RESEARCH ARTICLE

Cow calf contact in dairy herds viewed from the perspectives of calves, cows, humans and the farming system. Farmers' perceptions and experiences related to dam-rearing systems

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HIGHLIGHTS

- **Dam-rearing is practiced in a wealth of different systems.**
- **A study based on research interviews revealed four main perspectives to address, namely those of the calf, the cow, the human, and the farming system.**
- **Dam-rearing contributes to nutrition, care, and learning and meets many aspects of the organic IFOAM principles, particularly regarding fairness.**
- **Farmers need to reorganize the dairy farming system including their own way of viewing their animals in systems, which allow contact between cows and calves.**

KEYWORDS **organic dairy farming, dam-rearing, mother-bonded calf rearing, extended suckling systems, cow-calf contact, farmer practices, farmer experience**

Abstract

A common practice in dairy farming is to remove the calf from its mother a few hours after birth. The public debate on the subject has increased, and views on whether the calf should be allowed to stay with its dam for weeks are debated among citizens, farmers, and advisors. The aim of this article is to present, analyse, and discuss experiences and arguments on dam-rearing of calves through interviews with actors, primarily farmers, involved in organic dairy farming in four European countries. The interviews showed that dam-rearing is practiced in a wealth of different systems, and four main points of view should be considered: that of the calf, the cow, the farmer, and the farming system. Three important qualities of cow calf contact systems are described from the animals' perspective: 1) nutrition, 2) care, and 3) learning.

The discussion included ethical considerations referring to the principle of fairness as expressed by the International Federation of Organic Agriculture Movements (IFOAM). Well-balanced and managed dam-rearing systems are suggested to contribute significantly to the physiological development and natural behaviour of mother cows and calves. The calves obtain capacities and skills through learning from the dam and others in the system. Major efforts are required when organising suitable calf- and cow-friendly dam-rearing systems, and farmer observations must be more careful because they take place in a group and therefore need to account for complex situations. In doing this, the farmer shows animals respect, and treats them justly as part of the ethical alliance between animals and humans cohabiting on a farm. Farmers' trust in the capabilities of the animals – such as the cow's ability to look after the calf and the calf's capability to live in a complex dairy system – seems to partly break with some of the animal husbandry qualities that are often considered important when taking care of cows and calves in a system with early separation. "Being in control" in new ways than previously was identified as a key for human learning in these systems as a part of the shifting focus when observing animals and spending time with cows and calves differently. In a cow calf contact system, the humans need relies to a higher

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degree on being able to observe and judge a complex situation than, for example, on giving the calves exactly the same amount of milk of a specific temperature at the same times every day.

1 Introduction

Under natural conditions, cattle live in herds, in which they synchronise their activities such as grazing, ruminating, and resting together. The pre-parturient cow will seek isolation to calve in sheltered areas (Lidfors et al., 1994); here, strong bonds between calf and dam develop within hours of birth. Disturbance increases the risk of mis-mothering (Edwards, 1983), although the dam (here defined as the mother cow) is hormonally prepared to care for her calf until 6 to 14 months of age (e.g. discussed by Flower and Weary, 2001). When returning to the herd, the calf stays within the herd and is cared for and nursed by its mother five to nine times daily in the first weeks of life (Jensen, 2011; Fröberg and Lidfors, 2009). The bond is both nutritional and social and also encompasses social learning and exchange of affiliative behaviours (Mogi et al., 2011; Newberry and Swanson, 2008).

