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Shaping cow-calf contact systems: Farmers' motivations and considerations behind a range of different cow-calf contact systems

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ABSTRACT

Most dairy farms rear calves artificially by separating the newly born calf from the dam and feeding the calf milk from a bucket. However, the general public and scientific community have begun to question the effects of artificial rearing on animal welfare. Research so far has focused mainly on dam-calf contact, where each cow takes care of her own calf. However, previous studies show that Danish and other European farmers are using and showing interest in a variety of different cow-calf contact (CCC) systems. In the present study, we used qualitative research methods to explore the perspectives of Danish farmers who either had or had tried to establish a version of a CCC system. Farmers were asked about their motivation for establishing the system, what had shaped the system to its current form, and how they perceived the calves to benefit from the system. Practical considerations was the theme most commonly brought up and related to both why farmers chose to have CCC in the first place and in what way they had chosen to organize their CCC system. Practical considerations included a sense of ease, flexibility, and a more natural and therefore rational approach. The economy was also a repeated theme, but although the economy to a large degree shapes the type of CCC chosen (dam-calf contact or foster cow contact), it was rarely mentioned in relation to choosing a CCC system in the first place. Ethical considerations were a strong motivator for farmers with dam-calf contact systems, although less so for farmers with foster cow contact. The farm's image as seen by the consumer was an important motivation for farmers with many on-farm visitors, and with the farm's image in the eyes of the farming community potentially also influencing farmers. Farmers generally perceived the calves to benefit from the care of the cow and no difference was seen in the importance attributed to care, between farmers choosing dam-calf contact and foster cow systems.

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INTRODUCTION

Under natural conditions, cows usually nurse their calves until 7 to 14 mo of age, and the calf is continuously cared for by its dam, even after the next calf is born (Reinhardt and Reinhardt, 1981; Veissier et al., 1990). Studies have shown that dairy cows in today's dairy systems will show the same maternal behaviors if given the opportunity (Rørvang et al., 2018). It is well founded in the literature that the separation of a calf and its dam causes stress for both animals (Newberry and Swanson, 2008; Weary et al., 2008). Nevertheless, separation within hours of birth is the most common practice in the management of calves and dairy cows, both in conventional and organic herds. This practice is referred to in the literature as artificial rearing (Sirovnik et al., 2020).

In Denmark, organic farmers have voluntarily agreed to keep the calf with the cow for 24 h, compared with 12 h for conventional farms (Landsforening and Fødevarer, 2022). In the agreement, the organic community specifically states an interest in improving animal welfare and ethical conduct. However, the separation after 24 h in organic farming could still be argued to conflict with the organic principle of fairness, according to which "animals should be provided with the conditions and opportunities of life that accord with their physiology, natural behavior and well-being" (IFOAM, 2005). Rearing calves with their dam would improve adherence to the fairness principle and reviews of recent research establish that dam-calf contact, being one type of cow-calf contact (**CCC**), likely have the potential to improve welfare without compromising health (Beaver et al., 2019; Meagher et al., 2019). In addition, CCC better conforms with citizens' and consumers' views (Weary and von Keyserlingk, 2017; Placzek et al., 2021; Sirovica et al., 2022).

The CCC systems on high-production dairy farms are, however, relatively scarce, though some farmers are starting to implement CCC in Nordic and European

countries (Eriksson et al., 2022; Hansen et al., 2023), including Danish organic farms (Vaarst et al., 2020). However, a range of barriers to the implementation of CCC has been identified (Vaarst et al., 2020; Eriksson et al., 2022; Neave et al., 2022; Hansen et al., 2023), which relates mainly to a reduction of salable milk and issues with suitable housing.

Indeed, in the review by Johnsen et al. (2016), they suggest that having unrestricted, whole-day contact between a cow and her calf may be infeasible under current farming conditions, due to both economical and welfare-related concerns (Johnsen et al., 2016). Animal welfare, specifically related to increased separation stress seen in cows and calves that have formed a strong bond (Weary et al., 2008), was also among the main barriers to having CCC when farmers were asked (Eriksson et al., 2022; Neave et al., 2022; Hansen et al., 2023). Indeed, Hansen et al. (2023) surveyed 213 Norwegian farmers who had tried out a CCC system and found that more than half of those who discontinued the system did so mainly because of increased separation stress in the animals.

These barriers may explain why farmers try out different versions of CCC systems, such as the use of foster cows who each suckle 2 to 4 calves, part-time contact systems, or a combination of both (Vaarst et al., 2020; Eriksson et al., 2022), as the use of these management choices may allow farmers to run a more feasible system (Johnsen et al., 2016; Meagher et al., 2019). However, little is known about the motivation and shaping factors related to the different choices farmers make when managing their CCC system. The interview and survey studies are also pointing to discrepancies between farmers. Animal welfare is mentioned as a main barrier to implementation by some farmers, due to the increased separation stress, although aspects of animal welfare such as healthier calves, a more natural calf-rearing system, and maternal care were mentioned as the main reasons to have CCC systems by other farmers (Vaarst et al., 2020; Eriksson et al., 2022; Hansen et al., 2023). This illustrates an interesting discrepancy, with animal welfare being both the reason to have and not to have CCC.

Behavioral research is emerging on the benefits of CCC systems in terms of the improved opportunity to experience positive social interactions and perform highly motivated behaviors (Johnsen et al., 2021; Wenker et al., 2021), which are believed to facilitate good welfare (Lawrence et al., 2019; Rault, 2019). However, the later separation of cow and calf induces a strong behavioral response, which is expected to be detrimental to welfare (Johnsen et al., 2015b; Wenker et al., 2022). Farmers' perceptions of how their CCC system affects animal welfare can inform our understanding of how they balance positive and negative effects and potentially suggest management choices that can improve animal welfare in CCC systems.

This paper aims to investigate the motivations, perspectives, and experiences that shape the variety of CCC systems currently practiced in Danish organic dairy herds, as well as in relation to the benefits of CCC from the perspective of the calf. The 3 research questions are (1) what motivates farmers to choose a CCC system in the first place, (2) what shapes the type of CCC system applied on each farm, and (3) how do farmers perceive their calves to benefit from their version of CCC system.

METHODS

The Research Ethics Committee at Aarhus University, Denmark, has reviewed the study design and no ethical approval was needed under the Danish legislation. All interviewees signed a declaration of consent stating their anonymity and voluntary participation.

Research Approach

This study was based on a qualitative research approach and explored the perceptions of farmers with experience in CCC systems through semi-structured qualitative interviews. This interview method allows each interviewee to add new perspectives to the whole picture, and interviewees are therefore encouraged to use examples from their experiences and focus the interview as wanted within the decided interview theme. The interviewer ensures the interview stays within the theme, asks follow-up questions, and investigates seemingly contradictory statements.

