having experience with both early separation and CCC systems. As far as we have seen, no earlier research has focused on farmers' experiences and perceptions of the interrelationships between cows and calves and humans in CCC systems.

This article is based on interviews with Norwegian dairy farmers from 12 farms with CCC systems. The aim was to explore how Norwegian dairy farmers with CCC systems practice these systems and how they experience and perceive the interrelationships between the cows and calves and the humans within these systems.

MATERIALS AND METHODS

The Setting: Current Norwegian Dairy Farming

In Norway, the agricultural sector is highly regulated (e.g., Almås, 2004; Almås et al., 2013), and dairy production is the most regulated (Almås and Brobakk, 2012). In 2021, the country had 6,925 registered dairy farms, with an average of 30.9 cows per farm. During 2021, each cow produced on average 8,191 kg of milk (Tine SA, 2022). In total, 91.3% of the dairy cows were Norwegian Red, a dual-purpose animal bred to produce both meat and milk.

The Qualitative (Interview) Study

The target group of this study was composed of farmers with experience in practicing CCC systems. As little is known about how farmers experience such systems and especially how they perceive the interrelationship between cows, calves, and humans in such systems, a qualitative approach with semistructured interviews was suitable for our study (Vaarst and Sørensen, 2009; Ferneborg et al., 2020).

Selection and Invitation of Interviewees

Our most important inclusion criterion for the interviews was that farmers had at least 1 yr of experience with CCC systems, with calves together with their dams for at least 4 wk. Further, we aimed to reach saturation with the sampling to cover a range of different factors that may be important in how farmers practice CCC systems and in their experiences and perceptions (Yin, 2013). Thus, different types of farm practices needed to be represented, and we therefore wanted at least 3 or-

Table 1. Themes from the interview guide that were used for interviews with Norwegian farmers with cow-calf contact systems in the SUCCEED (sustainable systems with cow-calf-contact for higher welfare in dairy production) project

Short version of the interview guide
About the farmer, the farm, the housing, and the animals
Practice with cow-calf contact from before, the beginning, and until today
The change/why they started with cow-calf contact
Economy questions
Benefits and challenges with cow-calf contact
If they want any changes, what is important for cow-calf contact, advice for other farmers
Obstacles and benefits for more farmers to have cow-calf contact

ganic farms and farms with different housing systems, including freestalls with an automatic milking system (AMS), freestalls with milking parlors, and farms with tiestalls. We were also aware of the practice of CCC on pasture in Norway and therefore aimed to include at least 4 farms with the practice. Last, we aimed to interview both male and female farmers in different age groups and to have variation in the location, number of animals, and calving season.

In the summer of 2020, the first author posted on Facebook (social media platform), in a group for people interested in CCC, about our plans to interview farmers and invited eligible group members to participate. The group, Samvær ku og kalv—forum for melkebonder (Cow calf togetherness—a forum for dairy farmers), had 1,500 members in 2022. Five farms were recruited by farmers contacting the first author in response to this post, while farmers from 5 other farms were contacted after we identified them through social media as probably matching our criteria. Farmers from 2 farms were found and contacted after a small survey in another part of the SUCCEED project (sustainable systems with cow-calf-contact for higher welfare in dairy production, project number 310728) that our study was part of. The farmers were contacted through Messenger or by phone. We told them about the project, confirmed that they fitted our criteria, and then asked if we could interview them.

The Norwegian Centre for Research Data (a part of Sikt-Norwegian Agency for Shared Services in Education and Research from January 1, 2022) determined that the processing of personal data in this interview study was in accordance with privacy regulations. The study has been reported in line with the COREQ checklist (Booth et al., 2014)

All the interviewees received an information letter with a statement of consent to sign before the interviews. The letter contained information including the aim of the project and why the interviewees were being asked to participate. It also stated that participation was voluntary and explained our privacy policy and their rights. The interviewees were informed that one

researcher (first author) was working at NORSØK and was doing her PhD and that the other 2 researchers (second and third authors) were working at Ruralis, with one of them (second author) leading the part of the SUCCEED project that included interviews. Some of the interviewees were familiar with the first author from earlier research on CCC and previous communication.

Interviews

The first 3 authors collaborated on the interviews, which were conducted in synergy between the SUCCEED project and another project. In total, 17 farmers from 12 farms located in 5 different Norwegian counties were interviewed in Norwegian. One other farmer who had initially agreed to participate eventually withdrew her participation due to time constraints.

A team of researchers within the SUCCEED project developed the interview guide, and a short version of this is shown in Table 1 (the full guide is available at <https://acrobat.adobe.com/link/review?uri=urn:aaid:scds:US:141793f9-00b6-3fcb-93d4-294c4e7bc009>; Johanssen et al., 2020). The collected interview data were intended to be used for 2 scientific articles (including the current one) and a report on economy in CCC systems. The first author conducted one pilot test of the guide and made some modifications to improve it before interviews were conducted. Since the interviews were semistructured, different questions were asked given different degrees of attention and time, guided by the course of the conversation.

Our 12 in-depth interviews with a semistructured approach were conducted from October 2020 to March 2021. To ensure that interviews were conducted consistently by the 3 researchers, the first 3 interviews were conducted by 2 researchers together. The first author took a course in qualitative interview methodologies in 2019 with the last author as course leader. The others had experience with conducting in-depth interviews from earlier work.