These aspects of natural needs, motivations, and behaviours have been largely ignored in organic dairy farming, although they refer to principles of care, fairness, ecology, and health (IFOAM, 2005). The practice of separating cow and calf immediately after birth has been broadly accepted as a normal practice of professional dairy farming. This is based on main arguments that especially address: 1) risks of disease transfer; 2) the amount of saleable milk, which there is less of when the calf is drinking ad libitum (Meagher et al., 2019); 3) that calf and cow may find it more traumatic and suffer being separated when the bond has been established and built up over a period of time, compared to separation immediately after birth (Weary and Chua, 2000; debated by Johnsen et al., 2016); and 4) that there is less human contact with calves in mother-bonded systems, and this can potentially lead to more difficult handling ('wild animals' or aggressive behaviour towards humans when a cow wants to defend her calf). These arguments seem to justify not only the separation of calf from cow immediately after birth but also the abrupt way in which it normally happens. However, over the last few years, interest in cow-calf contact systems has been growing, and more people have increasingly questioned early cow-calf separation in dairy farming. On the other hand, some farmers have practised dam-rearing for decades, e.g. in Dutch systems, following the so-called 'family herd concept' (Dixhoorn et al., 2010; Verwer et al., 2018). Furthermore, an increasing number of ethological studies have pointed to the benefits for the calves of having access to maternal care, learning, and socialising (Mogi et al., 2011). Several studies have documented higher growth rates of calves in dam-rearing systems, partly explained by the higher amount of milk (Grøndahl et al., 2007; Ivemeyer et al., 2016; Kälber and Barth, 2014). Practical experience has also shown benefits of cow-calf contact systems in terms of lower disease incidence and mortality rates when compared to artificially reared calves (Wagenaar and Langhout, 2007; Kälber and Barth, 2014). An increasing number of herds have started adopting different forms of cow-calf contact systems, some of which are dam-rearing systems, partly as a response to the growing public debate and awareness about ethical alliances between humans and farmed animals.

With regard to the legislation in organic farming, mother-bonded rearing or any other form of cow-calf contact system is not addressed beyond the source of milk: "All young mammals shall be fed on maternal milk in preference to natural milk, for a minimum period of three months for bovines including bubalus and bison species and equidae, 45 days for sheep and goats and 40 days for pigs"[5]. The EU regulation applies in France and the Netherlands with no further specifications. In Denmark, calves must stay with their mothers for a minimum of 24 hours, and calves must be in groups (a minimum of two animals) from the age of one week, but no further specifications apply. Norway is not a member of the EU but follows the EU regulations with some additional regulations, for example, the calf should suckle its mother for three days. Furthermore, according to the Norwegian national regulation generally on cattle husbandry, calves should be able to drink from calf feeders with artificial teats until they are one month old if the suckling period is shorter than one month[6]. According to the organic guidelines, separation should happen gradually: "Dam and calf should be separated gradually after the suckling period. Having some physical contact during the separation process reduces stress for both dam and calf"[7]. Some private organic labels in some European countries mention cow-calf rearing or prolonged suckling, sometimes with specific rules. For instance, the Norwegian Animal Protection Label states that calves must be together half of every day for the first six weeks. Besides, some on-farm processed dairy products mention different forms of cow-calf contact systems.

Studies have shown that dam-calf rearing requires changes in the daily practices and long-term priorities of farms when compared to systems with early separation of calves and cows. Farmers may need to observe and interact differently than when rearing calves separately from the cows, which can be challenging. Perceptions, experience, and strategies shape the priorities of individual farmers, and advisors and colleagues may be influential as farmer partners. Hence, besides technical aspects, the transition to new innovative practices needs changes in human and social perceptions and actions (Padel et al., 2015; Ivemeyer et al., 2015).

Growing interest and curiosity about dam-rearing is making it relevant to explore the possibilities for implementing these systems in different types of farming systems. The required changes in daily practice when shifting to novel systems, including the ways of observing animals and perceiving animal husbandry, calls for a focus on experiences

[5] The Commission Regulation (EC) No. 889/2008 of 5 September 2008, Chapter 2, Section 3, Article 20.1.

[6] Norwegian Regulation No. FOR-2004-04-22-665 on cattle farming.

[7] https://www.mattilsynet.no/om_mattilsynet/gjeldende_regelverk/veiledere/veileder_for_okologisk_landbruk.2651/binary/Veileder%20for%20økologisk%20landbruk (in Norwegian; p 34)

and concerns regarding the management of cows and calves in dam-rearing systems.

This article aims to present, analyse, and discuss experiences of and arguments on dam-rearing of calves through interviews with organic dairy farmers in four European countries. The analysis in particular focuses on ethical considerations related to the organic IFOAM principle of fairness as a lens through which calves, cows, farmers, and sustainable farming systems can be viewed in the discussion of contradictions around fitting animals or fitting (dairy farming and food) systems.