Data Collection

We contacted Danish farmers who were shareholders of 1 of the 2 dairy companies. The farmers were selected based on the dairy company's knowledge of each farm's production system and personal communication with an organic consultant, who had visited all farms delivering to each dairy within the previous 6 mo. Farmers were contacted if they had experience with any form of CCC, either in a current system, a system under development, or a system which they had chosen to discontinue. A total of 13 farmers were identified.

During the summer of 2020, those 13 farmers were contacted via telephone, and 12 (**farmers A–L**) agreed to be interviewed, the last farmer not having time for an interview within the study period. All interviews were performed by the first author (female, Danish, MSc. in animal science, no farming background, currently a

PhD fellow focusing on different CCC systems, mainly focused on ethology, curious and interested in effects of CCC systems for animals and farmers) using semi-structured interview techniques. Interviews occurred in person on the respective farms (**farms A–L**), usually in the kitchen, in Danish. Interviews were audio recorded and manually transcribed verbatim with Nvivo by the interviewer. The interview durations varied from 30 min to 2 h.

The farm owner was the primary person interviewed, but the farmer was asked to include others if they were crucial in the decision-making regarding the given CCC system. In some interviews, the spouse, the calf manager, or both were present. All interviews began with a farm tour, during which notes were taken to be followed up on during the interview, but no further relationship between interviewer and interviewee was established before the interviews. The interviews started with an introduction to the research project and the interviewer's background knowledge of farming. Then, introductory questions about the farmer's background and facts about the farm were asked (see Table 1 for an overview of farm characteristics). Following this, the farmers were asked about their initial motivation for starting a CCC system and to describe the path of change toward the current CCC system. Last, farmers were asked how they perceived calf welfare as a result of their CCC system and specifically prompted by 4 written flash cards to discuss and prioritize the benefit of CCC for the calf. The flash cards covered: nutrition (natural meal frequency, right temperature of milk, satisfied suckling need, and no contamination during storage), care (maternal grooming, close contact, and protection), learning (observe the cow's behavior, learn what and where to eat and rest, how to be herded, and how to react in a socially correct way), or other (the farmer was encouraged to add his or her own perspectives). The 3 perspectives used for the flashcards were based on emerging themes from previous research (Vaarst et al., 2020), and the fourth card was added to allow for new perspectives. Each flash card was described in a standardized manner. Farmers were asked to arrange the cards in front of them. This approach was chosen to guide farmers to be specific in which elements of animal welfare they found important in their system and reflect on whether these elements had guided their management choices. After each interview, the interviewer immediately wrote up a 1- to 2-page summary and impressions from the farm and the interview to help guide the analysis.

The interviews were analyzed by the interviewer using a modified grounded theory method (Brinkmann and Kvale, 2015) under supervision from the second author. The transcribed text was organized into meaning condensates, which were grouped into common themes across all interviews. These themes were further grouped and organized into a model that represented an overall structure, including all elements of the interviews. The transcripts were not returned to the participants due to a relatively long pause between interviews and analysis (1 yr).

RESULTS AND DISCUSSION

The analysis of data relating to the first 2 research questions (the initial motivation for CCC and factors shaping CCC systems) resulted in a range of factors enabling, encouraging, or hindering the conduct and practice of different CCC systems. These factors were grouped into 4 major themes: (1) practical considerations, (2) economy, (3) ethical responsibility, and (4) image. For the last research question, on the benefits of the CCC system from the calf's perspective, one theme emerged: care is care. The results and discussion section is organized around the 3 research questions and the corresponding main themes. Before the results and discussion are presented, a short description of the different CCC systems that farmers used is given to introduce the reader to the farms and the technical terms used to describe the systems throughout. An overview of each farm included in the interview study is given in Table 1, and references to farms and farmers are based on this.

Different Versions of CCC Systems

The CCC systems in the present study were either dam-calf contact systems, where each cow is rearing her own calf, or foster cow systems, where a cow is rearing 2 to 5 calves, one of which can be her own. Some farmers practiced hybrid systems, where they started with dam-calf contact during the first weeks after calving and then moved the calf over to a foster cow. Half of the interviewed farmers currently used or had tried out a dam-calf contact system and the other half of the interviewed farmers had or had tried out a foster cow system, including hybrid systems. Farmers had further chosen between whole-day or part-time contact between the calf and the cow. Part-time implies either half-day contact (between the 2 daily milkings, either during the day or the night, used in the 3 active dam-calf contact systems) or several short contact periods (in this case 2 $\times$ 1 h of contact per day in a foster cow system).

Motivation for Choosing a CCC System. Farmers were asked to explain what had motivated them when they initially had chosen to manage a CCC system.

Table 1. An overview of the main characteristic of the farms enrolled in the interview study

								Organization of CCC system				
											Calves in CCC system	
Host farm	No. cows/ yr	Cow breed[1]	Calving pattern	Milking system	Housing of CCC system[2]	Status of CCC	Experience with CCC	Time with dam	Time with foster cow	Daily contact time	Replace heifers	Other calves
A	265	Cross	May–August	Carousel	Deep litter, slats and pasture	Active	24 yr	4 d	—	All day	Yes	Yes
B	80	Cross	All year	Parlor	Deep litter	Stopped[3]	4 mo	8 wk	—	All day	Yes	Yes
C	250	Cross	October–December	Parlor	Deep litter and cubicles	Active	1 yr	1 d	6 mo	2 × 1 h daily	Yes	Sold ~2 wk
D	230	Jersey	All year	Robots	Deep litter	Stopped[3]	5 mo	10–15 d	2 mo	All day	Yes	Yes
E	270	Jersey	All year	Carousel	Deep litter and pasture	On-off	4 yr	2 d	Sold[4]	All day	No	Yes
F	150	Cross	All year	Robots	Deep litter	Active	1 yr	2–3 wk	3–4 mo	All day[5]	Yes	Yes
G	120	Jersey	April–August	Parlor	Deep litter and pasture	Active	2 yr	3 mo	—	Part-time, night	Yes	Sold ~2 wk
H	180	Cross	All year	Parlor	Deep litter	Stopped[3]	1 yr	2–3 mo	—	All day	Yes	Sold ~2 wk
I	50	Jersey	July–October	Tethered	Deep litter	Active	30 yr	3–5 mo	—	Part-time, night	Yes	Sold ~8 wk
J	53	Jersey	May–July	Parlor	Deep litter and pasture	Active	20 yr	4–7 d	4–5 mo	All day[6]	Yes	Sold ~2 wk
K	180	Holstein-Friesian	June–September	Parlor	Cubicles and pasture	Active	2 yr	3–4 mo	—	Part-time[7]	Yes	Yes
L	55	Cross	June–August	(Mobile) Parlor	Deep litter	Active	20 yr	1–2 d	3 mo	All day	Yes	Yes

[1]Breeds used for crossing were Holstein-Friesian, Jersey, and Danish Red.

[2]CCC = cow-calf contact.

[3]Farmer H managed all cows and calves in a CCC system for a period before discontinuing, and farmers B and D tried the system out on a subset of animals.

[4]The farmer sold sets of foster cow with ~4 calves after bonding.