Seven of the interviews were done during farm visits, with 6 taking place in the house and 1 taking place in

Table 2. Background information about farmers interviewed, their animal housing, number of dairy cows, milk quota, and calving time

Farmer ID code ¹	Age (yr)	Type of farming	Animal housing ²	No. of cows in 2020	Milk quota in 2020 (t)	Calving time
1M and 1W	47 and 34	Organic	Freestall, milking parlor	14.1	44 (+cheese)	Spring
2W	52	Conventional	Tiestall	14.4	118	Autumn
3W	38	Conventional	Freestall, AMS	52.8	440	All year
4M and 4W	35 and 36	Conventional	Freestall, AMS	36.0	276	All year
5M and 5W	39 and 39	Organic	Freestall, AMS	24.5	196	Sep.–Mar.
6S and 6F ³	35 and 61	Conventional	Tiestall	14.7	173	Autumn
7M and 7W	32 and 36	Conventional	Freestall, AMS	14.1	122	All year (focus spring)
8W ⁴	39	Conventional	Freestall, AMS	60.0	320	All year
9M	48	Conventional	Freestall, AMS	38.7	365	All year
10M ⁵	61	Organic	Freestall, milking parlor	20.7	81 (+cheese)	All year
11W ⁶	58	Organic	Tiestall	18.8	137	Spring and late summer
12M	49	Conventional	Tiestall	16.0	99	All year

¹M = man; W = woman. The number is the farm number.

²AMS = automatic milking system.

³F = father; S = son (where the son has taken over the farm).

⁴Cows per year and milk quota were not retrieved from Kukontrollen for interviewee 8.

⁵Son (31 yr) has taken over the farm.

⁶Son (34 yr) has taken over the farm.

the barn. During some of the interviews, other people were present in the interviewees' homes, but they did not disturb the interviews to any notable degree. Because of COVID-19-related restrictions at the time, the other 5 interviews were done via Microsoft Teams with audio and video. Some risk exists that interviews can be different when conducting them in different formats (Lobe et al., 2022), but the interviews went satisfactorily and we received the necessary data we needed from each interview to meet the aim for this article.

At 6 of the 7 interviews with farm visits, a tour of the barn took place after each interview and included talking about the solutions in the barn and taking some notes and photographs. After 12 interviews were conducted, the authors agreed that data saturation was reached, as additional interviews would only contribute to the aim formulated to a minor degree (Glaser, 1978).

Data Editing and Analysis

All interviews were audio recorded and had an average duration of 101 min (range: 51–130 min). They were transcribed verbatim by first author, and no transcripts were returned to interviewees. Through guidance from and discussions with the last author, the first author analyzed the interviews in NVivo version 12 Plus software (QSR International: <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home/>). The analysis was done inductively, inspired by the methodological approach used in grounded theory (Corbin and Strauss, 2015). All the material from the transcribed interviews was used in the analysis, with sequences of statements being given

a heading in line with the content through open coding, before axial coding was performed to identify themes across the interviews. Interviewees' statements were translated into English by the first author and are presented in this article to illustrate the themes and findings. Each statement is identified by the interviewee ID code (Table 2), with the number denoting the farm and the letter indicating either the interviewee's gender (W = woman; M = man) or the farmers' relationships to each other, where relevant (S = son; F = father).

RESULTS

Background information about the interviewees and their farms is presented in more detail in Table 2. A diverse group of farmers were represented in the study. Three farms (6, 10, and 11) started having most cows and calves together in the 1990s. The other 9 farms started having most cows and calves together between 2015 and 2019. On farms 2, 3, and 12, the farmers also had previous experience with having cows together with calves, either nursing cows or cows with their own calves.

Some similarities could be identified regarding the ways in which farmers practiced CCC systems, but generally, the results showed that the farmers from the 12 farms had widely different systems and routines while practicing CCC systems, as shown in Table 3. On all farms, cows and calves were together inside the barns in the cow area; on 7 farms, cows and calves were also together outside on pasture.

From the qualitative analysis, we identified several themes related to farmer experiences and perceptions

Table 3. How the cow-calf contact system is applied at the 12 Norwegian farms participating in the interview study¹

Farm no.	Calving and cow-calf alone-time	Full time together (how long, where)	Less time together, weaning, and separation	On pasture
1	Mostly on pasture, if inside; a separate pen until the pen is occupied by other cows	3 mo, mostly on pasture, some in the freestall.	Gradually less time together till weaning at 4 mo. Calves in own pen when not with cows and after weaning.	Yes, preferably
2	Calving pen of 2 tiestall cubicles; alone for 2 d	2–3 wk in an area with 3 lying cubicles. Cows are tied, calves are loose; then cows are moved to the other side of the feeding area and the calves to their own pen.	Cows are tied, calves are let out to be with cows for several hours 2 periods per day until wk 4. Then a period around milking morning and evening until just before wk 8, and 1 period per day till weaning at 8 wk.	No, not yet
3	Calving pen; alone for 4 d	9–10.5 wk. Cows are in the welfare area often for around 2–3 wk before they are moved to the freestall area. The calves use the whole barn after 1 wk.	Nose flap for the last 1.5–2 wk they are together, then calves are moved to their own pen.	No, not yet
4	Calving pen; alone for 4–7 d	9.5 wk in the freestall area after calving pen. Access to pasture during grazing season.	Nose flap for the last week they are together, then calves are moved to their own pen.	Yes
5	Calving pen; alone for 2–5 d	1 mo, with cows (dams) in the freestall; after, calving pen; then 2 mo with foster cows in own pens with 1 cow and 2–4 calves.	Fence-line contact with dam for a few days after 1 mo. Moved from foster cows after 3 mo.	No, do not want to
6	Preferably outside; if inside, calving pen; alone for 1–2 d	4 wk on pasture or in the tiestall, where cows are tied and calves are loose before calves are moved to their own pen.	Cows are tied. Calves are let out to be with cows for a period after milking morning and evening until wk 8, then for 1 period per day until 9 wk.	Yes, preferably
7	Calving pen; alone for at least 5 d	6–9 wk. Cows are in the welfare area for at least 1 wk, then moved to the freestall area; calves can move around the whole barn.	Cows and calves are moved to the welfare area, where they have fence-line contact for 3 d before being moved again. Calves get milk until weaning at 12 wk or more.	No, do not want to
8	Calving pen; alone for at least 1 d (the calves can move out of the pen)	3 mo (6 mo before). Cows are in the welfare area as long as space is available, then moved to the freestall area. Calves can move around the whole barn and have access to pasture in the grazing season.	Abrupt moving of calves to their own pen.	Yes, preferably
9	Calving pen, preferably alone in colostrum period (4–5 d)	2 mo together in the freestall area after calving pen. Access to pasture in the grazing season.	Abrupt by moving calves to their own pen, but some (if strong bonds or a lot of vocalizations) are together for some more days when the farmer is in the barn.	Yes
10	Calving pen, alone for 5 d	8 wk together, in the freestall area after calving pen. Access to pasture/go outside almost all year round.	Calves are moved to a pen where they have fence-line contact with the cows for at least 5 d before being moved again. Heifer calves get milk until 4 mo, and bull calves until 6 mo.	Yes
11	Calvings take place in tiestall cubicles	Most of the calves are with the cows full time for the first 2 d, lying on hay beside the cow. Then the calves are moved to their own pen.	Calves are let out in the tiestall area for periods morning and evening until 3 mo. In the beginning, they get more hours together and before milking, then gradually less time and after milking instead.	No
12	Outside in grazing season, when inside; the cow is released from her tiestall cubicle when calving until a couple of days afterward	2–4 wk together inside where cows are tied and calves are loose, outside on pasture before calves are moved to their own pen, or both.	Calves are let out from their pen for half the day until between 70 and 100 d.	Yes