2 Materials and methods

2.1 The GrazyDaiSy project and its research approach

The GrazyDaiSy project is a European CORE Organic project that aims at developing innovative, resilient, and sustainable organic, grazing-based dairy systems within different economic and agro-ecological contexts within Europe. It focuses, among other things, on the rearing of cows with young stock, e.g. allowing mother-infant contact. In this study, we focused on dam-rearing systems, which in this study we understand as calves being together with their own mother for a minimum of two to three weeks after birth. This article explores the perceptions, practices, challenges, and benefits of dam-rearing in four different European countries (France, Norway, the Netherlands, and Denmark), which represent each a special context for cow calf contact systems. The study is based on semi-qualitative research interview methods in Denmark, Norway, and France in combination with an analysis of 12 years of on-farm research on the topic in the Netherlands.

2.2 Data collection and analysis

In Denmark, 15 interviews were conducted (see *Table 1*): (A) 11 face-to-face digitally recorded and transcribed interviews in June to August 2018 with Danish farmers who either had some experience in dam-rearing or had expressed interest in dam-rearing systems but who used other calf rearing systems (from early separation to foster cow systems), and (B) 4 over-the-phone interviews with farmers who had participated in a study trip to the Netherlands and Germany to explore cow-calf contact systems (interview length 32 to 53 minutes). All interviews were (A) transcribed or (B) summarised and then analysed by the first-author in Nvivo® using

TABLE 1

Description of the interview methods and the first analysis done per set of interviews. After this, a joint analysis was done across the seven sub-studies, where a common frame was used to analyse the results from the perspectives of the different actors: calves, cows, farmers, and farming system.

Country	Study	No. farmers	Method of interview	Method of analysis per set of interviews
DK	(A) Perceptions of dam rearing and experiences of calf management	11	Semi-structured qualitative face-to-face interviews, voice recorded and transcribed	Analysed by the first-author in Nvivo® using meaning condensates, which were collected into themes for each of the studies (A and B), which were analysed separately.
	(B) Impressions of cow-calf contact systems after a study trip to the Netherlands and Germany	4	Semi-structured qualitative phone interviews, noted down during the interview	
F	Farmer experiences with cow-calf contact systems	3	Semi-structured qualitative face-to-face interviews, voice recorded and transcribed	Each farm described as a case study. All case studies were summarised, highlighting similarities and contrasts, opportunities and challenges.
N	Farmer experiences with cow-calf contact systems	5	Semi-structured qualitative face-to-face interviews carried out by two persons, one of which took notes directly on the computer while interviewing	
NL	(A) The Family Herd project (2007–2011)	15	Semi-structured qualitative face-to-face interviews and structured online questionnaire	
	(B) In-depth personal interviews with dairy farmers with several years' experience in dam-rearing systems (2008–2009)	20	Semi-structured qualitative phone and face-to-face interviews, noted down during the interview	
	(C) An MSc study (2018–2019) by Anne van Wijk: "Visions of Dutch dairy farming on cow-calf rearing"	15	Semi-structured qualitative face-to-face interviews, voice recorded and transcribed	

meaning condensates that were collected into themes at two levels specifically developed within sets A and B. In Norway, five qualitative interviews were conducted in June to July 2018 with farmers who used dam-rearing systems on their farms. The interviews were conducted by two persons, one of which noted the responses directly while the farmer talked to the other interviewer. The notes were sent to the farmer for checking afterwards. In France, three farmer interviews were part of a more extensive interview survey in May to June 2018 involving 20 organic farms. Interviews were voice recorded and transcribed. These three interviews were all with farmers who kept calves with their mothers for at least two weeks. In the Netherlands, several studies have been conducted over 12 years (2007 to 2018), including several documented interview studies. In this manuscript, we include the results of the following studies, which all contain results from different type of qualitative interviews with farmers: 1) the Family Herd project (2007 to 2011; 15 farmers), 2) in-depth personal interviews (2008 to 2009; 20 dairy farmers with several years' experience in dam-rearing systems), and 3) an MSc study (2018 to 2019; 15 farmers with different levels of experience with dam-rearing systems).

After the individual detailed analysis of each set of interviews, an analysis across all four studies was conducted, based on the themes that emerged from across the different studies. In this analysis, the four different points of view, namely that of the calf, the cow, the farmer, and the farming system, came clearly out, and could be described and allow discussion across studies.

