



Calves with their dams in dairy cow systems



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Report from the CORE-Organic project GrazyDaiSy based on experiences from the Netherlands, France, Norway and Denmark.

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Introduction: how is dam-calf contact in dairy herds perceived and experienced?

Under natural conditions, pre-parturient cows seek isolation to calve in sheltered areas. Strong nutritional and social bonds between calf and dam develop within hours of birth, and will last when the cow return to the herd with her calf or calves. In dairy herds, normal practice does not allow this bond to be formed, and the calf and cow are separated quite immediately after birth, for example in Danish conventional herds minimum 12 hours after birth, and in organic dairy herds minimum 24 hours after birth, and in some places it is allowed to separate them earlier.

There seems to have been general agreement for many decades in the sector and with consumers that milk from dairy cows was best used and more or less reserved for human consumption. Based on this, a common understanding developed between actors including consumers that it is best for both cow and calf not to experience the bond to be formed – at least not ‘too much’ – to avoid making the separation more traumatic at a later stage.

However, this attitude and practice has become a steadily growing battle field of debate during the last years. Whilst a huge number of dairy farmers

refer to many challenges and risks connected to cow-calf rearing, an increasing number of farmers and citizens question this practice, and more and more farms introduce some type of cow-calf systems. Multiple options exist, depending on the surroundings and herd structures, e.g. whether a herd has all-year-round calving or seasonal calving patterns, which gives completely different opportunities, limitations and challenges.

No matter of the context specific conditions in a herd and which choices the farmers take when choosing and starting to experiment with cow-calf systems, dam-calf rearing will require changes in daily practices and long-term priorities, compared to systems where calves and cows are kept separately. Advantages exist in some systems compared to others, and new risks may occur. All those who take care of the calves need to observe and interact differently. Perceptions, experience and strategies shape the choices and priorities of individual farmers, and the systems emerge and develop over time based on these. Advisors, colleagues and veterinarians may be involved and be influential partners to the farmers, and the dairy industry as well as other related industries,

such as veal calf herds and housing design companies, may all need to re-think their products and marketing strategies.

All involved actors, from consumers and citizens, to the professionals such as farmers, advisors and industry partners, perceive and experience these aspects in ways which also contribute to shape the life of cows and calves, and the farming system and dairy industry. Hence, the visions and drivers, social structures, and experiences related to these systems are relevant to subject to research, and transition to new practices needs changes in human and social perceptions and actions. Cow-calf systems and the issues of early separation of cows and calves contain many potentially conflicting interests and perceptions, and encompass therefore all of these needs to include social and human scientific research to bring the edges together and find ways of communicating and developing future agricultural dairy systems. This report focuses on the farmers' perspectives.

The aims of this report

The aim of this report is to present perceptions, experiences and arguments on dam-rearing of calves, expressed through interviews with actors connected to organic dairy farming in four European countries, and analyse and discuss these studies across countries, framed in the legal and label framework in EU and four different countries:

- to present a wide range of different considerations and experiences on rearing calves with their dams in dam-calf contact systems across four different countries, and motivations for different ways of rearing calves with their dams, expressed through interviews with actors in the dairy environment, in particular farmers,
- based on this, analyse which practical conditions and choices need to be considered when choosing dam-calf contact systems, based on interview results and conducted studies.



Material and methods

The project

The GrazyDaiSy project has participation from fifteen partners in eight different countries aims at developing innovative, resilient, and sustainable organic, grazing-based dairy systems in different economic and agro-ecological contexts within Europe. One focus area is the rearing of cows with young stock, e.g. allowing mother-infant contact, and the project sets out to address knowledge gaps and controversies related to strategies of keeping calves with their dam.

GrazyDaiSy is based on participatory experimental and on-farm research, focused on innovative strategies for dam-calf rearing and more natural behaviour. We use many different research approaches, and this report is based on semi-qualitative interview methods to explore and understand perceptions, practices, challenges and benefits of dam-calf contact systems in four different contexts across Europe. This work is both meeting the aims of WP2 which focuses on sustainable maternal care, bonding and

debonding between dam and calf, and WP4, which wants to describe, discuss and develop strategies and practices for resilience in a range of European dairy systems.

The project is based on on-farm studies, taking a systems approach to research herd and farming systems, as well as human strategies and practices.

The overall project aim of GrazyDaiSy is to develop innovative, resilient, and sustainable organic, grazing-based dairy systems in different European economic and agro-ecological contexts, integrating the rearing of cows with young stock, e.g. allowing mother-infant contact.

The hypothesis connected to this report is: Context-relevant management strategies and daily care practices can be developed to make innovative grazing-based dairy systems economically viable, environmentally sustainable, and animal friendly in terms of health and welfare, under widely different agro-ecological and economic conditions.

Legislation and standards regarding feeding and rearing of the young calf in organic farming

EU-legislation and national interpretations and legislation

The EU legislation does not mention dam-rearing or any other form of young animals being with their mothers or other grown-up animals, but addresses the source of milk¹: *'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'*.

Denmark

In Denmark, it is interpreted as (The Danish guidelines²: *'After calving, the cow and calf must stay together minimum 24 hours (RFO 14:1b-ii & d-ii). The milk feeding period for calves is at least 3 months (KFO 20:1). You have to feed with mother's milk, or exceptionally with natural milk, in the milk feeding period (RFO 14:1d-vi)*'. Apart from this, milk from cows under conversion is considered organic when used in own herd, and organic milk replacer is possible to use in case of need. In addition, calving pens have to be provided and calves must be reared in groups (of two or more calves) from an age of one week.

Norway

Norway is not a member of the EU. However, due to its obligations under the EEA Agreement, Norway has implemented most EU regulations. Cattle husbandry in Norway is also regulated by the Regulation No. FOR-2004-04-22-665 on cattle farming. According to the law, the following shall be applied:

- Cattle shall have sufficient opportunities for free movement, exercise and natural behaviour, and spend a minimum of 8 weeks on pasture during the grazing season.

- Animals shall have permanent access to outdoor areas, preferably pasture (Appendix 3-155).
- During the grazing season ruminants shall have access to sufficient pasture land.
- Cattle kept in tie-stall housing systems shall have access to free movement and exercise on pasture for at least 16 weeks during summer. If the natural conditions do not allow a 16-week grazing period, the pasture requirement can be reduced by up to 4 weeks. The animals shall have the possibility to regularly exercise for the remainder of the year. Cattle kept in barns that were completed before the 1st of January 2014 and do not have pasture access, shall have access to an appropriate open-air run or other outdoor area that provides opportunities for free movement and exercise.
- Organic calves shall be able to suckle for at least three days after birth. The calf must be given natural milk for at least three months. If the suckling period is shorter than one month, calves should be able to drink from calf feeders with artificial teats until they are one month old.
- It is not permitted to muzzle calves or use any other devices that interfere with the calves' natural behaviour, including suckling. Housing systems that are designed to keep cows and calves together must include a designated calf shelter in a protected part of the resting area, to which mature animals have no access.
- Furthermore, the Norwegian guidelines for organic production recommend the following to reduce stress in connection

¹ The Commission Regulation (EC) No. 889/2008 of 5th Sep. 2008, Chapter 2, Section 3, Article 20.1.

²

https://lbst.dk/fileadmin/user_upload/NaturErhverv/F

[iler/Indsatsomraader/Oekologi/Jordbrugsbedrifter/Vejledning_til_oekologisk_jordbrugsproduktion/Oekologi_vejledning_februar_2019.pdf](https://lbst.dk/fileadmin/user_upload/NaturErhverv/Filer/Indsatsomraader/Oekologi/Jordbrugsbedrifter/Vejledning_til_oekologisk_jordbrugsproduktion/Oekologi_vejledning_februar_2019.pdf) (in Danish; accessed 28th March 2019)

with cow-calf separation after the suckling period is completed: *'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'*.