[5]The cows had access to pasture after exiting the milking parlor, where the calves could not follow. However, the cows would normally return directly to their calves, rather than go to pasture.

[6]During the first days after birth, until enough calves were ready for bonding to a foster cow, the calves stayed indoors while the cows were out on pasture during the day.

[7]Calves had the opportunity to follow their dam out to pasture, but if they did not immediately after milking, they had to stay in the barn until the next opportunity, at the next milking. Most calves chose to stay in the barn.

Practical Considerations. The most repeated theme across all interviews regarding the motivation to adopt a CCC system was a perception of ease of management, especially concerning daily routines and practical arrangements on the farm. Some farmers had chosen a CCC system many years ago when first buying their farm because they perceived it as the easiest approach and it made calf hutches, milk taxis, and other equipment unnecessary. Therefore, they had simpler farm structures and could rearrange their work time because the calves did not need to be fed at 2 set times daily. For example, farmers J and L described that having a small farm with little or no extra staff fitted well with a CCC system because they did not need a specific calf caretaker other than the cows. This sense of flexibility and reduced labor was also identified in other studies investigating dam-calf contact in, respectively, Norway (Hansen et al., 2023) and New Zealand (Neave et al., 2022), while the study by Vaarst et al. (2020) on Danish and Dutch farmers pointed more toward a change in the type of labor but not a reduction. This change in labor type was also echoed by farmer J in the present study, who described how they preferred to spend the time observing calves instead of feeding them and cleaning after them. According to a survey conducted across 6 European Union countries, which included a broad range of CCC systems (Eriksson et al., 2022), the majority of farmers reported a reduction in labor. However, some farmers reported no change or an increase in labor, particularly in part-time systems where animals had to be moved frequently throughout the day to reunite and separate calves or cows independently of milking times. In the present study, only 1 farmer practiced several short daily periods of contact, and they were moving away from this system to a simpler version with only 1 daily separation period to reduce the labor of moving calves. In other cases, the decision to change was described as originating from the need to address some issue. One example of this was farmer K, who recently had taken over new farm facilities and moved their animals there due to better grazing opportunities. However, at this new farm, no suitable calf housing existed; therefore, the owners chose to leave the calves with the cows in the freestall barn with cubicles:

> "In 2016, we took over the farm where we have the milk production today, and then, because there were no heifers or calf barn. the setup was not quite as one could have wished for, for the small calves. . . . We decided to let the calves be with the cows instead since it was the easiest solution at the time . . . and then it just kind of continued that way [. . .] then they [the calves] were taken care of." [Farmer K]

Another example was farmer A, who had a major issue with Johne's disease when taking over the farm, and they struggled to break the contagious cycle in the calving area. The solution became to have the cows calving outside, where plenty of space and fresh air exist. They changed to a seasonal calving system with spring and summer calving and decided to leave the cow and calf together without interfering for approximately 4 d, rather than trying to catch the calves and feed them colostrum out on the pasture. In the present study, 7 farms were run with seasonal calving, which was described to work well with CCC systems because during the most common spring and summer calving period, their barns were largely empty as young stock and cows were out on pasture most, if not all, of the time. This also allowed for lots of space for calving and bonding cows and calves to each other indoors, and for housing calves indoors if they did not follow the cow on pasture. As a third example of a practical issue motivating change, farmer F described a specific situation where a calf seemed unable to drink from either a bottle or a bucket. The calf became weak, and as a last resort, the farmer introduced it to a lactating cow. Immediately, the calf started to suckle and got better. The cow had milk for more, so the farmer added more calves, which developed into a new foster cow system.

In summary, farmers argued most often that they chose their CCC systems based on what would be practical and easy to manage. Indeed, during the interviews, a common story emerged about a shift in perspective of what was rational or easy. This shift was described as a revelation that followed the first step of change toward a CCC system. The revelation made the old, artificial system suddenly seem irrational. The new system then continued to grow because of this new perspective. The irrationality was largely related to a feeling of performing work that would naturally happen if cow and calf were left together, as described by farmer J:

> "It was mainly . . . it was less work, in the way that I preferred to observe the animals, rather than first milking the cows, then making sure the milk had the right temperature, teaching the calf to drink from a bucket, which isn't natural for them, cleaning the buckets, mucking out the small hutches. . . . I was just so tired of it, and it seemed completely foolish that I should spend time milking the cow and doing all of those things when it was something that would happen all naturally, right? So that was the motivation . . . it just had to be the easier way." [Farmer J]

Naturalness has been identified in different European contexts as crucial to the understanding of animal welfare in organic farming (Lund, 2006; Vaarst and Alrøe, 2012), including meeting the natural needs and motivations of animals. In this context, "natural" is not understood as "how things are in nature" but is closely connected to an ethical responsibility to care for the animals taken into one's custody, in terms of intervening when necessary. All of the interviewed farmers in the present study were organic farmers, and thus the perspective of using the natural behavior of cows and calves may have been an obvious point of reference to follow when organizing the farm.

Ethical Responsibility

Only 3 farmers mentioned ethical considerations as an initial motivator for deciding on a CCC system: two had dam-calf systems, and the third had a hybrid system. The ethical perspectives farmers mentioned related to naturalness and sustainability:

> "It came from within. . . . Both my wife and I . . . we always thought that . . . if we decided we wanted to be independent farmers, then we wanted to do it our way, not to stand out from others, but we just had some ideas about how it should be done. . . . We wanted to get as close to nature as we could while also being able to live off it." [Farmer I]

Until 2 years ago, farmer I had a hybrid system in which all calves had some initial weeks with their dams before being fostered. Two years ago, they changed to only having dam-calf contact, arguing that it was more humane to the cow, even though it was less practical for the farmer. They felt that it was important that the cow's welfare was prioritized, too, and that this could only be achieved if each cow kept her own calf, reflecting the fairness aspect of the IFOAM principles of organic farming (IFOAM, 2005). On farm G, which also practiced dam-calf contact, the dairy farm was run as a part of a large collective with a considerable focus on sustainability, and for them, a sense of increased naturalness when each cow rears her calf was described as a main driver for choosing a CCC system.