3 Results and discussion

3.1 The system's perspective in a wealth of diversity

In practice, the interviewed farmers had experience with a broad range of cow-calf contact systems, including dam-rearing systems, and beyond. Some were mixed or hybrid systems, where calves stayed with their mother for a couple of weeks and then were taken care of by foster cows, or where each cow would nurse two to four calves, one or two of which could be her own. In this article, we focus on the systems where calves stay with their dam. Three main systems were studied across different countries:

1) permanent contact between the mother cow and her calf (except for separation during milking);
2) limited suckling contact, determined by the farmer, for example, either during the day or night hours or for a few hours twice daily (typically after machine milking); and
3) one-sided access in systems where either the calf or the dam can determine the contact by entering and leaving the area where they can stay together.

All three main dam-rearing systems have several types of sub-systems, depending on practical possibilities in the farming system and preferences of the farmer. Different ways of and procedures for separating cow and calf were also described, ranging from abrupt separation in combination with weaning to gradual or two-step separation and weaning by means of fence-line systems or use of nose-flap. Another possibility is through transition from mother cow to foster cow or through hybrid systems.

3.2 The calf's perspective

3.2.1 Nutrition, care, and learning as three main perspectives

Farmers across countries came up with a range of arguments regarding the benefits for the calf in the dam-rearing systems and the reasons for having dam-rearing systems from the calf's perspective. Many emphasised good calf health and referred to both physical, mental, and emotional health, which almost can be seen as directly linked to three main perspectives emphasised as important for dam-reared calves: nutrition, care and learning.

Regarding nutrition, farmers highlighted the advantage of the calves having access to milk at the right temperature and in an amount that matched their needs. If the calves lived in systems with permanent access, they could also suckle as often as they needed to.

Some of the interviewees emphasised care as "something more to these systems than cows just being feeding machines" or used expressions similar to this. One of the terms mentioned was care, especially in terms of the cow licking the calf for a long time, the cow protecting or guarding the calf, and other type of physical contact. For example, two Norwegian farmers let cow and calf spend the first five to six days after birth alone to bond in a calving pen before they let them into the group with the other cows and calves with free access to their grazing area. Here, they experienced the calf running around and being closely followed by the cow everywhere the first day in the group. Because of this experience, other cows and calves did not bother these young calves.

Some interviewees mentioned learning as important, in more general terms meaning "learning to be a cow", "learning to get around in the system", but also in more concrete sense meaning "learning to graze", "learning about the fence", or "learning to walk to the fields on a walkway". Interviewees who emphasised learning referred to systems where cows and calves stayed in the system which was built for cows, and where the cow could guide the calf, and the calf could follow the cow, for example, when grazing or seeking shade. Learning was more restricted in special indoor cow-and-calf areas but could include, for example, learning to eat roughage. One of the Danish interviewees, who had seen dam-rearing systems in practice for the first time (during the study trip mentioned in Section 2.2), explained that she had always thought of a cow-calf contact system as being separate from the 'normal dairy system'. However, after having seen it work in herds, she now thought of the potential importance of learning: "Is it a learning site for the calf to be with the cow? […] they should not stay in the cow-house, was my previous thinking, but now I think that they also learn something from that. Whichever way, I think that the calf should be better planned for in the system, and it should be thought of as a 'calf system'" (Int-17B). Learning was also mentioned as a special aspect of social life and as a practical, convenient feature:

it is good for both calf and farmers if the calf can learn better to fit smoothly into the system later in life, for example, by learning about electric fences, walkways, cubicles, and different feedstuffs. In other words, the calf's relationship with its mother, fellow calves, and the other animals in the herd is the learning environment for the calf.

3.2.2 Being born as a calf not intended to stay in the herd

Most of the dam-rearing systems referred to by the interviewees kept the bull calves in the herd for only a few weeks before selling them off to other herds, such as fattening herds. The farmers described this as unavoidable because they did not have the space and capacity for keeping the bull calves. The same would happen to the female calves that they did not want to keep as replacement heifers. Therefore, some farmers preferred to separate these calves from their mothers early. One major reason was that the calves would have to drink from buckets in the farm that received them, and that requires the time and effort of the workers or farmers in the new place if the calves were used to only suckling. However, some farmers delivered calves to farms where the receivers appreciated their size and robustness and seemed to manage to get them into the system regardless of whether they had suckled for their first living weeks or not. Under most circumstances, bull calves and heifers that were not intended to be kept in the system were separated abruptly from their mothers. This aspect was brought up and debated in more of the interviews with the Danish farmers, who had been introduced to cow-calf contact systems during the study trip. They talked about it as a 'dilemma' in these systems: they tried to give the heifer calves a good start in a cow-calf system, but all the calves selected to go out of the herd experienced the stress of abrupt separation and loss of the mother early in life.