¹The farms are numbered in the same order as in Table 2.

of the interrelationships between cows, calves, and humans in their CCC systems. In the following, we have structured the presentation of these themes chronologically in relation to the life cycle of the calves in the CCC period. First, we have 2 themes: how the farmers ensured adequate colostrum intake after birth, and how they experienced establishing a strong bond between the dam and her calf after birth. Next, we have a theme regarding farmers establishing their own relationships with their cows and calves. That theme is followed by a theme about milking of cows during the CCC period and a theme about calves learning in the CCC systems. Next, we describe a theme about housing systems for CCC and CCC on pasture, followed by a theme about the last phase of the CCC period: separation of cows and calves and weaning. Last, a cross-cutting theme is presented, which is relevant for all the stages of the CCC systems; this theme encompasses being a farmer working in a CCC system and how farmers perceive natural behavior and animal welfare in the CCC systems.

Ensuring Adequate Colostrum Intake

Colostrum intake is a critical phase, and farmers had different strategies to ensure that it was adequate. Half of the farmers said they almost always bottle-fed the calves with colostrum after birth. Some measured the quality of the colostrum, and if the quality was insufficient, they used frozen colostrum of better quality. Some farmers had modified their colostrum practices based on previous experiences, as farmers 1M and 1W from farm 1 explained:

After each calving, we try to give [the calves] colostrum from a bottle to ensure that they get enough colostrum the first days. (1M)

There was actually one calf that died. We thought he drank, but he did not. It looked like he drank, but he did not get any milk. So, he did not get any colostrum, and he became in poor condition, and nothing helped. It was just horrible. (1W)

The other half of the farmers were more focused on observing and maybe helping the calves suckle from their dams, and they bottle-fed colostrum only when they felt it was needed for different reasons, as in the case of farmer 8W:

It is only for some I [give colostrum from a bottle] because I think no matter how poor quality colostrum that the mother has, it is actually the mother's milk that has the immune substances

that are best for the calf, and, if you have beef cows—I also have some of them—then you almost always let the calf suckle freely from its own mother. And I have found out that the health of calves that I have given colostrum from a bottle from its mother, and the health of calves that have been suckling freely, there is no difference. If I give some from a bottle, it is because of reasons like when there is blood in the milk, visible poor-quality colostrum or some mastitis, or, yes, if the cow is in bad shape.

Farmer 9M had several reasons for changing his practice regarding colostrum:

I used to give the calves colostrum from a bottle to be sure, but now, if I see the calf suckling, I do not do this. There are several reasons for that, but the most important is that, why should I make a possible bacterial bomb and put that into the intestinal system of the calf. They can do this very well themselves. But it happens, for example, with a heifer with a hard udder and very short teats. It can be challenging for the calf to suckle, so then you must consider it. If you see on the first milking of the heifer that the amount of milk is equal in all glands, then you understand that the calf has not drunk. You will see it on the calf as well, so you must keep an eye on them in the beginning.

Ensuring that Dam and Calf Establish a Strong Bond

For all farmers in the study, a good relationship between the dam and her calf was obviously of high importance. To ensure this, several farmers pointed to the importance of keeping a cow and her calf together on their own during the first days after birth in a calving pen to help establish a strong bond between them (see Table 3), including preventing the calf from suckling from other cows in the herd. Regarding calving pens, some farmers talked about the importance of the cow being able to see herd members through this pen. If this pen had solid walls, the cow would get stressed about being isolated from the herd and thereby not being able to bond properly with her calf.

Farmer 11W talked about the bonding between a cow and her calf:

It is very important that they actually get these first days to make a bond because it is actually so solid a bond that it takes quite a lot for the calf to go to another neighbor cow. It can be, if there is some special reason for it, like a disease or that the cow is treated with penicillin or, yes,

things like that, then we may have to get the calf to suckle from another cow, and that also usually works fine as well, but then you must be more careful because they have full control over who is their own calf.

Calf rejection was generally not seen as a problem by the farmers, but some talked about experience with calves rejected by their own mothers. The farmers shared different practices used for these calves. Farmer 5M was convinced that if calves, for some reason, could not suckle from their own mothers, they would find other cows and be satisfied:

It often requires some effort to get cows to adopt a calf that is not their own. But the calves that are out here, they always find themselves an udder to suckle from anyway. When it is a calf standing and suckling from its mother's udder, the mother stands still, and the other calves can see this and take this opportunity to suckle from this udder at the same time as the cow's own calf is suckling.

Farmer 8W said that she always allowed all her cows to be with their calves, but she experienced some cows that she perceived as rejecting their calves, and she removed those calves from their mothers. Later, she had observed these cows "stealing" calves from other cows. Some farmers had also observed that calves occasionally suckled from cows, for instance, when they were hungry or when they were older.