France

In France, organic farming specifications are based on OF European Standards. Regulation regarding calf rearing is exactly the same as EU legislation. There is no additional rules on moment and conditions of separation between calves and their mother cows.

The Netherlands

In the Netherlands new-born calves should be provided with colostrum as soon as possible after birth, but within 6 hours after birth. Calves should be fed twice a day with enough iron, reflected in a hemoglobin concentration of 4,5 mmol. From two weeks on calves should be provided with fibre rich feed. From the age of 8 – 20 weeks old the amount of fibre rich feed should be gradually increased from 50 to 250 grams.

Feeding mother's milk or organic milkreplacer to organic dairy calves is prescribed until calves are at least three months old (IFOAM, 2010; source: skal). Organic calves should be provided with natural organic colostrum. If natural organic colostrum is not available natural conventional colostrum may be provided (source: skal).

Other standards and private labels

Denmark

In Denmark, no label endorsed calf rearing specifically at the time of this report, although a few initiatives indicated that calves with their mothers was regarded as a step towards better animal welfare. One example is the concept called 'Grassmilk' implemented by Thise Dairy, according to which the calf should be with the mother during the colostrum period ('3-5 days' given at <https://thise.dk/historier/graesmaelk/> (accessed on 28th March 2019)).

Organic Denmark launched a concept to development called 'OrganicUPLIFT' ('ØkologiLØFT' in Danish), where each farmer could choose between a wide range of actions and changes on the farm. Although still under development, it clearly encourages cow-calf-rearing.

In Denmark, there are a few animal welfare labels, such as one introduced and managed by the animal protection organization 'Dyrenes Beskyttelse' ('The Protection of Animals'; the label is called 'Recommended by The Protection of Animals';

<https://www.dyrenesbeskyttelse.dk/anbefalet-af-dyrenes-beskyttelse> (accessed on 28th March 2019). One of the criteria for this label is 'The animals must not starve, but have to have access to natural feeding materials and water, so that they can maintain good health and vitality'. The term 'natural feeding materials' could be interpreted as the milk from the calf's own mother, but they do not explicitly address dam-rearing, and in practice 'natural feeding materials' are considered to be 'natural milk' (that is, not powder milk).

The Coop organization in Denmark also has a label (<http://xn--dyrevelfrd-k6a.coop.dk/media/1081/kriterer-for-malkekvaeg-og-oksekoed-fra-malkekvaeg.pdf> (in Danish; accessed the 28th March 2019)), where it is possible to get from 1 to 4 'hearts', all of them beyond the normal legislative requirements for animal rearing. Three hearts are awarded for 'the good organic life', where it is mentioned that calves are together 'a bit longer than in conventional herds', and there is 'late weaning', which refers to weaning from feeding with cow milk until an age of minimum 13 weeks, but does not explicitly include dam-rearing. Four hearts are based on individual application, and judged by a panel of animal welfare experts, and in some cases awarded to herds with no dam-rearing of calves.

Norway

All providers of organic products in Norway are certified by Debio.

The Røros Dairy (Rørosmeieriet) is Norway's only all-organic dairy. It supplies a variety of dairy products under their own label in addition to the Debio Ø-label.

The Norwegian Animal Protection Alliance has developed its own label to certify good animal welfare. The Grøndalen farm was awarded Norway's first animal protection label. The farm wants its cattle to lead as natural a life as possible; in their own words: «The most natural situation for a cow that has calved is to be together with her calf. For the calf it is naturally best to be with its mother and be cared for. At the same time, it is important to teach the calf how to behave in a herd. All our animals have access to extensive outdoor areas throughout the entire year. In our view, this is important to ensure the health and vigour of our animals, which in turn gives us great milk and our own Nýr fresh cheese!». According to this label, the mother cow and calf has to stay together minimum 12 hrs/day for 6 weeks³.

A growing number of local brands are popping up, e.g. certifying grass-fed animal production (as opposed to production based on imported concentrates).

France

In France, there is one private label in organic farming, BioCohérence, that has been created after the European label was implemented in 2009. Farmers that subscribe at BioCohérence label think that the European label is too lax. BioCohérence label has restrictions regarding

animal feeding and grazing, and limitations of antiparasite treatments as well as it was in the ancient French standard. This label also insists on the principle of the link to the soil. But specifications for calf rearing in dairy cattle are the same than in OF European standard ; there is nothing about maternal bond between calves and cows.

Demeter is another private label present in France, and linked with Biodynamic agriculture. Demeter specifications in France are the same as European Demeter label. There is nothing about calf-cow separation on dairy farms.

The Netherlands

In Netherlands products from dam-calf contact systems or cow-calf contact systems do not have a special brand or label. Some farmers sell their products (dairy products and/or meat) on farm and promote that these products are derived from a system in which cow and calf are allowed to have contact. There are also some farmers' cooperations as Demeter and Natuurweide that are exploring the possibility to incorporate cow-calf contact in their private standards. The Dierenbescherming (Dutch Society for the Protection of Animals) is exploring the possibility to incorporate cow-calf contact into one of the categories of their Beter Leven label (Better Life label).

³ <https://dyrevernmerket.no/wp-content/uploads/2018/08/Dyrevernmerket-Kriterier-for-melkekuproduksjon.pdf> (In Norwegian)

Background: Different practices of rearing calves and heifers in conventional and organic dairy systems in the participating countries

Denmark

In Denmark, it has become law in conventional herds that calf and dam have to stay together for at least 12 hours. In organic dairy cattle herds, calf and dam must stay together for 24 hours, and that is what most do, although often feeding the calf colostrum from a bottle or bucket in addition to what it gets from suckling. After this, the calf is milk fed from bucket (with or without teat) for 3 months, or from feeding automats. The amount of milk varies from farm to farm, but is often 6-8 liters per day per calf, divided in two daily feedings, although few give them more, e.g. up to 12 liters daily. In organic herds, it is common to select cows with lower quality milk (high SCC or treated with antibiotics after the 'conventional withdrawal time') and feed their milk to the calves. Calves are normally housed in small groups. It is allowed to have them one week in single boxes, and after that, they will often be housed as pairs and then groups.

Norway

In conventional dairy farming in Norway, it is generally common to separate calf from cow immediately or short time after birth and move the calf to a separate calf pen. The calf is fed colostrum from its mother for the first few days and is moved to a group-housing pen together with other calves after maximum eight weeks, but often after one to three weeks. How long a calf is alone are depending on herd size and calving time.

In organic production, calves usually stay together with the dam for the first three to five days, after which they are separated and moved to a group-housing pen with other same-aged calves. Different methods are used to separate cow and calf. Some farmers remove the calf completely from its mother, often to another part of the barn to avoid further contact between cow and calf. Another method is to separate cow and calf

gradually, e.g., by giving the calf access to its mother and letting it suckle a few times a day. Gradual separation can also be achieved by keeping cow and calf together all day or for parts of the day without allowing the calf to suckle. After, the calves are completely removed from their mother and moved to separate calf or yearling pens.

Calves are given milk from buckets, feeding bottles or automated milk feeding systems (AMF). For organic calves, the Norwegian dairy company TINE recommends 8 liters per calf per day divided into three to four meals up to 4-5 weeks of age, and then gradually less milk until 13 weeks. The calves are fed concentrates and hay or silage in addition to milk.

Calf management in Norway depends on whether a farm practices spring calving, which allows all calves to begin grazing while still young, or year-round calving. Calves born during the winter have to be kept indoors until the grazing season begins in May or June, thus resulting in mixed-age groups of calves. Calves are generally kept in small groups on pasture, often with a small supplement of concentrates and perhaps some milk for the youngest ones. Yearlings and heifers usually graze on separate pastures or rough grazing land for the entire summer. Many farms have access to sufficient grazing resources for their yearlings and heifers, thus keeping grazing pressure and parasite risk low. None of the organic farmers we interviewed mentioned having parasite problems with their calves or yearlings. Farms with limited grazing land, and which thus are forced to use the same pastures year after year, may experience infestations of coccidia, nematodes or flukes. Norwegian livestock farmers thus emphasise pasture rotation when possible, e.g., by spring-

grazing calves and yearlings on pastures that were not grazed by cattle the previous year.