3.3 The cow's perspective

3.3.1 Mother cow often not in focus

Some farmers focused solely or mostly on the calf's health and the above-mentioned needs: nutrition, care, and learning. However, some farmers mentioned better mental and physical health for cow and calf; for example, Norwegian farmers experienced that there was less milk fever and retained placenta when the calf stayed with the mother, which they saw as an argument for having dam-rearing systems. The main focus on calves also became apparent in hybrid or foster cow systems, where it was important that the calf was doing well and bonded successfully with the cow, but it was of less importance whether the cow was the mother or foster cows. In other words, the mother cow's loss of her calf was mentioned less, or not at all, if compared to the mentions of the benefit of the calf being with "a cow", which could also be a foster cow.

3.3.2 Is the mother cow motivated to care?

A group of the interviewed Danish farmers who had been on a study trip to the Netherlands had stayed overnight at a Dutch farm with a dam-rearing system. In the morning, they had walked into the cow-house, where they had watched calves and cows starting the day: "The calves were lying in a small group to the right, and they had been there since the evening [when also having looked into the cow-house; Ed.]. When we came in, the cows walked over to the calves and started licking them – as if the cows wanted them to drink. She might want to get rid of some milk" (Int-10B). This statement indicated that in this case the cows took the initiative to nurse the calves.

3.4 "What is the best time to suffer?"

The views on how the separation causes suffering in cows in comparison to calves are interesting in terms of the time when the separation is done. Many of the Danish interviewees had expressed interest in dam-rearing but had no experience with it, and they expressed concern that the separation was more traumatic the longer the calf and cow had been together. They referred to the fact that both cow and calf are more silent when separated earlier. This was expressed by the Danish Int-5B: "[…] and the break is probably not so big when they are four days old. I believe that the break feels bigger the older they are. Otherwise, one should wait until they are completely able to take care of themselves."

The above statement was focused on the calf's perspective, but the stress of the dam also had to be considered. One of the Danish farmers (Int-17B, who did not have a dam-rearing system but who participated in the study trip to see such systems) proposed an argument that the time with the calf may help the mother cow to 'postpone' the stress: "And still: what about the cow – it is her stress. It is really difficult to figure out what she gets out of all this […] there are some diseases around calving that they avoid. That is a time where they are maybe less stressed – and maybe there is something about their hormonal pattern. Then there is an advantage that their stress comes a bit later." Two French farmers perceived that cows were more depressed when separated from their calf soon after birth. The French farmer B recognised that cows made less noise because they were too sad, but he perceived them as angry when they were separated later (at three weeks), stating that they expressed their stress and fear more easily.

3.5 What is 'natural' about dam-rearing systems?

Many of the interviewed farmers referred to cow calf contact systems as meeting natural needs, and both arguments and questions were brought up in the interviews using the terms 'natural' or 'naturalness'. For example, the question of high-yielding dairy cows with deep or low udders (unsuitable for suckling for a calf) that produced so much milk that the calf was at risk of overdrinking was raised by several interviewees across the countries. The question of what is natural in a dairy herd was consequently posed.

A major discussion arising from the interviews with farmers from all studied countries is about who should or would approach the other in one-sided access systems – the cow or the calf or both, with reference to how it would be in a natural system. A second question was how this could be designed in a dairy herd. It was commonly argued that the mother would seek the calf during the first days, but that

later the calf would approach the mother when hungry. One of the interviewees said: "It is maybe more natural that the calf is the one finding the cow after 14 days, but this also depends on whether they have a cow-house that is suitable" (Int-3B). Many similar statements and discussions came up, articulating that it might be more natural to let the calf be the one to approach the cow. However, it was also stated that this would require a calf-friendly system, for example, slatted floors designed for calf hooves, more hygienic floors, and less risky housing designs (e.g. to prevent young calves from being squeezed by cows in heat, or by floor scrapers). Many interviewees argued that they would prefer a system where the calves could stay all the time, and the cow could leave and come. This was not based on an argument about naturalness or whose interest it was to approach the other, but more practical arguments such as mentioned above. Completely different conditions and challenges exist in systems where calves and cows can stay together on grass, and where the cows in some cases give birth to calves.