Farmer F, managing a hybrid system, described a hope to "do better for both cows and calves" when asked about the motivation to change. When asked to elaborate, the farmer described how behaviors such as cross-sucking [i.e., abnormal behavior in dairy calves (Veissier et al., 2013)] indicated that something was wrong and that having to drink large quantities of milk in only 2 daily feedings was hard for the calves. The farmer stated that it did not feel nice to manage the animals this way and attributed that to the lack of naturalness in the system. However, the farmer had chosen to move the calves to a foster cow after a few initial weeks with the dam, to be able to produce more salable milk. As was also found in the study by Vaarst et al. (2020), multiple farmers mentioned, like farmer F, that having CCC "felt nice" in the sense that they felt good when they saw a cow and a calf together and it gave them a sense of satisfaction to watch the cow perform maternal behavior:

> "Oh well, then they were allowed to stay for another day, and that turned into 1 more day, and then more. . . . Yeah, it was just the joy of seeing cows and calves together [. . .] there is just nothing better than seeing a cow and her calf lying together in the straw." [Farmer K]

The sense of satisfaction seemed to follow as a secondary benefit more than an initial motivator but still seemed to relate to a sense of managing a more ethical system. Farmers shared these perspectives across the different types of CCC systems. In the study by Hansen et al. (2023) farmers who have CCC were identified as having a special interest in animal welfare as they agreed more with statements such as "The cow has not equally good welfare without CCC" and "CCC provides good animal welfare" (Hansen et al., 2023). In the present study, only 3 farmers directly mentioned "animal welfare" as one of the primary motivations for having CCC, and they did so in relation to naturalness. In organic agriculture, introducing naturalness in the farming system as a way of providing the animals better animal welfare, has been debated in the literature, especially in the years when organic animal farming was increasing (Lund, 2006; Verhoog et al., 2007; Vaarst and Alrøe, 2012). As highlighted above, "natural" in this context is not understood as "being like in nature," where animals also are subjected to predators, hunger, thirst, and other dangers. The concept refers to the farm context, where the human caregivers take responsibility to care and intervene when necessary to avoid suffering. Lund et al. (2004) unfolded it as an ethical responsibility to allow animals naturalness and thereby meet their natural needs as much as possible, but at the same time ensure their well-being through care and intervention when necessary.

However, the present study included a broad range of CCC systems, including foster cow systems, which can be argued to not allow the same level of fairness (IFOAM, 2005) as dam-calf systems, since it does not allow all cows to meet their natural needs and motivations to perform maternal care. In contrast, foster cow

systems can still ensure that the calf can suckle milk from a cow and have social interactions with a cow. Thus, the inclusion of foster cow systems in the present study may have changed the focus away from animal welfare as seen from a more ethical fairness perspective (IFOAM, 2005) and more toward a naturalness and physical functioning perspective (Fraser, 2008) while focusing on the calf.

Image

Three farmers mentioned their image from a consumer's point of view as an important motivation for change. These 3 farms (B, D, G) all had farm shops, and therefore consumers visited their farms. They believed it looked better to "non-farm-educated" people when cow and calf were together, as described by farmer D, and liked to show the system to guests:

> "I think it means a lot [for the motivation] that we have that [on-farm sale of ice cream]. People who come here to buy an ice cream can tour the farm, and . . . it is something they can understand, people from the city, they can relate to that [seeing cows and calves together]." [Farmer D]

It thus seemed that at least part of the motivation to change was driven by the external pressure of society's expectations, but that it specifically became a driver when consumers or visitors had free access to the farm. As the public is showing an increasingly critical view of some practices in the current dairy industry, such as the handling of bull calves (Ritter et al., 2022), zero-grazing, as well as the early separation of cow and calf (Busch et al., 2017; Hötzel et al., 2017) the motivation to change to CCC driven by public image may become increasingly important. However, many citizens also express that they are not aware of these practices and they thus only reject them when being made aware (Placzek et al., 2021), which also points to the need for aligning expectations and sharing knowledge between producers and citizens. This may also be part of the explanation as to why citizens do not always reflect their opinions on animal welfare in their consumption patterns (Vanhonacker et al., 2010).

Economy

Just 1 farmer (farmer H) described an initial motivation for choosing a CCC system related to economy. They believed that the milk produced in a dam-calf system was worth a large premium and should be sold at a higher price. However, farmer H discontinued their system because they were not currently able to get a higher milk price from the dairy.

> "There are two motivations for that [having a CCC system]. First, I am convinced that you can get a really good milk price, and second, I believe I can remove my calf barn. I really believe in it." [Farmer H]

The perspective of CCC as the facilitator of an improved economy is not common in the literature other than when connected to less labor (Eriksson et al., 2022; Hansen et al., 2023) or improved health and growth of calves (Hansen et al., 2023), but in those cases, they are mentioned as ways of making up for the decrease in salable milk, not as economic incentives themselves. However, in the study by Knierim et al. (2020), they presented a case comparison of the full accounting of, respectively, a dam-calf system and an artificial rearing system and found that at least in some cases, dam-calf systems may improve net profits.

Farmers were asked to describe their version of a CCC system and what had influenced their choices in the process of developing the system. The 2 themes, economy and practicality, were largely intertwined for this research question and are thus presented together.

Practical and Economic Considerations

Salable Milk. All but 1 farmer who tried a dam-calf contact system reported a decrease in the amount of salable milk compared with an artificial system, as calves drank much more milk when suckling directly from the dam than they would normally when fed artificially. Some farmers expressed that they could or would not continue with a dam-calf contact system without compensation because the production price was too high. As mentioned earlier, farmer H described how the milk from a dam-calf contact system would be worth a higher price, and they had already tried out a successful dam-calf contact system but had discontinued it due to lacking compensation from the dairy. Farmer K, who had dam-calf contact due to the unavailability of calf housing facilities on their new farm, still considered moving the calves to another location and rearing them artificially instead. This was due to the decrease in salable milk under the current dam-calf contact system. Thus, for this farmer, financial compensation would be a strong motivation to stick with the system, although it was not the original driving motivation.

> "Ah, but if you could get that additional price, then I would probably prefer . . . to organize the system differently because it also needs a bit of

> investment if you want it to work optimally. You could make those investments, of course, but then you want to be sure to get the additional price. Otherwise, you would probably take those calves away, as most people do, and then rear them like most others, to get the higher yield from the cows." [Farmer K]

The reported decrease in salable milk was also one of the main reasons for farmers not wanting or discontinuing a CCC system in the study by Hansen et al. (2023). That dam-calf contact decreases the amount of salable milk is supported in the literature (Zipp, 2018; Barth, 2020). In the present study, the lack of compensation offered was thus described as the main reason for either stopping CCC or changing to a foster cow system when otherwise having the structural opportunity for a dam-calf contact system. The remaining 2 farms with active dam-calf contact systems were farms I and G, who did not consider discontinuing dam-calf contact. Farm I explained that dam-calf contact was not an issue with regards to the amount of salable milk, but it was more work than a foster cow system because they had to milk all of the cows. They had recently started selling their milk labeled as cow-calf milk to the dairy but without extra compensation. The farmer explained that they had been operating a CCC system for more than 3 decades and had managed to keep their debt to the bank relatively low. Therefore, maximizing profits from milk production was not a top priority for them.

Farm G was part of a large collective with an on-farm café and sale of milk, and they also delivered milk as a niche product directly to restaurants. They were thus able to sell some of their milk at a higher price, which somewhat reduced the concern about the decreased level of salable milk.