France

In France, the common practice in organic dairy cattle herds is to separate calf and cow just after birth to milk feed them from bucket (with or without teat) for 3 months. A calf is fed first with its mother's milk (colostrum), and then with milk from cows, often high SCC-milk. Automated milk feeding systems are also used. The amount of milk is around 4-6 liters a day, divided in two daily feedings. Calves begins to eat roughage (hay or straw) at an age of approx. 15 days of age, to help development of the rumen. They also receive an amount of 2-2.5 kg of concentrates or grain (e.g. spelt) per day until they are weaned, at the average age of 3 months (Audoin et al, 2014).

After separation from their mother, calves are usually housed in single boxes placed outside, to prevent infectious diseases. However, in organic farming, this is only allowed to an age of 1 week, after which they are housed in small groups.

Nowadays, more and more farmers, in organic as well as in conventional farming, will let cows and calf together for 24-48 hours before separation. On some farms, weaning occurs later, at the age of 6-8 months. If this this practices, the amount of milk decreases with age, while the amount of solid feed, typically roughage, will increase.

Results from a recent survey in France in the ProYoungStock project

According to a quantitative survey made by engineering students in the ProYoungStock project⁴ based on 58 interviews with farmers who have cow-calf rearing systems, 53% have calf-dam rearing systems and 47% have calf-nurse cow rearing systems.

There are two different types of calf-dam systems:

- 1) Calves stay with their mother until weaning. Weaning occurs at an average age of 105 days (from 75 to 180 days). This involves only replacement female calves. In 61% of the farms practicing this calf-dam system, calves and dairy cows stay together all day long. In 49% of the farms, farmers bring calves to their mother twice a day, and let them suckle during an average time of 30 minutes (from 10 to 60 minutes). In 75% of the cases, calves suckle their mother before milking. At weaning, calves and cows can see each other, but have no physical contact. Male calves and female calves, which will not be kept in the herd, stay from 2 to 3 weeks with their mother and are sold then. All cows are milked in the weeks where they nurse their calves.
- 2) All calves stay with their dam after birth from 1 to 42 days (average time of 14 days) and then they are fed artificially (with milk from the farm or with powder milk) during an average time of 90 days. In 76% of all cases, calves stay with their mother all day long. At 24% of the farms, calves are kept separate from their mothers, except from 15-120 minutes twice every day, where they are brought together. Two groups of farming system were described: one third of the farmers let calves stay with their mother for 1 to 4 days, and two thirds of farmers let calves stay with their mother for 8 to 42 days. Separation is more difficult in the second case.

The Netherlands

In the Netherlands, the predominant way of rearing dairy calves, both organic and conventional, starts with immediate separation from the dam. This is advised to prevent transmission of possible diseases from cow to calf

⁴ <https://projects.au.dk/coreorganicofund/news-and-events/show/artikel/proyoungstock-research-for-improved-organic-young-stock-rearing/>

(Gezondheidsdienst voor Dieren = Dutch Animal Health Service). Calves are then housed alone and bottle-fed or force-fed colostrum from their dam, the frequency varying from just once to several times daily for one to three consecutive days. Newborn calves should be provided with colostrum as soon as possible after birth, but within 6 hours after birth. After this, they are fed milk replacer or raw milk. Milk replacer is often recommended because it contains more vitamins and minerals and is of uniform quality, while fat and protein levels in milk can fluctuate (source Denkavit). Both can be supplied in a bucket or a teat bucket.

From two weeks on calves should be provided with fibre rich feed. From the age of 8 – 20 weeks old the amount of fibre rich feed should be gradually increased from 50 to 250 grams. Calves should be fed twice a day with enough iron, reflected in a hemoglobin concentration of 4,5 mmol.

There are no regulations for non-organic dairy farms that specify until when milk or milk replacer needs to be supplied to dairy calves. Weaning incidentally happens after 3-4 weeks, but on average happens after 10 weeks (WUR, 2012). Feeding mother's milk or organic milkreplacer to organic dairy calves is prescribed until calves are at least three months old (IFOAM, 2010). Organic calves should be provided with natural colostrum.

In the Netherlands, an alternative to complete hand-rearing that is practiced is to leave the calves with their dam during the first few days after birth, so they can suckle the first milk that otherwise is fed by bottle. A radically different method of calf rearing is prolonged suckling, where the calf is left with its dam or a foster cow, or has access to a cow to suckle several times daily for a prolonged period of time.

Around 45 Dutch dairy farmers keep cow and calf together ranging from two weeks up to six months of age, in which a suckling period of 6-8 weeks is most common. Their experience with these dam-calf contact systems vary from a year to over 25

years in which each farmer has developed his own method.

Colostrum is mostly bottle fed in all the alternative rearing methods, although there are farmers, mostly the ones that have a cow-calf contact system, who let the calves suckle the colostrum.

Within each alternative system there's variation in which calves are kept in what system. Some farmers have both male- and female calves in a dam-calf contact system, irrespective of the calves staying on the farm or going to a veal farm. Others only keep replacement heifers in dam-calf contact systems, while the males and surplus females are directly separated. But also the other way around is practiced.

Cows with calves are kept together in several different housing systems as in deep litter barns as well as in barns with cubicle boxes and slatted floors. Some keep cow and calf together in the dairy herd, or in a separate area of the barn (mainly practiced with foster cows). Some have special areas for the calves which the cows can enter, others have a separate area for the calves where only the calves can stay with free access to the dairy herd. These separate areas for calves are also used by some farmers to limit the amount of contact and suckling opportunities the calves can have with the cows, as for instance calves can be kept in those areas between milkings or when cows are on pasture. Others allow the calves to go on pasture during daytime, but not at night time. These areas are also used, or specially created, when it comes to weaning and separation. Calves are put behind a fence allowing contact with the cow and suckling if the dam allows it. The opportunity to suckle is prohibited after several days while contact is still possible. The use of noseflaps is also practiced by some farmers allowing the calf to stay in the herd, but preventing it from suckling.

Only a few farmers have a seasonal calving pattern. These farmers keep the heifer calves with a foster cow on a separate pasture, or with the dam in the herd, separating them at the time of

indoor housing for the winter. Except for the foster cows (e.g. specially selected cows for their mothering ability, lame cows, cows that cannot be

milked), all cows are milked at least twice a day, some also by robotic milking.

Data collection and analysis

Denmark

The Danish author of this report conducted the following interviews, which create the basis of the results in the Danish part of the study:

- A. June-August 2018: Face-to-face-interviews of Danish researchers, advisors, and farmers with various experience and/or interest in dam-rearing of calves. The interviews included other elements of the GrazyDaiSy project (non-medicine use and innovative grazing strategies), and lasted from 58 to 111 minutes in total. The full analysis of these interviews is not presented in this report, and they are only shortly summarized.
- B. November 2018: Interviews of 11 participants on a learning trip to The Netherlands, organized as a project activity in GrazyDaiSy, visiting 5 Dutch farms with some form of dam-rearing and listening to two presentations about Dutch research results regarding dam-rearing. These interviews were conducted over phone while typing notes, and lasted from 32 to 53 minutes. As can be seen in Table 1, some of these farmers also participated in 'Round A' of interviews.
- C. March 2019: Short (20-48 minutes) phone interviews with five of nine farmer participants in a meeting at Thüenen Institute in Germany with focus on dam rearing. Only the husband was interviewed from two married couples (their own choice), and two farmers were inaccessible at the time of the conduct of interviews. One of the farmers was also interviewed in 'Round A'.