3.6 The farmer's perspective: learning to navigate

3.6.1 Dam-rearing can give farmers pleasure, pride, and motivation

More of the farmers stated something similar to the statement in the headline. The Norwegian farmer 3 added the following: "It is incredibly inspiring […] Cow and calves together give motivation. I am prouder of being a dairy producer." In France, a farmer phrased it as "a pleasure" to see calves suckling their mothers. These and similar statements indicate that experiencing calves and cows being together was highly motivating for the farmers and added quality to their lives, and helped them overcome inconveniences and challenges connected to the cow-calf contact system. However, a recent Dutch MSc study (the Dutch Study C, see *Table 1*) included interviews with two farmers, who had left the system. They explained this using the term feralisation, which meant that their animals became more difficult to handle for humans.

3.6.2 The balance between trusting the animals and being laid back

In the interviews with French and Norwegian farmers, as well as in several Dutch studies, the confidence and trust in calves' and cows' abilities to adjust and adopt to the systems became apparent. This trust was shown at several levels. For example, the French farmers told that their calves in dam-rearing systems had diarrhoea, but they recovered spontaneously and it was not critical, nor did it require action from the farmer. The Danish interviewees who participated in the study trip and visited Dutch and German dairy farms with dam-rearing were confronted with different types of cow-calf contact systems, which they found challenging (e.g. slippery floors, iron bars in the cubicles of the cow housing system, etc.). Calves had access to or lived in housing systems originally designed for cows. They perceived that the Dutch farmers trusted that their animals could manage in those systems, and when they had asked the Dutch farmers questions about management in cow-calf contact systems, it became evident to them that the Dutch farmers had many years of experience that the animals normally did fine in the systems. The visiting Danish farmers questioned themselves whether the farmers were sufficiently in control or, as some of the farmers expressed it, "too laid back" regarding supervision of the calves and cows in these dam-rearing systems. At the same time, they acknowledged that the calves looked so well that the farmers apparently could trust that the calves would find their way in the complex systems. However, the interviewed Danish farmers in the Danish Study B emphasised that even when the calves seemed to do well in the cow herd, they thought that more efforts should be made to organise a system which would be more friendly to small calves.

3.6.3 Some farmers feel uncomfortable when not in control

Some interviewed farmers had experience with bucket feeding of calves. In such system, the farmer is able to tell exactly how much milk each calf consumes. Although some farmers put forward the argument that their dam-rearing system was easy to manage, most interviewees with practical hands-on knowledge of dam-rearing systems emphasised the need to re-think time and efforts rather than save time and work. They still needed to spend time with and among the calves. One major reason was to make them used to humans. One of the major concerns among many farmers was calves becoming wild as heifers and cows. Although some farmers had experienced this, others had had the opposite experience. For example, the Norwegian farmer 3 claimed: "Calves that have been with their mother become calm and confident as grown-ups." It was not followed up in the interviews how the experiences may have been seen in the light of different practices, but a Danish farmer stated: "Well, now, milk feeding is not the only way in this world to be in contact with your calves. You can simply go there and talk with them and walk between them, and then they also get to know you and don't become wild" (Int-22A).

Observing animals in dam-rearing systems according to some farmers' descriptions also required a re-thinking of focus and a more general view of how they move and react. Having calves in the cow herd was different from calves in smaller boxes with fewer animals, where the calf and its immediate surrounding and status are easier to observe, for example, in its first critical hours. The French farmers all experienced that the calves became more wild after having been with their mothers for three to four weeks. However, they also experienced that they were relatively easy to make confident with humans after separation (although this in some cases was achieved by tethering them for a couple of days, which can also be strongly criticised according to the IFOAM principles and legislation). Farmers also realised that they were not entirely in control in the same way as they used to be when they gave the milk in the bucket. When bucket feeding the calves, they could measure how much milk each calf received, and could check whether it actually drank it. In the dam-rearing systems, they had to rely on their ability to observe the animals and, so to speak, shift focus from input-based (the amount of milk fed) to outcome-based measures (how the calf looked like and did it seem to have a full belly).