The farmers' dairy cows were generally perceived as being very good mothers, but several farmers talked about how some cows can seem stressed and some can seem aggressive toward their calf or like they do not want it or do not understand what is happening after calving. Some farmers also talked about differences between primiparous and multiparous cows in different ways. For example, farmer 1W said:

We often see it in older cows. Because we bought a full herd, and then we see it in those who have been separated early before, that they have in a way, their instinct has been destroyed because the heifers are much more protective [of their calf].

In contrast to farmer 1W's perception of primiparous cows, other farmers, if they experienced some cows being stressed and aggressive toward their newborn calves, it was most often primiparous cows. Some farmers had felt forced to practice early separation of calf and dam in such cases, while others, such as farmer 11W, had found methods to calm down such cows. She explained:

Like, for, example a primiparous cow, who is a bit, like, in shock after calving... she is not herself, and then she can be a bit rabid both against us and with her calf— perhaps mostly with her calf—and she can be kicking towards it, and then, all you have to do is to take it easy, be patient and pet and stroke and talk to [the cows], massage the udder and keep this going until they sort of slowly but surely calm down and find out that this is not so bad after all.

Almost all the interviewed farmers had experienced cows showing aggression toward people to protect their calves. This aggression was mainly within a short time after calving, and most of the farmers had experienced it with only a few cows. Furthermore, some farmers talked about how this aggression was an expression of a strong maternal instinct and not a general characteristic of the cow. Some farmers described how, compared with multiparous cows, primiparous cows showed more aggression to humans when protecting their calves. The farmers explained that it was because the primiparous cows did not yet know the farmer that well or because they could be more stressed after calving, having just experienced it for the first time.

When the relationship between a cow and her calf was well established, it was a pleasure to experience the interactions between calves and cows, as explained by farmer 10M: "...then you saw that face and the eyes and the body of that cow, it was absolutely amazing, it was... the eyes shone and the body... it showed a happiness that I had not seen before." He thought the most important thing for a cow was to be the mother of her calf, and he said: "My definition of a happy cow was a cow that was together with her calf."

Farmers Establishing Their Own Relationships with Cow and Calf

In parallel with facilitating a good relationship between a cow and her calf, the farmers seemed concerned with developing a good relationship between themselves and the calves. To be able to handle the calves, the farmers simultaneously had to have a good and trusting relationship with the cows. The farmers often explained that they understood the dams' need to protect their calves. Farmer 4W said:

I think they are much happier with being allowed to be together with their calf. You can see that they really love their calf, and that they protect it. They will not let anyone come and mess with their calf.

Farmer 10M talked about the importance of cows feeling safe around the farmer:

You [as a farmer] need a good relationship with your cows. The cows need to be used to you and to feel safe around you. The person that the cows feel safe around, that person, she will not be angry at during and after calving.

Some of the farmers talked about how they had to handle the animals differently, behave differently, and read the animals more closely, as farmer 3W noted:

If a cow thinks her calf is threatened, she will run straight at you. Then, you do not have a chance. And this, this is something that you really must be aware of. You must handle the animals in a different way because the calf is there with the cow, which has not been there before. And it does not need to be you threatening the calf; it might just as well be the neighboring cow. But it is just that you are standing there.

However, the interviewed farmers were also aware that even though they themselves had developed a good, trusting relationship with the animals, the risk of aggression toward other people was higher. Farmer 5M gave the example that the cows seemed to feel very safe having him around, but especially children whom the cows did not know well were more vulnerable to aggressive behavior. Farmer 10M mentioned that it was safer for employees to work with the cows when the calves were artificially reared compared with when the cows were together with their calves that they wanted to protect. He said:

If you have a lot of employees whom the animals do not know, then it will be much easier to take the calf from the cow immediately, milk the cow, and give milk to the calf. You must think about the health risk for the employee. If you, as an employee, are there when cow and calf are together, make sure the calf is suckling. Be present and pay a lot of attention to them. This can be a bigger challenge, maybe the biggest.

Some farmers perceived calves in CCC systems as different from artificially reared calves, as explained by farmer 10M:

Most of the calves that are together with their mothers are not very interested in having contact with you. They will accept that you pet them a

bit and that, but they will not come towards you and let you do whatever you want with them as they would if it was you who was giving them the milk from day one, the whole time. They are two different calves [the calves with their dams versus calves artificially milk fed by humans].

Other farmers perceived their calves being just as tame now as they had been before when they were artificially reared, or even that the relationship between farmer and calf had become more pleasant, as farmer 2W explained:

I think it is a lot nicer now to be around the calves. They come to me when I am milking the cows as well. People say that they do not form any attachment with me now, but that is not true, because now, they do not associate me with food. They come to me when they want to be cuddled, and that is a lot nicer compared to standing there being pushed, chewed on, and butted because they are not getting their food.

Some, such as farmer 9M, talked about individual differences among the calves:

If you are good at cuddling them, especially during the first period in the calving pen—that is, during the colostrum period—then you can imprint them well with that. But it is very individual as well. Some calves will stand up and run away once they see you, and others will come and meet you. And this is how it will be when they are in a separate calf pen as well. But then you will not notice it in the same way because then there will be many together in a small area, but when you have six calves together with 40 cows, then you will see it right away if that one calf is a bit skeptical.

In relation to observing individual differences, some farmers had also experienced that the calves copied their mothers' behavior, so a shy cow would transfer this attitude to her calf and her calf also became shy. This could incentivize the practice of consciously choosing the calmer cows and calves to keep and, in this way, breeding for a good temperament.