Person-code	Description	Participated in		
		A	B	C
1	Researcher			
2	Researcher			
3	Researcher			
4	Advisor			
5	Farmer			
6	Farmer			
7	Farmer			
8	Farmer			
9	Farmer			
10	Farmer			
11	Farmer			
12	Farmer			
13	Farmer and advisor			
14	Farmer / agriculture teacher			
15	Farmer			
16	Farmer			
17	Farmer			
18	Farmer			
19	Farmer			
20	Farmer			
21	Farmer			
22	Farmer			

Table 1. A list over the interviewees in the Danish study, and the round(s) of interviews in which they participated, referring to the text above (A=June-August 2018; B=December 2018-January 2019, after an excursion, and C: March 2019, after an excursion). Farmers 10, 12, 13, 14, 16, and 22 had more (years) or less experience ('trying it') with cow-calf systems.

The transcripts or notes were all included in Nvivo documents and analysed separately as three sets of interviews, using codes and axis specifically developed within sets A, B, and C. In this report, Set A is only represented through a summary, where a more extended analysis of sets B & C are presented. Interviewees are identified by a number followed by the letter (A, B, or C). The latter indicates the round in which the interview was made, see Table 1.

Norway

The Norwegian team visited and interviewed three organic dairy farmers who had cow and calf together during a longer period every day including at pasture, one conventional farmer who had cow and calves together for a period of two times per day, and two organic dairy farmers who did not have cow and calf together for longer than the usual 3-5 days. In addition, we conducted the same interview, albeit with no visit and on-farm observations, of another two organic dairy farms and other stakeholders. These included some researchers and advisers, as well as representatives from a farmer's association, an organic dairy and the slaughter industry.

Selection of farms: There are few organic farms in Norway, and very few who had cow and calf together for longer than 3-5 days in those days. In the writing moment (late 2019) there are more. We used the agricultural extension service as well as the internet to search for and select our informants.

The farm data we collected included farm acreage (arable and grazing land), fertilizer regime, seed mixtures, herd size and composition (dairy cows, calves and yearlings, as well as other livestock species), milk quota, milk yields per cow, cattle breed, housing and milking systems, pasture management and cow-calf separation method. The interview also included questions on the farmers' opinion regarding pros and cons of the different separation methods, their motivation for changing their cow-calf separation procedure, cattle health issues, such as parasite infestation problems, work load, profitability, reputation of the farming profession, etc. We asked a total of 50 questions, using an open-ended approach.

The Norwegian National Board of Animal Production Recording is a member-based reporting system, which includes the Norwegian Dairy Herd Recording system for the dairy industry. Members have continuous, on-line access for both entering and retrieving their own data. Norway thus has the world's most comprehensive cattle database. We were granted

access to the data of the farmers participating in this project.

The project itself and the questions we posed to the farmers were also presented to two focus groups.

France

The French author of this report organized and supervised a qualitative survey made by an engineering student during her trainee of 6 months at INRA of Mirecourt. The student conducted qualitative interviews with 20 organic dairy farmers that have implemented cow-calf rearing systems in May and June 2018.

The first step consisted of identifying farmers following this practice, using information from advisors and technicians of organic agriculture organisations, as well as veterinarians. The interview guide has dealt with socio-technical aspects of cow-calf rearing, that is, focused on the farmers' calf-rearing practices, their point of view of this form of livestock production, and its advantages and disadvantages. All interviews have been recorded and transcribed. A double analysis of the interviews has been made: (1) an analysis of rearing practices through a systemic approach and (2) a content analysis in accordance with the Grounded Theory of Glaser and Strauss (1967). We identified different thematic associated by farmers with cow-calf rearing.

Ultimately, 20 dairy farmers were surveyed: 5 in the Lorraine region and 15 in western France. Farmers were younger and more highly educated than the average French organic farmer and most of them participated in exchange networks with other colleagues. In their regional contexts, their farms were representative of organic dairy farms. We observed different calf rearing practices. The main system, concerning 17 of the farmers interviewed, was nurse-calf rearing. This practice consists of leaving 2-3 calves with a cow, separated from the dairy herd, until weaning (an average of 6 months). Usually female calves identified as future replacement heifers are reared in this way, but sometimes male calves

are, too. The other three farmers interviewed have implemented calf-dam rearing system, that is to let the calves with his mother for more than one day: generally, calf can stay with its mother from 15 to 45 days.

The Netherlands

The Dutch data presented in this report is a compilation of research done on this topic in the period of 2007-2018. Please find a list of reports and articles (some of them in Dutch), which give details from these studies at the end of this report. From 2007-2011 the Family Herd project was run with 15 farmers, two researchers and an architect to develop a housing system to keep all age categories underneath one roof, with special focus on dam-rearing.

In-depth personal interviews were held in 2008-2009 among 20 dairy farmers with several years' experience in dam-calf contact systems. Main focus of the interviews were on the pros and cons, challenges and chances when practicing a dam-calf contact system. All interviewees joined a meeting in which the results of the interviews were presented and discussed among them, including a first set-up in order to get insight in the costs and benefits of such a system.

In 2009 an online questionnaire was held under all organic dairy farmers with 40% response rate. Main focus of the questionnaire was to get insight in the rearing methods practiced on organic farms and the pros, cons, challenges and chances of such methods. If farmers practiced or had practiced a dam-calf contact system more emphasis was put on their experiences and perception.

From both the interviews and questionnaire it became clear that weaning and separation were the biggest challenges for farmers who are practicing dam-calf contact systems. This was also the main reason for farmers to resign from such a system and the main reason for farmers not to adapt such a system. Second main reason was the 'loss' of saleable milk. For these reasons, on-farm research was conducted in 2009 – 2012 into different weaning and separation methods.

Research into marketing strategies of milk derived from dam-calf contact systems was conducted in 2013.

In 2016-2018 these studies have been extended with a survey in which globally available scientific knowledge and Dutch stakeholder opinions on dam-calf contact systems were investigated and compiled.

In 2018-2019, a MSc project was conducted to study the visions of Dutch dairy farmers on cow-calf rearing systems and to study the farm characteristics and calf management of farms with and without cow-calf rearing systems. Data for this study was collected during interviews with Dutch dairy farmers (n=15). Farmers from farms with four types of dam-calf contact systems (or not) were interviewed:

1. Experienced farmers (who have implemented cow-calf rearing on their farms; n=7; 4 conventional, 3 organic and 1 biodynamic,
2. Farmers who stopped with cow-calf rearing; n=2; both organic;
3. Transition farmers (interested to change to a cow-calf rearing system (n=2; both conventional);
4. Traditional farmers (who do not have experience with cow-calf rearing on their farm and who are not interested to change to a cow-calf rearing systems;n=4; one organic and three conventional).

Methodological considerations

The present study aimed at revealing and unfolding farmers' perceptions of and experiences with dam-rearing systems. Our four countries represented widely different levels of experience among farmers on dam rearing, which gave us an unique possibility to cover a wide range of perceptions and experience. Although we were all part of the same research project, our data collection was mainly guided by practical possibilities, resources, and different background

of the interviewees. Hence, the collected data from interviews including previous studies, became quite heterogeneous.

We analysed the interviews – both newly collected as well as results of Dutch research over a 12 year period – separately in the first hand, and then looked at common lines, views and concerns across studies. Interestingly, many similar lines were coming out from different angles, as will appear in the text below. However, we need to emphasize that a study of this kind definitely has its methodological challenges, because we combine and analyse across different samples and interviews, including previously conducted

research, although never published in this light before. Furthermore, there are relatively few interviews per country in most countries. We need to emphasize that the results should be seen in this light. However, there is currently only little documented research on the perceptions, practices and experience of farmers regarding cow-calf contact systems. In this report, we therefore do not make firm conclusions, but rather suggestions, and we present the background material in a quite detailed way, and thereby open up for some interesting perspectives and ways, in which we potentially can view the field of dam-rearing.