Farmers who had built up experience with dam-rearing systems over a long time realised that they had been through this change of perception, and had learned to watch the calves and cows in another way. However, farmers who saw dam-rearing systems for the first time (such as the Danish group of farmers being confronted with the Dutch systems) described a feeling of uncertainty and discomfort when thinking of it. This made them question whether such systems, for example, could be managed sufficiently if different employees had to share the supervision of the system.

3.6.4 Overview of the most important pros and cons regarding dam rearing systems across participating countries

Pros and cons regarding dam-rearing systems across the four countries participating in this study are outlined in *Table 2*. The interviews showed that four different perspectives were considered: calves, cows, the human caregiver, and the system understood as the cow calf contact system as part of the farming system. The table is based on articulated experiences, which vary highly among farms and systems. This explains why completely contradictory statements come up, for example, that animals are both calmer and wilder in dam-rearing systems.

As can be seen in *Table 2*, the system's perspective is complex, and the pros and cons in each type of system are closely linked with the farmer's preferences and the different physical conditions and opportunities.

3.6.5 Methodological considerations

The aim of the present study was to reveal and examine farmers' perceptions of and experiences with dam-rearing systems. We wanted to analyse and discuss how dam-rearing systems could contribute to improved animal welfare and sustainable future farming systems, and the interview studies present a broad view across different countries and contexts. Although part of the same research project, the data collection was mainly guided by practical possibilities and resources and was therefore quite heterogeneous. Interestingly, the studied countries represented widely different levels of

TABLE 2

Overview of pros and cons for dam-rearing across countries, mostly with inputs from farmers and actors with experience in dam-rearing systems in Norway and France, as well as interviews with Dutch farmers in three different studies from 2005 to 2019. The table is based on the statements of farmers and organised by the authors to show the perspectives of each involved actor: calves, cows, farmers, and the farming system.

Perspective	Pros	Cons
Calf's	Can drink as much milk as they need, at the right temperature, in their species-specific way (slow suckling), as often as they want, depending on circumstances Less mortality Care and stimulation from the dam Good and more balanced growth Farmers experienced healthy and robust calves, which seemed to have a high immunity to diseases Heifers do not suckle each other (experience from Montbéliard herds) Learn to eat hay, grass, solid feed earlier Respect the fences, walk on walkways Get used to the daily rhythm, routines, and sounds of dairy systems Better roughage intake	Show strong signs of stress and can be very noisy at separation Lose more weight at separation Some farmers tether calves after separation for some days to make them less wild Excessive growth; fat calves Dangerous for the calves to be among cows in the herd as some of them do not accept calves of other cows
Cow's	Calmer herds with more social animals Highly motivated to be active after giving birth Caring, protecting and fulfilling a natural need Lower frequency of disease just after birth	Show strong signs of stress at separation and call for the calf
Farmer's	Calm and confident animals Different types of work with more attention to animals Satisfying to see calves suckle their mother; 'beautiful to see'; proud to be dairy farmer "It is more natural" Possibilities to diversify (special brands of meat and milk)	"Wild", difficult calves More work, e.g. if they are on pasture Difficult to keep eyes on calves when they are in the herd Dependent on the system: difficult to teach calves to drink from a bucket after late separation (if they have to) Calves drink "a lot of milk" Difficult to machine milk; poor milk let-down The farmer may get less milk, hence lower income, which can be critical in a farm where the main income is milk
System's	Possible to organise in many different systems, where considerations depend on: Robot vs milking parlour Seasonal vs even all-year-round calving patterns Priorities regarding full-time access vs part-time access Possibilities for common grazing Building layout in general	If one-sided access: doubt about whether the calf should find the cow, or the cow should find the calf Dimensions in the housing system can be difficult to calculate for both cows and calves of different ages

experience among farmers on dam-rearing, which gave us a unique opportunity to cover a wide range of perceptions and experiences. The rather heterogeneous data material allowed us to discern some common lines, views, and concerns. However, we need to emphasise that the methodology of combining and analysing across different samples and interviews, as well as the relatively few interviews per country, clearly presents challenges. We need to emphasise that the results should be seen through these lenses. Until now, little documented research has been done on the perceptions, practices, and experiences of farmers regarding cow-calf contact systems. In this article, we present some interesting potential ways of viewing the field of dam-rearing, rather than drawing firm conclusions.