Farmers from farm 1 had realized that they had to spend more time handling calves, as 1W explained:

The first calves we weaned, they were so wild, they were not used to being handled, you know. It is something completely different when you are standing there, and the calf knows it is you who

is giving the food. But here, you are kind of the enemy when you are out there [on the pasture]. So, we had to do something about that; we had to start socializing them. It was our veterinarian who gave us advice that we could make a sort of a calf creep out there, where they could get some hay and concentrates, a teat, and some water, and then we could take them in there and sort of force them to get cuddled.

Farmer 1M noted “Two times a day, we handle them.”

Milking of Cows During the CCC Period

Through the CCC period, farmers found that less milk was delivered from the cows while the calves were suckling. Some farmers had also experienced problems with milk let-down during milking, but this seemed to be most common with primiparous cows and mostly during the first days after calving.

Farmer 2W described solutions for this challenge:

Some cows do not let down their milk unless their calf is present. If the calf is present all the time, I will also not get any milk from her. So, then it happens that I must take away the calf, even though the calf is newborn. I have to take away the calf around an hour before milking, and then I will bring it back when I am going to milk because then she will let down the milk. It mostly works. And when the calves are bigger, then it happens that I put on the milking cluster, then take it off one teat, get the calf, then she will look at her calf and start to let down the milk when she sees her calf.

Farmer 2W also talked about how she thought some CCC farmers may believe that the calves are drinking more milk than they actually are, because of poor milk let-down in CCC cows during milking. Farmer 10M thought it could be hard to know when the udders were full or empty, even after more than 20 yr of experience with CCC systems, and he stated: “You must let go of controlling everything. You can’t be a person who wants to control everything. The cow should also contribute to control a little. But the udder, it behaves differently when the calf is working with it.” Farmer 8W said she had no problems with milk let-down and referred to the fact that cows and calves were together full time, which she thought made them more relaxed.

Some farmers had AMS, including a separate area which they called the “welfare area,” where they could

keep a closer eye on newly calved cows and their calves. As farmer 7M said:

One of the reasons we have them in the welfare area is so we can get them into the milking robot manually morning and evening, when we are in the barn cleaning and feeding and so on. If they are together with the others, there can be some that do not have enough milk. There can be a lot of incorrect milkings, and I do not think that is good for their udders.

Farmer 3W talked about doing this mostly with the primiparous cows because they are more often empty in one or more quarters after their calves have been suckling, and mostly in the beginning after calving.

Calves Learning in the CCC Systems

Almost all the farmers talked about the positive effects of calves learning from cows in CCC systems, while also mentioning individual differences and the fact that calves also learned from other calves. They talked mostly about this in connection to eating behavior, emphasizing that the calves learned to eat roughage, concentrates, and silage, and that they learned how to graze and drink water. In addition, some talked about how the calves learned how to live as cows. Farmer 9M said:

So, the calves learn all the automatics in the barn from day one. They know where everything is, and how everything works. The mother has kind of taught them this. Such a simple thing like learning to lie down in the lying cubicles. If I buy heifers that have been in a tiestall before, then I can have heifers that for a whole week will lie down on the slatted floor. Now I do not need to think about that [when the calves have grown up]. They will understand this because they have been lying on the mattresses from day one.

This impression was also backed up by farmer 2W, who stated:

It is the most natural thing; the calf is together with the mother and learns from the mother and learns how to behave. And if you have a nice, calm cow, you will get a nice, calm calf. It is easy to see that, if there is some handling of animals, and calf and cow are together, then the calf is calm. If you have a nervous cow, then the calf will be stressed

and will stay very close to the mother, so it can be both positive and negative.

Housing Systems for CCC

As shown in Table 2, the farmers in this study had different housing and milking systems. They generally experienced that dairy cow areas were not built to accommodate CCC and therefore were not adapted for small calves. Several farmers experienced calves accessing places in the barn where they should not be, such as on the cows' feeding table, leading to a greater need to clean and more waste of feed. Others did not see this as a problem. Farmer 9M said the calves learned where they should go:

Sometimes you get some calves that think it is nice lying [on the feeding table], but, if you are a bit determined. . . I also have camera surveillance, so if you are good at taking them away from there in the beginning, they will understand that this is not the place to be.

Farmers also talked about "childproofing" the barn by putting up planks and gates around areas that the farmers did not want the calves to enter. Farmer 5W talked about the calves living in a more dangerous environment and said:

Compared to a squared pen, that is completely safe. Now they are kind of everywhere [in the barn]. But you can compare it with kids. You can lock them inside so they are safe, but you have to let them out to experience the world as well.

Some farmers thought that freestalls were more suitable and worked better for CCC than tiestalls, as farmer 2W said:

When the cow is loose, she gets control. Now when she is tied, she does not have control. And the calves are like kids; they have full control over their mothers. And then some cows can get very stressed. So, I think this will work better when the cow is loose because then she can more naturally control her calf better.

Interviewees generally agreed that sufficient space for the animals to move around in the housing system and free access to resources such as roughage were important to have calm animals, especially when having small calves with the cows. It was also seen as important to have areas, such as calf creeps, where the calves could get away from the cows as needed. They

also experienced calves lying between, in, or in front of the cubicles, and sometimes taking up a whole cubicle, which the cows seemed to accept.

CCC on Pasture or Not?

On 7 of the farms, cows and calves were together outside on pasture in the grazing season, which usually lasted from between May and June until between September and October. On one of these farms, farm 10, cows and calves could go outside almost all year round. Two farmers wanted to have the CCC on pasture, but felt that it was challenging, and 2 other farmers did not want to have cows and calves together on pasture because they used forest and mountain pastures. Farmer 7M explained: "Just the combination of cow and calf in the forest I think is a bad combination. These areas are not suitable for small calves, and a little calf will not be able to walk that far." Farmer 5W had similar concerns:

If the small calves run far up in the mountains as well, then they would not come back in the evening ever again. The cow would have no reason to come back in the evening. She could just stay in the mountains with the calf. Ah, no. . . [. . .] . . . no, we have not tried that, but for now we are trying to steer away from that. We are trying to keep it as simple as possible in the summer.