Results: perceptions and experiences related to dam-calf contact systems

Summary of the studies in Denmark

Three interview studies took place in DK, and in the following, the main weight will be on 'Study B' (farmers reactions after a study trip to The Netherlands and Germany on cow-calf contact systems with a special focus on dam-calf contact systems), because it is based on reactions to actual experiences.

Study A: Interviews of 17 farmers, advisors and researchers at the GrazyDaiSy project start

Farmers with experience on cow-calf-contact systems

Three of the interviewed farmers had experience with some type of cow-calf rearing, and their systems are briefly described below.

Int-12A:

In this dairy herd, the dairy cows were separated from their calf/calves after 24 hrs. The cow-calf system was used only in relation to castrated bull calves, which were matched with a suckler aunt from the milking herd in the spring. The aunt was selected because she had high SCC or other 'weaknesses'. They were sold as 'sets' to people for summer grazing e.g. of extensive areas, and both aunt and calves were normally slaughtered in the autumns.

Farmer experiences and motivations for this system: This system gave bull calves a good life over the summer. It also gave an opportunity for a good life for cows, which were no longer strong enough to stay in the dairy herd, but were good nurse cows. It gave an additional good income for the farmer, selling animals, which were normally

not of high economic value. According to the farmer, it was important to select the cows with the abilities to nurse calves, and calves of same size, which could form a good group. He experienced only the bonding process, which took place in separate boxes, normally over a few days. He could very quickly tell whether there was a 'good match' or not, and took action if not. All cows with nurse calves were 'sent out of the farm', so it was important that it worked well between cow and calves before they were sent to other farms.

Int-14A:

A herd of seven milking cows for teaching agricultural students in organic agriculture. They all calved in spring, and each cow stayed with its calf/calves, and an additional calf bought from a nearby farm, during the day hours, mostly on grass. They were kept separately during night, and both groups stayed indoor in same building. The cows were only milked in the morning.

Farmer experience and motivations for this system:

It works well, is easy to handle but require a close surveillance and immediate intervention in case something does not work. The cows and calves get amazingly quickly used to the system, e.g. that the calves are kept separately during night, although within sight of the cows. Despite attempts to bond calves to specific cows, there is some cross suckling, depending on cow and calf. Separation happens after minimum four months, and according to the herd manager, this is the reason why it does not seem difficult, stressful or gives a lot of reactions such as calling and noise: '*... at that time, well, they are a bit tired of them, you know, ...*'. The main challenge is the many people who are involved in taking care of the cows and calves, including students with no experience on dairy production, and communication as well as skills looking after calves and cows have to be developed. One main motivation for this system is the fact that this is a school for organic agriculture students, and the herd manager wants them to get to know a system, which she first of all think of as

more ethically right than systems with separation after one or few days after calving. It may not be the most common, but can be applied and to a large extent represent a 'more organic approach'. It fits well into the rhythm of the farm, and seems to be 'logic' in this context. This system had only been applied for the second year at the time of the interview, so the herd manager was a bit excited to see the reactions of the first heifers, calving in this system, in which had grown up themselves as calves with access to their mothers. The herd manager was fully aware – among others because she had worked in a large dairy herd where they had tried to implement this system – that with such a small herd and many people involved, it would work completely different than with a big herds and one or few persons working there.

Int-22A:

Herd of approx. 50 cows/year and seasonal calving August-October. Cows stay with their calf/calves in a calving area for few days after calving. Afterwards, both are included in a larger area where cows and calves stay together 12 hrs. (either night or day), and the calves stay alone 12 hrs. The farmer used to select approx. half of the cows to stay in this system: each cow has her own calf + one extra. Both bull and heifer calves stay in this system. However, during the summer just prior to the interview, every cow had had access to her own calf, if she wanted. The reason for this was simply that it was easiest: the summer had been very dry, and the cows had to go out to the grazing area through another door than the one they used to, and in this way they had to pass the group of calves, so it was impossible to keep the 'hybrid system'. Separation normally happened late December irrespective of age (calves <3mths. are bucket fed after this), and is normally abrupt. Cows are milked once per day: after the 12 hrs. in the cow herd, without calves. This system has gradually been developed over 28 years.

Farmer experience and motivation for this system:

A main motivating factor for initiating this system many years ago was to get an easier system, with a group of cows only being milked once per day,

and the calves being taken care of by the one who was probably the best in the world: its mother. They had tried different methods, e.g. separation during night versus during day, different ways of separation and bonding, and different strategies for selection of cows to stay in the system. The farmer emphasized that he was the only decision maker and manager of the farm, so he had the overview over the herd and could remember what happened during the years, so the development was experience based over many years.

Farmers' motivations for their systems

'When you are there, this is the way...'

The motivation for starting the different forms of cow-calf rearing differed widely between farmers. The two farmers who had calves suckling from birth with their mother both were motivated by the fact that 'it seems to be the only right thing for the calf'. Other factors influenced, e.g. the wish to teach 'alternatives' at a college for organic farmer students. The opportunity to sell calves with a suckler aunt was an obvious motivation for Farmer 14. They all described their system as very easy to manage, when you first have established and developed it, and had no wish to do things in any other way. Although 'developed', it still needed considerations and adjustments all the time, and time was spent differently than in conventional calf systems, rather than it was 'saving time'. The pleasure of seeing the interaction and what was described as 'natural behaviour' made all accept that it could require extra efforts and surveillance at times.

Summary of interviews with farmers without dam-rearing on perceptions and attitudes to calves with cows

At the beginning of the GrazyDaiSy project, interviews were conducted in Denmark with the actors around the project (researchers, advisors and organic dairy farmers in the dairy company 'Them' which was partner in the project, and other dairy farmers as described in M&M). Most farmers were aware that there seemed to be an increasing push from consumer groups and organisations (e.g. the vegan movement), and were uncertain

Experience of the calf in the systems

Generally, the farmers experienced that the calf found its way, and were very comfortable in the systems. They considered their system to be a good 'calf care system', which is underlined by the fact that two of the systems (Int-12A and Int-22A) had nurse-cow or hybrid systems: the calf was taken care of by a cow, and the cow was taken away from her calf. The two farmers, who kept the calves in their systems, did not perceive that the calves were wild to a degree, which created any problems, as explained by Int-22A: *'Well, now ... bucket feeding is not the only way in which a farmer can get in contact with the calves. There are other ways. You can simply walk around in the area, where they are, and they know who you are when you talk to them, push the feed into the feeding rack, fill up the water trough, or just walk around talking around them... '*

Experience of the cow in the systems

Int-14A talked much about the cow, and how the cow took care of the calves, and how the cow recovered much better after calving, when she was motivated to stay alert and caring for the calf, and by the mere fact that more time with no or low stress after the calving allowed her to recover. In previous years, the Int-22A had selected approx. half of the cows to stay in the cow-calf area and experienced that some of the cows seemed not interested in their calves, even when they themselves had grown up in this system.

about what they actually wanted, and what they actually knew about Danish dairy farming today, and the status regarding animal welfare and pressure for production. However, the majority of interviewees was curious towards cow-calf-systems and the project, but had either not yet considered introducing such system, or had experience with cows and calves staying together 4 days instead of 1 day postpartum, or from

suckler aunt systems, which had turned out to not be successful. Some of the main concerns were that the calves became wilder, and that the system would be very dependent on one person taking care of it more or less always, which did not work in larger herds with more employees and need for everybody to have holidays now and then. The main concerns regarding cow-calf systems are summarized in the Table 2. They served as main arguments for not considering such systems, sometimes in addition to arguments for having a good calf management system in place, and the calf welfare was good as it was at

the time of interview. Some farmers also questioned how these actors understood ‘naturalness’, and how it could be understood at all, in the context of high yielding dairy herds. Some also raised points regarding the detachment of consumers from the farming environment, as expressed by Int-16A: *‘Those people who live at Nørrebro (a part of Copenhagen) and who bring their children to day-care and want others to take care of them, why do they want us to have the calf with their mother? They could start taking care of their own children ...’*.