4 Final discussion: Are dam-rearing systems fairer to the animals?

The results of this study (including the summary of pros and cons in *Table 2*) indicated that dam-rearing systems can be organised in ways that support the health and welfare of the animals, as well the farmers' need to feel pleasure working with and in their farming systems. However, some risks associated with having small calves in cow housing systems were highlighted, such as slatted floors and iron bars between cubicles.

One interesting point to raise when discussing the suitability of these systems for future organic dairy systems is how to bring the organic principles described by IFOAM (2005) into the debate. These principles are intended to serve as an ethical guiding framework for organic agriculture. Although the four principles are intertwined and strongly connected, and although all of them are relevant to the focus area of this article, we consider the principle of fairness to be particularly relevant for the discussion at the center of this article. The formulation, "this principle insists that animals should be provided with the conditions and opportunities of life that accord with their physiology, natural behaviour and well-being", may guide a development of animal systems which allow contact between mother animals and offspring.

When we view dam-rearing systems as they were presented according to the perceptions and experiences of farmers and through the lens of fairness, the contact between calf and mother can be seen as a significant contribution to the physiological development and natural behaviour of both. The mother cow is strongly motivated to nurse, protect, and care for the calf. It can be argued that it is unfair to the cow to lose her calf and that cows show clear signs of stress when this happens. The calves obtain capacities and skills through learning from the dam and others in the system, adding to their life opportunities. Using the term 'life opportunities' in the context of calves opens additional questions and considerations. It could for example include earlier learning being in groups of adult animals, which may make them more confident to explore their surroundings. To be fair to the calves, the farmers must minimise any risk in the farming system and organise it to benefit all animals. Major efforts are required when fitting the farming systems to the needs of both cows and calves. By doing so, the farmers show the animals respect and treat them justly, which is also highlighted in the principle of fairness and can be seen as part of the ethical alliance between animals and humans in their shared world and farm framework. This could include organising a gentle separation in a way that mimics nature and allows for care and contact; however, one can argue that separating cow and calf after a few weeks or months does not mimic nature because natural separation would happen at 7 to 14 months of age.

The interviews also revealed some issues of potentially unfair discrimination that need solutions in future farming systems. This relates in particular to the difference between calves staying in the herd and calves leaving the herd (typically bull calves), and to their mothers, which have to go through early and abrupt separation. The construction of having two classes of calves can be questioned from a fairness perspective.

To make dam-rearing systems fair for everybody, much practice development, education of advisors and farmers, and research on specific topics related to dam-rearing systems is still necessary. Dam-rearing systems take place in multiple contexts, and this needs to be taken into consideration when developing practices and making choices of ethical importance.

5 Conclusions

When farmers react to, consider, and organise a dam-rearing system, their priorities and perceptions can be described using four different perspectives: 1) the calf's perspective, 2) the cow's perspective, 3) the farmer's perspective, and 4) the farming system's perspective.

Three important qualities were described from the animals' perspective: 1) nutrition, 2) care, and 3) learning. Seen from the calf's perspective, its physiological need for nutrition and emotional needs for care and protection were highlighted, and the possibility for learning early in life. These three qualities were partly echoed also when seeing it from the cow's perspective, although care for and protection of the calf were described as strong needs. A need to develop systems that are suitable for both cow and calf, especially with low risk for the calf's welfare, was identified. Some critical issues that need solutions were also revealed. One major critical issue was the often early and abrupt separation of dams from calves that are intended to leave the herd (typically bull calves). Regarding the farmer's perspective, it was remarkable that farmers from the participating countries expressed the satisfaction and pleasure of working with and in dam-rearing systems as a strong driving force to keep dam-rearing systems.

The interviews showed how humans' trust in the animals' capabilities, such as the cow's capability to take care of her calf, and the calves' capabilities to find their way in complex cow housing and grazing systems, seemed to induce a shift of focus for the management of the system. Farmers with dam-rearing systems spend their time with cows and calves differently if compared to when they were feeding the calves with milk in buckets. "Being in control" in a cow-calf contact

system relies to a higher degree on the ability to observe and judge a complex situation rather than, for example, giving the calves exactly the same amount of milk of a specific temperature at the same times every day.

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