It thus seemed that the 2 farms with active dam-calf contact and plans to keep it had a farming system that allowed them to produce less salable milk without economic issues due to either being low-input/low-output or selling products at a higher price on-farm. The 3 active dam-calf contact systems were all effectively managed with part-time contact, chosen to increase the amount of salable milk [as also found by Barth (2020)]. However, calves with half-day contact are still able to suckle large amounts (Wenker et al., 2020; Roadknight et al., 2022) and may to some degree impair milk let-down (Barth, 2020; Nicolao et al., 2022), which will result in less salable milk than in an artificial rearing system. Indeed, one of the reasons that farmers chose foster cow systems was the economic benefits related to salable milk. Farmers mentioned that foster cow systems allowed them to choose how much milk they would allocate to the calf by adjusting the number of calves suckling each cow. Some farmers in the present study explained that they estimated their calves' milk intake in the foster system was similar to traditional levels in artificial rearing systems (approximately 6 L/d; Cantor et al., 2019). However, recent research points to calves being underfed on traditional milk allowances (Khan et al., 2011; Cantor et al., 2019), and thus care should be taken, when allocating several calves to a foster cow, that no calves will end up underfed. Farmer B also explained that the decrease in salable milk in their dam-calf contact systems was not only due to calves drinking a lot of milk but also due to issues with milk let-down when the cows were milked in the parlor. This issue is also reported in the literature (Fröberg et al., 2008; Zipp et al., 2016, 2018). The impaired milk let-down was the main reason that farmer B had discontinued their attempt at a dam-calf contact system. They described that if the cows had been willing to share the milk with the farmer, then the system had worked fine. None of the farmers with foster cow systems milked the foster cows, which meant that issues with milk let-down in the milking parlor were not a concern. This perspective was also reflected by farmer L, who had chosen a foster cow system because they thought the milking cows should focus on being milking cows, and then the foster cows could focus on the calves:

> "She [the dam] starts worrying about the calf instead of focusing on being a milking cow [if they are left together]." [Farmer L]

The above perspectives on the cows underline how the milk is perceived as first a product to be sold. It can be speculated that a centuries-long emphasis on the production of milk and butter for export (Lampe and Sharp, 2018) still influences the general perceptions of cows as producers of milk for consumption.

Undesirable Milking Cows. Farmers pinpointed that by splitting the work between foster cows and milking cows, farmers had the opportunity to take certain, undesirable milking cows out of the lactating herd and let them take care of calves. The undesirable cows could have a high SCC or be lame, low-yielders, difficult to work with, or weak in the herd.

> "Then, if you have a high cell count cow, you can move it up there [to the foster cow system] for half a year, and then it can come back . . . so it is also a way to keep the cows longer. . . . If you can save or nurture 10 cows every year that otherwise would have been slaughtered because you were tired of herding them back and forth because they were lame or they had too high a cell count and you had to milk it out manually each day [.

> . .] So it can actually be a group of special-needs cows . . . it can be a cow with teats pointing in all directions—that is a good teaching cow—it's easy to get hold of, so it's good care for the calf, but it is also good care for the cow that otherwise would not fit in the system." [Farmer C]

As seen from the above quote, the use of undesirable milking cows as foster cows was both motivated by practicality and economy, but also a sense of giving the cow in question a different type of care and finding a place for her in the system. However, farmers did not discuss the ethical implications of using cows with impaired health status to care for calves. Studies on the welfare of foster cows are lacking and should focus on both the effects of the bonding process (Loberg and Lidfors, 2001), of nursing multiple calves and of weaning and separation (Loberg et al., 2008).

Another aspect exists, relating to the undesirable cows with high cell counts, that pushed farmers toward foster cow systems. In an artificial system, farmer G explained, high SCC milk was often fed to the calves by bucket, and thus not wasted. However, in a dam-calf contact system, cows with high SCC would be milked, in contrast to a foster cow system, and the milk discarded, since no calves were fed in buckets. Further, as mentioned by farmer G below, high cell count cows in a dam-calf contact system could not be culled, at least not during the calves' milk feeding period, whereas in foster cow systems they could either be culled or repurposed as foster cows which, in some cases, might allow the cow to recover from mastitis or a lameness issue.

> "We have 40 L a day [of high cell count milk] we throw out—actually twice a day—but that's also the problem, we have high cell count cows that could go [be culled], but we cannot let them go because they are with their calves! So, we just milk them in buckets for 3 months before we let them go." [Farmer G]

The issue raised about not being able to feed high cell count milk to calves in buckets because calves are suckling directly on the cows should also be considered from an ethical perspective, as feeding waste milk to calves may lead to detrimental health effects (Abb-Schwedler et al., 2014).

Housing and Space. All but 1 farm had their CCC system in deep-bedded straw when indoors. It was evident from the interviews that most of the farmers only perceived deep-bedded environments suitable for CCC, thus the presence of such buildings had enabled them to try a CCC system. Often, this enabled a foster cow system, because deep-bedded barns or pens often were located away from the milking parlor. Farmer D explained how on their farm, they would have preferred to have a dam-calf contact system, but due to having only a limited area of deep-bedding at a practical distance from the milking parlor, they had ended up with a hybrid system, where calves were moved to a foster cow in a different barn when there was no more room in the deep-bedded area close to the milking parlor.

> "Well, so, in the perfect world, right here at our place, the cow and her calf would stay together for 3 months or so. That would be the perfect situation. But . . . given the space requirements . . . we can't do it." [Farmer D]

Having whole-day dam-calf contact on organic farms during summer would require the calves to follow the cows onto pasture, which in turn would be costly in extra fencing for all the fields, and it was perceived as an issue if calves were to walk long distances for fresh pasture. Indeed, farmer K explained that because they also had sheep, all of their pastures were extra well-fenced, which meant that letting calves join the cows on the pasture was only an issue if they had to walk very far. Using a foster cow system, farmers only had to improve the fencing for a smaller part of the pastures. However, farmers with dam-calf contact systems in the present study had, as mentioned earlier, chosen a part-time system, which meant young calves could be kept indoors or in a smaller well-fenced yard while the cows were away on pasture.

In summary, in foster cow systems, cows and calves could be housed without consideration for access to the milking parlor, as foster cows were not milked, and during summer only some of the fences had to be calf-proofed to allow cows and calves pasture access. This meant that farmers could use simple barns with straw bedding or pieces of land for foster cows and calves, which was not suitable for milking cows, due to the infrastructure of the farm.