Some of the farmers who had CCC on pasture preferred to have cows calve outside and to have CCC on pasture. They had several reasons for this, such as it being more natural, more space being available, the risk of infection and injuries being reduced, and the workload being lessened. Farmer 6S said:

The advantage of having calving in the autumn is that then they can be outside and calve outside on pasture. I want to have as much calving outside as possible. When they calve outside, the animals are much faster, or healthier and fitter.

His father, farmer 6F, added:

I really like to have the animals outside on pasture as long as possible. Before, the calves stayed inside while the cows were outside, but now it is no problem, and we do not need extra fences for the calves, because they are together with their mums that are taking care of them.

Several farmers with cows and calves together on pasture talked about how calves could escape the pasture

by slipping under the electric fence. However, they did not see this as a problem because the calves did not go far, and they would come back when the cows called them or went inside. Farmer 10M said:

All mothers are amazing. The cows are very kind and very good mothers—like most mothers, regardless of species. And if you thrive at home, you will always come back home. It is like that with the calves as well. The calves can be away exploring on their own when they are outside, but they will always come back home. So that is not a problem. But many people call me, saying, “There are some calves here. . . .” It would be a problem if they went out onto the big road or the railway track or something like that, but they have never done that.

Some talked about how difficult it could sometimes be to find newly calved calves outside. They would hide during the first few days after calving, and had to be searched for and found, or, as approached by farmer 1M: “When a cow has calved it can take two to three days before we see the calf because it is lying down and hiding. We just have to wait until the calf shows up, and it does show up.” Farmer 1W said, “Yes, they behave like wild deer.” During the first year with this system, they spent a lot of time searching until realizing that the calf would turn up eventually.

Separation of Cow and Calf and Weaning

The farmers approached weaning differently, as can be seen from Table 3. Some experienced the strongest reactions to separation from the calves, such as farmer 11W, whereas others experienced that the cow reacted more than the calf. Some farmers experienced the cows vocalizing for some days after separation. For example, farmer 5M said: “The cow will vocalize for two days, and she does that if you take away the calf from day three or week three. She will stand and vocalize for two days.” Farmer 8W said that when the cows vocalize, they stop because they lost their voice, and farmer 10M said he thought they stopped vocalizing because they gave up.

Farmer 8W thought that many cows do not react much because they are tired of the calves by the time they are separated. As farmer 12M explained:

When cows are taken away from their calf, there can be heart-breaking sounds for a couple of days. We do not have that. There is a bit of noise when we take them away if they have been together for 80 or 90 days, but it is mostly the calf that still wants access to dessert. The cow, she does not care much anymore.

However, several farmers talked about individual variations in reaction to separation, both between cows and between calves. As farmer 7M said:

It is very varied. Some do not. Most cows vocalize on the first day—some more, some less. All react a little, but as long as the calf is full and satisfied and knows where the mother is, it will lie down, rest, and sleep with its friends. It is the mother who is most stressed. But we have also had a couple where it just seems like it was nice, no reaction.

Two out of 12 farms (farms 7 and 10) continued giving milk to the calves after separation from the cows, and the farmers talked about how it could be challenging to get the calf to drink from a teat bucket or bottle after being used to suckling from a cow. Farmer 7M said:

I manage to do it with strength and power. The calves are enormously huge, so it is not easy. I manage to do it, but my father does not manage it. I must grab the calf, and the calf needs to be a bit hungry. Often, a clever method is to separate them in the morning and try giving them milk in the afternoon.

Some farmers had identified some ways of separating and weaning that worked well for both cows and calves. Farmer 1W experienced that separating more cow-calf pairs at the same time helped, and farmer 11W said:

It can be a bit noisy at weaning, but it has to do with how you do it. I have found a method that actually works quite well. For the calf it is not a problem, but the mum. . . . Some mothers can make a little noise for a day or something, but now I do it successfully. [The cows] are so tired of those bullies that are fooling around with them by the time [the calves] are three months old, so they are happy to get rid of them. They can [still] see them. They pass them and sniff them every day.

Some compared this late separation with previous experience with early separation. Farmer 8W remembered that the cows did not react and the calves did not care when they were separated early; however, farmer 10M had a different experience:

If we let [the cows] lick [the calves after calving], for five minutes, or half an hour, or an hour more or less, they just got sad. The easiest thing for them was just when we took the calf away im-

mediately after calving. Then they would stand there quietly. They were actually apathetic is how I would describe my cows.

Being a Farmer Working in a CCC System

Compared with when the farmers had artificially reared calves, half thought that they spent less time working and the other half thought that they spent as much or more time working with CCC systems. All agreed that they spent less time on calf feeding. Several talked about the work being more flexible, especially when having AMS and no longer having to go to the barn at certain time points for calf feeding. Several also talked about that they used the time differently, for example, by spending more time on observing, moving animals, making adjustments to the barn, and cleaning up after the calves. The interviewees generally agreed that they needed to be more observant and alert. Farmer 3W explained:

You must keep an eye on that calf and how it behaves and things like that to a much greater extent. There is more herd focus now. Also on an individual level, so you try to keep a certain clue on who is the mother of whom, so you can control and check on them.

All the interviewed farmers talked about their own sense of well-being in relation to having CCC. They talked about it being pleasant and cozy; it felt good; they felt proud, satisfied, and had a good conscience; they were happy with it; it was motivating; it gave a nicer environment in the barn; it was very interesting, very exciting, and great fun; and they had faith in CCC.

Farmer 11W said: “I think it is pleasant, it is nice to see, they have a good interaction. Instead of having to stand holding the bottle for the calf, I can stand and watch them enjoy themselves together.” Farmer 10M said: “A farmer wants to see healthy and clean animals that thrive and grow. When you see that in your barn because cow and calf are together, it is a factor that makes you think it is fun working there.” A similar perception was described by farmer 1M:

It is very interesting, and it is fun. This is much better than having a routine job because you can produce milk and only produce milk, but it is a lot more fun to make milk and to do it more on [the animals’] terms.