- The calves drink much milk, hence less delivered, and there is no premium price or compensation for this,
- The young animals become wild and difficult to handle,
- The separation will create too much stress for both cow and calf, and the noise will bother both family, employees and neighbors,
- Requires special skills and will be dependent on the same person being able to take care of the cow-calf-system,
- Lack of control when observing calves: difficult to spot if something goes wrong in the larger group, and even worse on grass or outdoor areas,
- Diseases that maybe could be spread between calves and cows, and drinking too much milk could give diarrhea.

Table 2. Summary of main concerns regarding cow-calf contact systems, given by farmers who had not introduced any form of cow-calf contact systems (that is, foster cows or dam-calf contact systems) in their dairy herds.

Study B: Interviews of 9 farmers, advisors and researchers after a study trip on cow-calf systems

Views on the calf's aspects

At four out of the five visited farms in The Netherlands, the calves were in various ways let into the cow housing area. All interviewees expressed surprise how easy it apparently was to make it work in environments, which in their eyes did absolutely not look ideal for calves, and even described as ‘miserable’ and ‘terrible’. They described the calves as ‘strong survivors’ which ‘impressed them’, and used words like ‘they make it just like that’. Int-1B expressed it as follows: *‘This was a place where he makes it work by letting the calves walk around among the cows, and they are joining them on the slatted floors. It is still difficult*

for me to understand how this can be done without experiencing that the calves damage themselves’. Most of the housing systems were with beds, and the presence of all the bars, poles, and frames made people puzzled that it could really work. To witness this and hear about it was obviously a ‘game changer’ for most in the visiting team. Furthermore, it released discussions (presented below) about ‘trusting the animals’ versus ‘being laissez-faire’ and ‘being in control’. However, one of the points on which there was quite clear agreement, was the way in which the systems were not organized to suit the calves, and they seemed potentially dangerous for the small calves. Some housing systems were also quite busy, and if there was e.g. a milking robot, there could be light

and walking night and day, which did not give much peace to rest sufficiently for a small calf.

Another point, which seemed to create consensus was the experience that most weaned calves looked quite miserable. This was perceived as surprising, both because the weaning process should be thought better into the entire system, and because it seemed very irrational: the farmers used a lot of milk on getting calves which really looked good, and then they 'lost everything' during the first weeks after weaning. The interviewees sought different explanations for this, especially the weaning itself, but also very much the preparation of the calves for a life after weaning.

One major aspect of the weaning was the abruptness of the separation. Both pros and cons were considered by the interviewees: could it be best to wean them abruptly and 'make a clear cut'? There was, however a slight consensus on gradual weaning as the preferred option, as e.g. expressed by Int-10B about the abrupt weaning at one of the visited farms: *'The contrast became so big. They should feel the cold world so suddenly. If this is something they do for animal welfare reasons, then I find it strange with this tough start'*. One of the visited farms had a separation box where minimum two calves were gradually fence-line-weaned, and the calves on this farm looked good after weaning too. They acknowledged that the care giver and his abilities to 'read the calves' and make it work, gave really good results, despite the fact that this farm was really had very old structures, which in some ways were 'run down'.

No matter how the separation itself took place, the interviewees clearly recognized the importance of preparing the calf for the life after separation, socially and nutritionally. In other words: when being separated, the calf must have developed a social life with other calves and be used to eat other feed. This process could be pushed by separating them part-time from their mother, or by offering them good feed and

possibilities to take feed and bond with the other calves. On one of the visited farms at the excursion, they offered the calves milk from an automated feeding station systems, which also made some of the interviewees reflect on the importance of preparing the calves for a 'life after separation'.

[What are the arguments for letting the calf being its mother?](#)

Contradictory opinions came up when reflecting upon important reasons for letting the calf be with the mother, seen from the calf's perspective. Where some of the interviewees emphasized how good the nutrition and access to milk was for the calf, and it might be a good idea seen from an immunological perspective, others emphasized that these systems were good because they were 'mother-calf-systems'. This gave another dimension, like expressed by Int-6B: *'To me it is not the same with suckler aunts – I think that I could see that on the calves: this was not their mother, they were feeding machines, and that is not the same – it gives them something else when they are together with the mother'*. (However, others acknowledged that any contact to grown-up cows could stimulate the calves to eat roughage or grass, for example). The un-restricted contact between cow and calf was described as 'letting the cow take care of her calf', and 'letting the calf learn', like expressed by Int-17B: *'We forget often that the calf can learn from the cow, and they do not learn in those mixed [calf]groups. We take that aspect away from the calf. We can compensate for that by letting the calf be with a cow'*. This participant also explained that she had always thought of a cow-calf system as being separate from the 'normal dairy system'. However, after having seen it work in herds, she started questioning whether being in the cow-system brought an important element of learning to the calf: *'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. Whatever way, I think that the calf should be thought into the system in better ways [than what*

we saw.ed.], and it should be thought of as a 'calf system' (Int-17B).

In particular the access to letting calves go with the mother on pasture was emphasized by more of the interviewees as an example of a system which lets the calves experience and learn from the mother. In most of the herds, it was very difficult for the calves to reach the cow feed, and in some cases, they were observed to be interested in this. More of the interviewees also mentioned that this was surprising: why not use the opportunity to let the calves eat with the cow when they were so obviously interested? In two of the herds, the calves could run into the feeding table and in that way 'participate in eating', but the hygiene aspects of this was also mentioned as critical.

Views on the mother cow's aspects

It became clear for more of the interviewees that the calf often was more in focus than the mother cow, when talking about the benefits of dam-rearing. When discussing the impressions of visiting the last farm on the excursion, which had a suckler aunt or nurse cow system, more of the farmers reflected on the differences between having calves with their mother versus with 'any cow'. On the last farm at the excursion, the calf and mother cow were together during the first day after calving, and then the calves were collected around a lactating cow, which served as a nurse during the milk feeding period. The interviewees acknowledged the benefits of this system, such as being able to 'use' the cows, which had milk of lower quality, and seeing the calves play and yet have access to milk at all times of the day. They also mentioned that the calves could learn from being with the cows, although they were not their 'real mothers', but when organized in a smart way, the calves would also start eating earlier and imitate the grown-up cows. However, they also clearly saw that the interests of the mother cows were not included in this system and said that this was more a calf system than a cow-calf-system, on the premises of the calf.

Another aspect of seeing a cow-calf contact system from the view point of the mother cow, was formed around the discussion on whether the mother cow should be able to approach the calf, or the calf should be able to go to a hide and then seek the cow. Maybe it was most natural that the cow would seek the calf in the first time, and later, the calf would seek the cow, as for example expressed by Int-3B: *'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'*.

More of the participants had walked into the cow house on the first morning of the excursion, and saw how the calves and cows started the day: *'The calves were lying in a small group to the right, and they had been there since the evening [where they also had 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 followed the idea that the cows woke up the calves, and that it was kind of natural that the cow approached the calf.

Most of the interviewees, however, took a standpoint 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 merely because the cow-houses were dangerous and unsuitable for young calves, e.g. with the scrapers and cows which came in heat.

It remained an open question, how the bull calves were treated in the various herds, but it was mentioned that seen from the cow's perspective, they should be allowed to take care of the calf no matter whether it was a bull or heifer. It was also stated as unfair if the bull calves were abruptly weaned because they should leave the herd at an age of 14 days, and heifer calves stayed. No matter what, the mother cow was still left alone, and in some cases after an abrupt separation.