In the present study, having freestall housing with cubicles was a barrier for dam-contact systems (in Denmark 60% of dairy farms have freestalls with cubicles vs. 30% deep-bedded; Larsen, 2021), and farmers explained that if they wanted a dam-calf contact system they had to rebuild their cow barns and change to deep-bedded systems to accommodate the calves. The issue of building constraints related to implementing CCC systems was also identified in the studies by Vaarst et al. (2020), Eriksson et al. (2022), and Hansen et al. (2023). However, farmers in the Hansen et al. (2023) study who had changed to a CCC system mostly reported having spent little or no money to facilitate the new system. This is similar to the current study,

where none of the farmers had invested in new housing due to their choice of a CCC system. This discrepancy could be explained by farms with CCC systems already having deep-bedding when deciding on a CCC system, making it an enabling factor. Nonetheless, 1 farmer in the present study managed a dam-calf contact system in a freestall barn with cubicles. However, during the summer months, the cows grazed day and night, except during milking time, resulting in an empty cow barn for the calves to roam. Using a calving season ensured that there were no calves during the period when cows were housed indoors. On the other hand, experimental studies on dam-calf contact have been made in a variety of housing systems including freestall cubicle housing (Fröberg and Lidfors, 2009; Johnsen et al., 2015a; Waiblinger et al., 2020a; Wenker et al., 2021). None of these studies reported issues with the housing system. The common perspective of the interviewed farmers, that dam-calf contact should be in deep-bedded pens, may thus be challenged. Studies investigating the advantages and disadvantages of housing calves with cows on slats or solid floors with cubicles would be of great interest to farmers considering dam-calf contact and who do not have deep-bedded housing for the milking cows.

Detection of Illness. Farmer D described how they, in their artificial rearing system, were used to judging the calves' health status based on whether or not the calf quickly drank all the milk provided in buckets. This was however not possible with suckling calves. Despite using dam-calf contact systems, farmers C and K described how they, due to their part-time systems, were able to assess the health of the calves by observing their behavior when they were reunited with the cows after a period of separation. They identified several positive indicators of good health, such as the calves getting up promptly upon the cows' arrival, stretching their bodies, and hastening to suckle. This use of a daily separation to condense the time needed to observe the health of the calves was mentioned as a practical management tool, which also encouraged farmers to handle the calves daily. Farmer C believed this was the main reason their calves did not get "too wild." Literature on the health of calves in CCC systems shows conflicting results or often no difference from artificial rearing systems (Beaver et al., 2019). However, although standard operating procedures have been developed and refined for artificially reared calves through the years (Kertz et al., 2017), more knowledge is needed on the practical aspects of ensuring good physical health in dairy calves reared by cows.

Ethical Responsibility

As is evident from the above section, a range of economical and practical reasons exist for farmers to choose foster cow systems. Nonetheless, 3 of the interviewed farmers had active dam-calf contact systems throughout the milk feeding period (farms G, I, and K). As mentioned earlier, the motivation of both farmer G and I was largely based on ethical considerations. Nonetheless, calves were still separated from the dams after approximately 2 to 5 mo, which is still substantially earlier than the natural weaning age [expected to be somewhere between 7 and 14 mo (Reinhardt and Reinhardt, 1981; Veissier et al., 1990)], and only replacement heifers were fully raised in the CCC system, illustrating and that the farmers probably still were constrained by either economy or practicality. However, as mentioned earlier, farmer K had landed on a dam-calf contact system because of lacking calf housing and was considering discontinuing CCC because of the decrease in salable milk. However, farmer K was not considering switching to a foster cow system to mitigate the economic issues. Farmer K argued that foster cow systems could have ethical issues, at least if the produced milk was labeled as "cow-calf":

> "You have to ask yourself, should it [the calf] have access to a cow, or should it be its mother, or where are you at? . . . And should you be allowed to sell your bull calves because you don't bother to castrate and finish them, so they leave the system after 14 days? . . . And is the cow milked for the rest of her lactation for the additional profit anyway . . . or not? These are the type of issues there are. . . . What kind of guidelines should be made, so it is not just 'all my milk is cow-calf milk', even though you actually only have a foster cow system in one end with 25 calves and some cows, and then 200 cows that are managed in another system. . . . Then it becomes a bit too focused on the money, then the values are gone. [. . .] It has to do with ethics and morals then, then you need to inform the consumer about the foster cow system, otherwise it's a bit of a fraud." [Farmer K]

In this quote, farmer K touches on a range of ethical concerns for CCC systems related to the fairness of only allowing some cows (foster cows) and some calves (e.g., replacement heifers) the increased contact. However, farmer K also explained that they did not necessarily think dam-calf contact systems were more correct than foster cow systems, but that it was important not to deceive the consumer. As already discussed above, consumer and citizen attitudes are increasingly critical

to the common dairy industry, and these statements suggest a future need to communicate and search for a common understanding between dairy farmers, dairy companies and citizens, as well as consumer communities.

The time of permanent separation from the cow, and weaning off milk, differed between the farms, but most farmers weaned and separated close to 3 mo of age, which is the legal minimum milk feeding period for Danish organic farmers. When asked about the animal's reaction to the separation process farmers mentioned behavioral reactions, such as calling for each other and searching behavior for at least a couple of days. This was independent of whether it was a foster cow system or a dam-calf contact system. Some farmers had tried out different approaches to minimize the weaning and separation stress. Farmer J had found that decreasing the distance between the calves and cows after weaning improved the process,

> "Back when we started having them on pasture, in the beginning, when we separated them, we took them far away, but that only meant trouble—calves that broke out—but now, when they are only separated by a double fence-line, then it is just like they are still with the herd. . . . When the foster cows walk to one end, then the others also walk to that end, if they lie down, then they all lie down close to the fence . . . so even though they are each on their own side, they are still in the herd." [Farmer J]

However, farmer I had tried a weaning and separation strategy where they gradually closed a fence between the cows and calves more and more and then finally put cows and calves on each side of the feed table. Farmer I thought this had increased the period of stress because the cows had kept calling for longer than they did when separated suddenly and completely. In the present study, farmers across different CCC systems generally seemed to view the separation and weaning response seen after more than 3 mo of suckling as acceptable in the light of the positive effects cows and calves had during the time together, and none of the 3 farmers who had discontinued a CCC system did so because of separation stress. This differs somewhat from the study by Hansen et al. (2023), who found separation stress to be the main reason for farmers to discontinue a CCC system. Some farmers in the present study had tried out different approaches to ease the weaning and separation, but with mixed results. Research in dairy calves and cows generally shows that weaning with fence-line contact (Johnsen et al., 2015b; Wenker et al., 2022) or by increasing the calves' independence from the cow by introducing it to an alternative milk source (Johnsen et al., 2018) decreases weaning and separation stress. However, some farmers in the present study felt that it just prolonged the stressful period. Experiences on whether calves could be introduced to drinking milk from a bucket after weaning from the cow were very diverse. One farmer reported that it was no problem as long as the milk was nice and warm, but 2 others had given up on this approach because calves did not figure out how to drink the milk.

Farmers who practiced hybrid systems were faced with 2 rounds of separation, 1 for the calf and its own dam and then later for the calf and its foster cow. Some discrepancy was found in what was perceived as the best time to separate from the dam to bond the calf to a foster cow, which influenced the choice between hybrid systems and foster cow systems. On one hand, farmers with active hybrid systems (F and J) argued to initially leave the calf with the freshly calved dam to ensure well-established suckling. They argued that calves and their dams were more ready to be separated when the calf was no longer hiding (cattle are usually perceived as hider species, where the young hides during the initial days after birth; Langbein and Raasch, 2000) and started seeking out the dam (approx. 1–2 wk). Further, they argued that it was easier to create the foster groups, as the calves were experienced in suckling, so they would be able to suckle even a somewhat unwilling cow until she accepted. That later fostering may be easier was also found in the study by Vaarst et al. (2001).