Some talked about how it promotes well-being for the cow, the calf, and the farmer. Several talked about how important it is to thrive in a workplace, and therefore, it was important for farmers to thrive when they were working in the barn. Farmer 2W said: “Sometimes I think that there are certain things that are more important than the economy. One should thrive in one’s workplace. I am out here [in the barn] for many hours per day.”

Several farmers seemed to appreciate CCC because its naturalness enabled the animals to express their natural behaviors, which in turn was seen to confer better animal welfare. Farmer 7M said:

We think it is better animal welfare when the calf is together with the cow. This is our way of interpreting animal welfare. Because it is a bit like a loose concept. The cow can get to express her natural needs because it is a natural need. When you see how they handle the calf, after calving and how they follow it in the freestall, calling for it and it comes and suckles from its mother, it is a natural instinct, a need that is being covered, that mothering role. So that is what we think good animal welfare is. But it does not mean that we think it is poor animal welfare to separate them early.

Others, such as farmer 5W, were not so sure: “I feel like animal welfare has increased. Or, I do not know, they had very good welfare when we separated them early as well.”

Overall, animal welfare was important to the farmers. Farmer 7W, who was also educated as a veterinarian, talked about wanting to be a good example as one reason for keeping a cow and her calf together. She also saw their CCC system as a continuation of the farm history with a focus on good animal welfare:

[Farmer 7M’s] grandmother was known for taking very good care of her calves, and this [focus on] animal welfare has been like the mainstay of the farm history. So, we wanted to continue, and to try something that might provide even better animal welfare.

Farmer 5W thought it was also important that the animals’ welfare did not come at the expense of the family’s own welfare:

We have [realized] that we have to think about what is good enough. We can work [in the barn] all day, and make sure the animals are doing opti-

mally, but then our kids and our own health will be negatively affected, so this must be balanced.

DISCUSSION

The current study aimed to explore and analyze how Norwegian dairy farmers applied CCC systems on their farms and how they experienced and perceived the interrelationships between cows, calves, and humans in these systems.

CCC Systems Were Widely Different

Our results showed that interrelationships between cows, calves, and farmers were perceived differently, and the farmers were practicing their CCC systems differently, which has also been shown in previous studies (Vaarst et al., 2020; Lehmann et al., 2021; Eriksson et al., 2022). It was highlighted that the current housing systems were not suited for these systems, which can partly explain why farmers found individual and farm-specific solutions for housing and grazing.

The farmers had different management practices around ensuring sufficient colostrum for the calves. Neave et al. (2022) showed that CCC farmers were not worried about calves' colostrum intake, while farmers practicing early separation were worried about it regarding CCC systems. Likewise, the experiences regarding separation and weaning and methods for them varied. Berge and Langseth's (2022) survey found that, among the 213 farmers who had tried having CCC but did not want to continue, the main reason among more than half (114) was stress in their animals after later separation.

The perceptions of farmers in our study of having cows and calves together on pasture ranged from thinking that the best and most natural way was to let them calve and be together outside to being wary of having small calves on pastures with the cows. Some farmers in a study by Vaarst et al. (2019) perceived that cow and calf were especially able to engage in natural behavior together on pasture. The farmers we interviewed who let cows calve outside talked about newborn calves hiding as a natural behavior and whether or not they spent time searching for these calves. In the study by Lehmann et al. (2021), one farmer viewed calves hiding on pasture as a challenge. Differences in management practice, such as searching for calves on pasture, may contribute to having a different degree of control and workload in CCC systems.

Calves from the CCC Systems

Our interviewed farmers agreed that handling of calves was important in CCC systems for the calves to become calm, tame animals. In the study by Vaarst et al. (2020), some interviewees said that calves that were together with their dams became calm and confident adults, and they talked about how you could have contact with the calves regardless of milk feeding by being around them and talking to them. Neave et al. (2022) found from interviews that farmers who did not have CCC were concerned that the calves could be more independent and wild with CCC systems and as the heifers grew, handling them could be difficult and dangerous. However, the CCC farmers in that same study said the heifers were still quite friendly and did not become wild.

Some of the farmers in our study had experienced the calves being a bit wild or shy on pasture, but when they focused on handling them through this period or afterward, they had no problem. In the study by Vaarst et al. (2020), some farmers experienced calves being a bit wild when they were with the cows, and especially on pasture, but it was not a problem when the farmers spent time handling them.

Regardless of having CCC systems, research has shown that bigger farms have more fearful calves (Leruste et al., 2012) and that the behavior and attitude of the people working with the calves are important influences on how the calves will react to people (Calderón-Amor et al., 2020). If calves are handled only when they are exposed to something uncomfortable, they will try to avoid being handled at all, but if the farmers handle them with patience, cuddle them, and speak to them with calm voices, they will be easier to handle (Ellingsen et al., 2014).

Cows, Calves, and Farmers Learning and Being in CCC Systems

Several of the farmers we interviewed talked about how a cow and her calf being together was natural, and they generally saw this as good animal welfare, similar to what has been reported in other studies (e.g., Wagenaar and Langhout, 2007). The general public's concept of animal welfare has been shown to often involve allowing farm animals to express their natural behavior (Placzek et al., 2021). However, as shown in the results, farmers had different perceptions and feelings regarding how much they could leave to the cow and the calf and how much control they needed to have over the CCC systems. A clear need existed to find a balance and to learn to let the calves and cows

interact and have space and surroundings that encouraged natural behavior and play behavior and enabled cows to nurse their calves safely, while also developing a trusting relationship with humans.