What is 'natural' in a farming context?

The interviewees brought up different aspects of 'naturalness', and especially three aspects were mentioned, some of which were already described above. First of all, nursing the offspring was mentioned as a natural need for a mother which had just given birth (as described in the section 'The mother cow's aspects'), and being with the mother to learn, being taken care of and have access to milk is natural for a newborn calf, as described in the section 'The calf's aspects'. In addition to that, some characteristics of today's dairy cows and farming conditions made some interviewees question 'what is natural, and can we talk about naturalness at all?'

Letting calves stay with their mother was generally referred to as 'the most natural'. However, the amount of available milk made some of the participants question the 'naturalness' under these conditions, such as Int-11B: *'He let them go for longer time together – 10-12 weeks – and if it works, then it gives good calves. In nature, there would not be 15 liters of milk for the calf. I don't think that it is good for the calves. If they gave them some better possibilities to eat, they would do that'*. One of the interviewees, Int-4B, further speculated over the consequences e.g. the calf stomach: *'But a heifer that becomes a cow earlier, will it be a strong cow? It is a kind of forced growth – and what is indeed 'natural'? That they become so big and fat – it does not sound right – it is a kind of 'veal calf', a goose liver paté. It could be interesting to see such a calf stomach inside, whether the rumen is working in such a calf.'*

These aspects lead to a general dispute about whether it was most natural to keep the cow having access to the calf at all times, or the opposite, or both? On this question, Int-13B also referred to what they naturally would do: *'He should do something like isolating them and separating them, but that would give him more work. I still think that if we consider what they naturally would do – for example the calves that would group in their own place – then we could close them off for ½ a day'*. As also asked about under the headline

'Guidance or control': if it is most natural that cow and calf are together only half of the time, does that justify that we as humans decide which part of the time they should be together?

Views on the care giver's aspects

There was consensus among interviewees, who had visited the five farms with different ways of dam-calf contact systems that the human care giver was paramount and decisive for the success of this type of system. Depending on the background of the interviewee, the same routines, attitudes, practices or systems elements were viewed widely differently, as will be unfolded below, but the abilities of the person(s) who took care of the animals, to step in and create the best conditions, were unquestioned. It became particularly clear because many of the statements made by interviewees showed that they found the stables and systems 'clearly not ideal' for dairy farming, and especially not viewed as ideal for rearing calves with their mothers, but yet the animals looked good and the calves seemed to thrive.

This also led to worries about recommending these systems in general and based on a quick conclusion that 'it was easy to make it work', because it was not. Furthermore (as will be discussed below): some interviewees expressed a worry about 'extrapolating' the results from these relatively small herds to much bigger herds.

All the Dutch herds, which the group visited, were relatively small (less than 100 cows) compared to average organic Danish dairy herds. As will be discussed in the section about the systems perspectives, this had practical consequences. One obvious difference to Danish systems was that the amount of calvings and calves was much less in the herds visited at the excursion. For the human care giver, it had the consequence that the system was more or less only handled by one responsible person, as pointed out by Int-5B: *'It requires that you have some good staff members. And what we saw, they generally had only one responsible person in each herd. There was only*

one person, who had to keep the overview'. In other words: the knowledge generation and experience were centered to one person, which on one hand made it easier to keep the overview, and on the other hand also contributed to building up a system which was closely related to the preferences and ways of working of one specific person. This also became very clear during the visits and through the talking with these different persons: they organized the system in accordance with their logic, values, experiences, and preferences. What one person perceived as 'easy' (for example to let the calf go with the cow into the milking parlour if there was a problem with the milk-let-down), was perceived by others as 'impossible'.

One of the biggest concerns among the group of Danish farmers before the excursion, was the 'wildness' of the calves, heifers and cows when not being imprinted by humans. During the excursion, we visited five different Dutch farms and experienced a range of different reactions among the cows as well as the calves, to our presence. In one of the farms, a cow almost lifted up the farmer with one of her horns – not because she was aggressive, but because she 'made contact'. Some of the interviewees saw this as positive. Generally, the cows at this farm were perceived as curious and approached the visitors. All the participants reflected on this range of 'wildness' and concluded in various ways that it probably mattered how and how often they were handled and 'met' humans, in addition to other factors such as genetic background. Although more of them said that the excursion had not brought clarity on this issue, some speculated on whether letting the cow being with the calf only part-time could help the 'socializing with humans', and one emphasized the importance of intensifying the positive animal-human contact in the process of weaning. One interviewee reflected on 'alertness' as a positive attribute: *'... when we walked on that field, it was like walking between heifers. They responded much more to humans. They could move so much more, they withdrew and came back. For me, it is something positive,*

that they are alert. It was not that you could not handle them. Of course there are things that you need to be 'obs' on – and you often see big, heavy cows that have difficulties in moving – maybe also the yield and the breed ...' (Int-3B).

Keeping the work load low

It was mentioned a couple of times by some of the interviewees that some of the systems which they saw, seemed to be 'not smart' because they gave too much work, e.g. when bull calves and heifer calves were treated in two different ways: then not much was saved. Likewise, in one of the herds, the separation happened after 3 weeks, which more of the interviewees were puzzled about, among others because of the double work of first watching them with their mothers, but also have the work of milk feeding them and teaching them to drink from a bucket, and to introduce different systems to the calves.

'Trust the animal' or 'being laissez-faire'?

One of the farmers stated: *'It is completely impressive, when you come to all these different herds, that they can make it work in such miserable systems'* (Int-6B), referring to the calves and what she called their 'survivor-drive' and ability to learn how to move between iron bars and on slatted floors and cows in heat. All interviewees expressed a similar surprise, although they emphasized that the herd sizes were not comparable to the relatively bigger Danish herds. The farmer quoted above stated that it had given her courage to 'trust that the calves and cows had an amazing drive to make it work'. However, she still questioned whether she could trust that they would make it in her system at home, where the milk yield was very much higher than in these herds, and where the number of cows and calves was significantly higher, as already discussed above. Even though their system had the potential to support the animals much better, it would still be a system with relatively many calves: *'What if something goes wrong? What can one do if something starts to go wrong? If you have 75 calves of different sizes, and the small gets infected by the bigger ... well I can*

see that they benefit from going together across age groups and learn from each other – but it was really strange that they did not get diseased’ (Int-6B). Int-11B were disappointed that he did not feel that he saw really smart and well thought-through systems, but just systems ‘where they let them go together’ without further organization: ‘I had probably expected that we got some solution on how we actually can do in practice. Not just let them go together, coincidentally – but to DO something’.

Various arguments balancing between ‘trust in the animals’ and ‘the farmers being laissez-faire’ came up: On one hand, the interviewees could see that the animals had the necessary abilities to make it work, despite various sub-optimal conditions. On the other hand, they also found that the farmers did not give them fair conditions, and that they sometimes seemed to lean too much back and were ‘gambling with the system’. They mentioned that it seemed that they took obvious risks (e.g. obviously slippery floors, narrow walkways and a lot of iron poles and bars) or did not intervene even when seeing that something did not work. Int-13B said for example about one of the farmers whom we visited: *‘The exciting thing about him was that he had some ideas about ‘naturalness’ and that he was lazy and just wanted it as easy as possible’.*

Although having different levels and views on the limit of ‘what you accept to look at’, there were also examples on which there was general agreement that something was unacceptable, such as a weaning area where there was almost no straw and it was partly outside, exposing the calves to rain and bad weather. One of the farmers did not separate the dry cows from the lactating cows, both because they wanted to keep it as one group and avoid the trouble of hierarchy recreation when bringing them together, and because it was easier and did not require housing of an extra group. As a result, there was many cases of milk fever, which also made a couple of farmers react with statements that this was ‘something, which could be done better for the

animals’. A couple of farmers reacted with surprise on the abrupt weaning and bad preparation (where the calves e.g. did not learn to eat properly) which made the calves lose weight and look miserable. Others wondered why some farmers were so ‘laissez-faire’ (as they called it) about the general living conditions, like for example expressed by Int-13B about one of the farmers *‘Imagine if he had a good grass field and good feed, what he could get out of it?!’*

Guidance or control?