However, this perspective differed greatly from farmers D and L, who felt that in a foster cow system, cow and calf should be separated soon after birth because leaving them together for 1 to 2 wk and then separating them was too hard on the dam:

> "In my head, they should be together [calf and dam] . . . for 3, if not 4, months. Otherwise, it's about getting that calf to the foster cow as quickly as possible. . . because I don't like to see how it is after 14 days [of the dam and calf together], like some do it. . . . It was clear, the more days together bonded them in a way that was harder for the dam. . . . It wasn't beneficial. . . . It was the worst for the dam—it was multiple days . . . of her pacing and calling. [. . .] The calves took it pretty well, they just suckled another cow down there [in the foster group]." [Farmer D]

In summary, farmers had mixed perspectives about a semi-early (a few days to a few weeks) separation from the dam. For some farmers, even a short period of contact between the calf and its dam was valuable enough

to justify the increased weaning and separation stress or they felt like the cow and calf were more ready to be separated after a few weeks, than right after birth. In contrast, some farmers strongly felt that separating a dam and her calf should happen as early as possible (and then transfer the calf to a foster cow) to especially spare the cow from bonding to the calf. Experimental studies have shown that separation after 4 d or 14 d results in intense behavioral responses, lasting for days, compared with when separating within 1 d (Flower and Weary, 2001; Weary and Chua, 2000). However, little is known about the respective benefits of dam-calf contact versus foster cow contact, and thus more research is needed to compare the effects of hybrid and foster cow systems.

Image

Largely, farmers did not elaborate on their image in the eye of the consumers as a guiding factor for how they managed their CCC systems. However, through the interviews, it became apparent that some farmers were influenced by how they were perceived in the general farming community. Though rarely articulated directly, especially farmers from the largest farms seemed reluctant to stand out from the general farming community, especially if being identified as particularly animal welfare friendly. They emphasized that their CCC system had not been motivated primarily by animal welfare arguments in the first place. Hence, they did not want to be seen as, as 1 farmer put it, "organic hippies" or "welfare gurus":

> "I like to . . . have cow and calf together. . . . I don't mind it . . . but that is not the motivation to do it. . . . It's not to be some welfare guru. . . . It was simply less labor." [Farmer C]

Through the interviews, farmers seemed to categorize themselves and other farmers into "us" and "them." Some farmers with larger farms expressed that they may not be able to manage their farms in the same way as smaller farms in terms of CCC. They felt that larger farms require a different type of structure and control to be effectively managed. Indeed, Vaarst et al. (2020) pinpointed that readiness to lose some level of control and increase trust in the animals may be necessary to run a CCC system. Eriksson et al. (2022) found that 1 characteristic of farms with CCC was smaller farm sizes (number of animals). In the present study, some farmers from the larger farms also seemed concerned that they could be perceived as incompetent if choosing a dam-calf contact system, as they used the amount of salable milk as a measure for comparison.

Earlier studies in a Danish context found similar experiences in the process of converting to organic production (Tress, 2001), where the social norms in farmer communities made converting farmers refer more to economic or practical reasons for their decisions to convert because these arguments were perceived as more valid and did not carry any criticism of other systems. However, the step to convert to nontraditional systems may also create stronger links between those taking initiative to new production systems, such as organic farming, as also discussed by Lähdesmäki et al. (2019). The surrounding society's perception may stimulate conversion, as discussed by Bouttes et al. (2019), and the network of peers was emphasized by Home et al. (2019). In relation to CCC systems, colleague interactions in farmer groups were shown as important to support each other in developing CCC systems, finding practical solutions, and also increasingly agreeing that foster cow systems were more feasible under current Danish conditions (Vaarst and Christiansen, 2023 [unpublished data]).

Another concern in relation to farmers' self-concept was the fear of having "wild animals," which some farmers associated with being a bad farmer. Due to CCC calves not associating humans with milk feeding and often being in less close contact with humans than artificially reared calves, farmers either feared or had experienced their calves to be less tame. Indeed, calves have been shown to be less interested in humans when reared by a cow than artificially (Waiblinger et al., 2020b).

Farmer D described how they take pride in having calm animals:

> "We brag about our calm animals. . . . They almost "attack" us when we get in [the barn], and people tell us that, from the outside, that wow, they are very attention seeking. [. . .] Raising cows that are comfortable around humans is something a farmer should spend some resources on . . . because it's so annoying to have animals that won't attack you when you arrive—in a good way, of course. It should not be like Moses at the Red Sea. If it's like that, then you should start to get worried that you are doing something wrong . . . you want to zigzag between your cows." [Farmer D]

Some farmers mentioned how they consciously tried to avoid allowing calves to become too wild. A couple of farmers hired young, uneducated help to come and spend time with the calves a couple of times a week. Farmer I stated that they housed calves in an easily accessible spot, where the farmer took care to answer all phone calls, to familiarize the calves with human

contact. Farmer C was in the process of changing to a more traditional foster cow system, rather than a part-time system with 2 daily suckling periods, and had put extra thought into keeping the calves calm:

> "We are going to take the calves away for 4 to 6 hours a day to still get that handling. . . . I also think it can be a bit of a stressful life to be a foster cow because there is never a quiet time, so I think they will appreciate it too. [. . .] But with the daily separation, we can handle the calves and see that they suckle well when they reunite, and we can spot a weak calf and make sure they don't get too wild." [Farmer C]

However, 1 group of farmers who had been using CCC systems longer had a different perspective, pointing out that the CCC calves changed and became less wild as they got older, and thus these farmers were not worried about the young animals being more fearful. Indeed, in the study by Waiblinger et al. (2020b), no difference was seen in the human-animal relationship when the animals were tested at the time of inclusion in the lactating herd.

Welfare Benefits for the Calf. When asked about how the calves' welfare benefited from the chosen CCC system regarding the care, nutrition, and learning perspectives identified by Vaarst et al. (2020), farmers generally struggled to prioritize these aspects and felt that they overlapped or were equally important. In general, it seemed that farmers agreed that the benefits for calves in a CCC system were covered by the 3 flashcards, as only 1 farmer used the fourth "other" flashcard. For that reason, this part of the interview turned out to mainly touch upon 1 theme: care is care.

As it happened, throughout the interviews, in contrast to the findings of Vaarst et al. (2020) and Hansen et al. (2023), most farmers in the present study did not seem to be strongly motivated by animal welfare reasons in choosing CCC systems. However, they mentioned naturalness and health as important, and both can be seen as strongly related to animal welfare (Fraser, 2008). This could suggest that the term "animal welfare," which was used to introduce the last research question, is not a preferred or familiar term for the farmers. A discussion on the potential bias of the interviewer and interview guide in relation to the concept of animal welfare is given in "Methodological Considerations." Nonetheless, farmers did try to prioritize the flashcards with the 3 aspects of calf benefits while describing their ideas and perspectives. As mentioned, 1 farmer did use the "other" flashcard; this was farmer H, who specifically stated that natural behavior was the most important aspect of welfare benefits that calves could gain in a CCC system.