This balance between “allowing naturalness” and “being in control” also related to how the farmers should ensure that the calves had sufficient amounts of colostrum and were nursed well. The farmers in this study generally perceived that most of their cows were good mothers. Most of the farmers who did not have CCC systems in the study by Neave et al. (2022) stated that modern dairy breeds did not always take proper care of their calves instinctively, and this ability might have been lost due to other breeding goals. Interviews by Vaarst et al. (2020) showed that CCC farmers experienced dairy cows as strongly motivated to nurse, protect, and care for their calves. The finding in this study that CCC farmers generally perceived calves’ colostrum intake as not being a challenge and dairy cows as being good mothers reveals several themes whereby farmers practicing early separation of cow and calf and farmers with CCC systems can have different perceptions.

Regarding animal welfare concerns, Neave et al. (2022) showed that the main concern about CCC systems by farmers practicing early separation ($n = 63$) was poor animal welfare due to a risk of mastitis, inadequate colostrum for the calf, increased stress from delayed separation, and lack of shelter for calves that were outdoors with cows. However, animal welfare was also important for the CCC farmers ($n = 4$) in the same study, and they perceived that animal welfare was promoted in their CCC systems. According to the review by Beaver et al. (2019) about cow and calf health in CCC systems, letting calves suckle cows shows beneficial or no effects on mastitis.

Farmers experienced that calves were learning in the CCC systems. Previous research showed that calves that are reared alone have difficulties with learning (Gaillard et al., 2014; Meagher et al., 2015) and that offspring learn from their mothers (Newberry and Swanson, 2008; Mogi et al., 2011). Similar to our findings, reports by Vaarst et al. (2020) and Lehmann et al. (2021) referred to farmers who also experienced that calves seemed to learn how to behave in the housing and grazing systems when they are with dams or other cows.

Supporters of early separation argue that the calves will be more trusting of people with artificial rearing (Neave et al., 2022). In addition, they argue that the farmer gets better supervision of the calves’ milk intake (Flower and Weary, 2003) when the calves are artificially milked, often in restricted amounts.

This was related to another experience when changing to CCC systems: When a calf is allowed to suckle

freely, it can drink a lot of milk. Farmers in the study by Lehmann et al. (2021) estimated that calves could drink up to 15 to 16 L/d, and thus, another argument against having CCC is a smaller volume of saleable milk (Meagher et al., 2019). In many cases, a smaller volume would make the CCC system less profitable for the farmer, whose main income comes from selling milk. Some farmers in our study talked about problems with milk let-down in CCC cows and that it could be hard to know how much milk remained in the udder in cows being both suckled and milked. One farmer in the study by Lehmann et al. (2021) had decided to combine dam-rearing and nursing cows for their calves because of problems with milk let-down, while other farmers in the same study said they did not have any problems with milk let-down.

Although farmers in our study had widely different perceptions of how much time they spent working in their CCC systems compared with when they separated cow and calf early, they agreed that time on calf feeding was saved and that work was more flexible, especially when having an AMS. In a Norwegian survey, farmers with CCC also experienced increased flexibility (Berge and Langseth, 2022). The decreased workload was seen as a positive consequence of CCC in the same survey, but the survey also included 213 farmers who had tried having CCC but did not continue doing it. Eight of these farmers reported “higher workload” as the main reason for not continuing with CCC. Several of the farmers in our study said they used time differently, for instance dedicating more time to observing the animals. Farmers interviewed in the Vaarst et al. (2020) study also perceived that CCC systems required increased observation and evaluation of the animals. Farmers who did not have CCC systems in the study by Neave et al. (2022) talked about being worried that these systems would increase labor and stress on the staff working with the animals and thus compromise staff well-being. However, 3 of 4 farmers having CCC systems in the same study talked about it being a simple system and that they saved time from not having to feed the calves.

All interviewed farmers in our study seemed to agree that having CCC systems benefited their well-being. They used a range of positive words to describe how they felt about seeing cows and calves together on their farms. Farmers practicing early separation interviewed by Neave et al. (2022) were worried about the stress and mental health of the staff if they had CCC systems. Vaarst et al. (2020) interviewed CCC farmers who expressed satisfaction and joy as a strong motivation to continue with these systems. Studies by Berge and Langseth (2022) and Wagenaar and Langhout. (2006) found that having CCC increased the farmers’ own well-being. A Swedish study revealed similarities, in

that dairy farmers felt happy when they knew their cows were doing well (Hansson and Lagerkvist, 2016), and other studies have shown that farmers' well-being was directly correlated with their animals' welfare (Hansen and Østerås, 2019; King et al., 2021). This may be an important aspect of the emerging concept of "one-welfare," as for example outlined by García Pinillos et al. (2016), as it might suggest constantly interwoven perspectives between humans and animals throughout the different stages of the calves' lives. The perspectives from the cows and calves are their welfare and well-being in terms of being allowed natural behavior, learning, freedom of choice for both cow and calf to move in the system, and the cow having fulfilled a strong motivation to protect and care for her calf. The farmers' perspectives are about enjoying seeing this interaction, learning from and reacting to it, being challenged and gradually developing the system to suit CCC, and at the same time supporting their work satisfaction.

CONCLUSIONS

All the interviewed farmers in our study followed different practices in their CCC systems regarding having cows and calves together and methods for separation and weaning. We noted differences in their experiences and perceptions, but also similarities. They were generally not concerned about the colostrum intake. They seemed to agree that their dairy cows were generally good mothers that took good care of their calves. The farmers perceived that they had good interrelationships with both the cows and calves in their systems, but they also faced a risk of aggressive behavior from cows wanting to protect their calves. When the calves were not artificially reared, it was important for the farmers to spend time handling them. The farmers agreed that calves learned a lot from being with their dams. Some found it best and most natural to have a cow and her calf together on pasture, while others felt that this situation would not be safe for the calves. Farmers experienced challenges with stressed animals after later separation, but several had found methods to minimize stress. The CCC systems can require more focus on observation and adjustment to the barn and milking routines. The farmers had different perceptions about the amount of work connected to the CCC systems, but they agreed that they spent less time on calf feeding. They were generally thriving with their CCC systems and experienced positive emotions seeing cows and calves together. Animal welfare and the animals' natural behavior were important to the farmers.

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