> "Animal welfare is not the right word, it should have been called natural behavior. . . . Like it says in the organic rules by the way, that's more important . . . it's just more correct." [Farmer H]

Despite struggles to prioritize the 3 perspectives, care was always prioritized as the first or the second perspective. This was related to the care elicited by cows toward the calves, such as licking and grooming:

> "I think that care from the cow is the most important thing . . . but I don't know why. . . . It's because . . . they are like babies that need safety and . . . well, I am really surprised about how much the small calves are being licked—some of them are always wet! And we also had calves that couldn't figure out how to drink from their cow, but they were so fond of each other anyway, even though they got their milk from us. (. . .) I don't know how it works, but there is a bond beyond the milk." [Farmer F]

One common perception was that from the calves' perspective, it was not important whether it was its own dam or a foster cow who took care of it, as long as it was cared for and allowed to suckle.

> "Once the calves have a full belly, they are ready to go and lie down . . . then it's actually more the cow who is worried about the calf, rather than the calf worrying about the cow . . . then the cow isn't so important." [Farmer K]

Therefore, the care elicited by foster cows seemed to be considered equally as good for the calf as care from the dam.

> "But the deal with letting dam and calf stay together, right, the whole mother-daughter feeling we are supposed to feel inside: the calf doesn't care one bit. To the calf, a cow is a cow." [Farmer C]

This statement was supported by farmer I, who focused on the welfare of the cow in choosing a dam-calf contact system.

> "We need to keep in mind the cow's needs, too! (. . .) I think that for the calf, it doesn't matter so much welfare-wise [whether it is the calf's own

dam] because for the calf it is about getting some milk and surviving." [Farmer I]

Farmers also expected calves to benefit from a nutritional aspect, such as having multiple smaller meals of milk at the right temperature, but most farmers felt that caring for the calf included nursing it and thus did not prioritize the nutritional aspect in itself. Only on the farm where calves were with the foster cows for 2 × 1 h a day (farm C) did the farmer specifically state that the first prioritized benefit was nutritional because it ensured that the milk was delivered at the right temperature and had not been contaminated through the handling process. Learning was prioritized quite differently among farmers. Farmers who prioritized this aspect described how when, and only if, the calf was allowed access to the same environment and resources as the cow, the calf had the opportunity to learn from the cow how to interact with the farm environment in the best way. Calves were mentioned to learn a variety of behaviors, such as eating solid feeds, navigating the barn, and correctly lying in cubicles rather than on the slats.

"Well I believe it is crucial that the calf has free access to feed, I mean the natural development where they see the mother eat hay, silage, and concentrate, so they also eat more and more of that, and that is also what the gut should develop toward . . . that's why it has 4 stomachs, that is not to drink milk, it just isn't." [Farmer I]

Little literature exists on how calves learn from cows and more broadly the effect of CCC on dairy calves' social and cognitive skills. However, some studies have found that calves reared with the dam have more appropriate responses in social situations and cope better with the novelty of regrouping (Stěhulová et al., 2008; Zipp and Knierim, 2020), and calves housed in a complex environment with both cows and other calves performed better in a reversal learning task than calves reared individually (Meagher et al., 2015) and were more likely to eat when presented with a novel feed type (Costa et al., 2014).

In summary, farmers with different versions of CCC did not differ in how they described calves to benefit from their CCC system. There is a lack of research comparing the effects of different versions of CCC on the welfare of the calf, but also on the welfare of the cow. Even though farmers perceive calves to benefit equally from different CCC systems, as long as they were allowed to suckle, this does not take into account the welfare of the cows. The motivation of the cows [as demonstrated by Wenker et al. (2020)] to care for their offspring cannot be met, for all cows, in a foster cow system and only for a shorter period in a hybrid system, compared with dam-calf contact systems. This indicates that the calves' welfare is prioritized in CCC systems with hybrid or foster cows.

Methodological Considerations. The nature of the present semi-structured qualitative interview study does not allow for generalizations, and care should be taken to understand the perspectives of the farmers in their contexts. The large diversity in types of CCC systems included in the present interview study allowed us to explore very different perspectives but also means that no strong, general conclusions can be drawn for each of the CCC systems. The diversity of farmers in the present study is strengthened by the inclusion of farmers that had tried to establish a CCC system, but for different reasons stopped after 4 to 12 mo. All interviewed farmers from the 12 farms involved in this study were shareholders of 1 of 2 relatively small, organic dairy companies where CCC systems were not a part of the payment agreement within the company (at the time of the interviews). Even though their CCC systems were very different and had been established anywhere between 1 and 30 years ago, it cannot be excluded that their common backgrounds in the same dairy companies could have influenced their visions and perspectives, although this was not explored as part of the interviews.

One of the 3 research questions explored in the present study was based on a previous study, which had identified 3 main aspects relating to the benefits of a CCC system from the calves' perspective (Vaarst et al., 2020). In the present study, these 3 aspects were included with the aim to investigate whether a correlation exists between chosen CCC systems and which welfare benefits were prioritized. When introducing the research question during the interviews, the interviewer used the term "animal welfare" before introducing the flashcards, which were used as prompts. However, farmers in the present study seemed unfamiliar with the use of the term animal welfare and did not recognize this as a main reason to choose a CCC system. Therefore, farmers may have been uncomfortable with how to respond to this part of the interview. Nonetheless, farmers could recognize the 3 aspects and agreed that they were important elements of what the calf gained from a CCC system.

CONCLUSIONS

The present study gives a picture of an emerging practice of establishing CCC systems in Danish organic dairy herds. The farmers' main motivations were related to practical considerations and a sense of ratio-

nality, and farmers described elements of naturalness and joy related to seeing a cow and calf together. Farmers also described major barriers to establishing CCC systems, and in particular dam-calf contact systems, such as financial constraints and structural challenges, for example having invested in housing systems that required major changes if they should provide space and facilities for CCC systems. Because the present study included farms with part-time dam-calf contact, hybrid systems, and foster cow systems, we were introduced to how and why these alternatives were seen as ways to manage these barriers. Part-time contact facilitated dam-calf contact systems by increasing the amount of salable milk and allowing cows access to pasture during the day without having to calf-proof all fencing. Foster cow systems may be the most feasible CCC system to implement in current farm settings because it fully circumvents the 2 main barriers of dam-calf contact. However, none of the CCC systems seemed to solve the last main barrier, the weaning and separation stress, but in the present study, farmers generally accepted some stress by the end of the milk feeding period, as it was weighted up against the positive effects of the contact period. Public image was only a primary driver for CCC for farmers with on-farm visitors, but some farmers showed considerations regarding their image and how they might be perceived by their peers as competent and professional.

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