Most of the interviewees acknowledged this ‘trust in the animals and that they can make it work’, but they also told that they would like to have the animals more under ‘supervision and control’ than they perceived it to be the case in the Dutch herds. This was for example expressed by Int-17B in the following way: *‘It should not be too loose – then I would have problems – I would not have peace inside myself. It should somehow be under control, with ‘nature’ as model’.*

More of the interviewees used the expression ‘having everything under control’ in different ways, e.g. when describing the gate systems which they saw in one of the herds with AMS and a designated calf-area to which the cows could get access, or the German research herd, where gate systems allowed the calf to have access to the cow area. The advantages of these systems were that not only could the herd owner control the animals and their access to each other to various agree, but it also gave them a possibility to follow and document their movements, irrespective of how ‘free’ they were to move around in the system. Some liked these gate systems because they gave possibilities quite easy regulation of gradual weaning procedures, which was a hurdle for many, and this could be used also in bigger herds. However, where some talked of it as ‘making the system easier to manage’ and positively as ‘making it more systematic’ or ‘turning the equipment into something which helped the cow-calf system’, others talked of it as ‘making it more complicated’ because it seemed to require more management, e.g. spending time on introducing

gate systems to the calves. Some mentioned the work plotting things into the computer take too much focus, for both humans and animals with 'too much steel and concrete'.

Views on how it can work in a dairy farming systems

Int-1B: *'But I did not see any solutions where this was perfect. Much of it was about the infrastructure. I am excited about what the economic consequences of these systems are, when it is calculated more precisely. Can the loss of milk be compensated by other effects? That is a general consequence of asking the researchers: the more we know, the more we are reminded that we still need to know. But which of the aspects which we talked about during the excursion, makes me either to keep doing what I do or consider other practices not just regarding cow-calf, but also other things? Ethics and what is good for who?'*

Int-10B discussed the balance between multiple interests: the farmer's work load, the amount of milk consumed by the calves, the efforts or possibilities to create a 'smart system' especially for separation of calves and cows: *'All that discussion about the amount of milk – maybe it is bad use of the feed, but it was completely crazy how they were growing! There might not be a reason for trying to make them drink less – it might just end up in failure if one focused on trying to limit it – it could create a lot of conflict – it wouldn't be worth it. For example, if they became ill. If they started weaning a bit earlier, they would still live up to the organic regulation – but limiting the amount of hours will just create extra work. It took a lot of focus in our discussions: how much milk they drank – in reality it might only be some hundreds of liters extra – maybe we could just give them some proper feed. It is indeed a plus that the cow can teach the calf how to eat – it would be a pity not to use that.'*

Int-1B: *'That farm made me most enthusiastic, because it made me think about how I could actually make things systematic. There was a bit too much 'old doors tied together with rope' – but*

he had the possibility to bring things under control so that he still got some milk from the cows, and if he could use the options to actually teach the calves to eat together, and obviously they couldn't. But regarding our skepticism whether it was actually possible to get some milk from the cows also when they were together with their calves, he showed it to be possible'.

Int 1B: *'There are still really many open questions: 'How can you organize it so that the calves are searching actively for solid feed, and drink more water, at an earlier time? How can it be organized in a logic way so that we consider the many different factors and still get some milk harvested? How can we make it work with the organic rules and calves on pasture from and age of 4 months, and not having two parallel herds?'*

Reflections on cow-calf-systems being a part of a bigger picture

As discussed elsewhere, the interviewees generally expressed frustration over the apparent lack of consistency between some of the gaps between intentions and actions, or the fact that some of the farmers seemed to do things 'halfway'. However, there was a general acknowledgement and enthusiasm about some of the visited farms, where the farmer had thought many different aspects into the farm and around the dairy herd and milk, or where cow-calf systems were part of or in consistency with a 'bigger system'. Some of the participants tried to find examples of Danish farms with similar initiatives, and referred to more and more focus on 'local products', 'pleasure' and 'events', and making a visit to a farm with a shop and a restaurant 'an adventure'. One interviewee mentioned that we in Denmark generally were 'handicapped' because of the cooperative movement, which had pushed a specialization and disrupted the contact between farmer, processor and product. It was also noticed that dam-rearing could be a good sales-argument, seen from a positive or negative angle: positive because the calves and cows actually might benefit from it, and the direct contact between farmer and consumer might

push a development, but negative if it became only a sales argument, and it was not properly thought through in all cases. This could for example be the case if the calves and cows were only together for 3 weeks – this could be perceived as ‘enough for the consumers to like seeing it’, despite it was far from the whole milk feeding period.

Other impressions, which the Danish visitors highlighted, were more related to the ‘bigger picture’ and had nothing to do with cow-calf contact systems but were just surprising and inspiring, e.g. long-term pastures which were 25 years old, or that the cows were horned, which was not even questioned in Denmark, where the normal practice is to dehorn.

‘At which time is it best to suffer?’

The views on how the cow versus the calf suffer from the separation are interesting in terms of time, because the interviewees tended to view early separation as most gentle for the calf, as for example expressed by Int-5B: *‘... and the break is probably not so big when they are 4 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...’*.

There was a general discussion, which was not articulated much in the interviews, about whether ‘silence’ was a sign of no suffering, again referring to what is natural: in nature the calf would be silent to not be discovered, and that was why the calf would not call the mother during the first time. The same was questioned regarding the mother: her stress also had to be considered, as discussed above under the headline ‘The mother cow’s aspects’. Int-17B unfolded it as an argument that the time with the calf helped 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. Gidi [one of the presenters at the evening workshop during the discussion. red.] talked a bit about it – there are some diseases around calving that they avoid. That is a time where they are maybe less stressed – and maybe something about their hormonal*

pattern. That there is an advantage that they stress comes a bit later. Maybe it is not that bad to push it a bit. We have actually done that ourselves, when we have had a cow that went down – then we have let the calf stay there a bit longer because then the cow has a drive – she is almost willing to roll over on her one side to let the calf drink.’

Do some animals have more right to meeting their natural needs than others? The question of the bull calves versus the heifer calves.

A balanced consideration to the mother cow as well as to the calf was addressed above, and another imbalance, or ‘injustice’ was the difference between males and females, as e.g. remarked by Int-1B: *‘The bull calves were sold, but the female calves got a good separation process...’*. Int-3B unfolded the aspect more: *‘Another consideration: the bull calves. In the first farm, he finished the bull calves at the farm, but the others all said goodbye to their 2-4 week old bull calves to conventional veal calf producers. He did not speculate much about that. In theory they could end up in Poland or Lithuania for fattening. I think that this is an important point: that they think about it – is this something that they care about? They should practice some gradual weaning also in those cases’*.

Indeed, treating the calves differently whether they were males or females, not only affected the calves themselves, but also their mothers: A cow giving birth to a male calf would most likely live through more stress related to relatively early weaning and abrupt separation, compared to her fellow cow which gave birth to a female calf.

Marketing aspects

More of the interviewees were quite surprised that the Dutch farmers delivered milk without getting a premium price for milk from systems with dam-calf contact systems: how could they make it work when the calf drank relatively much milk? They understood that the systems were part of a bigger marketing system (e.g. cheese produced locally on the farm, and at the same time having calves with cows), like explained by Int-17B: *‘The fact that he told about it – a whole*

concept which also meant that he got more for the milk – that it was an ‘experience farm’. Most farmers referred to their own situation and the investments they would have to make to have a dam-calf contact system, and emphasized that some kind of premium simply was necessary to compensate for not getting all the milk for sale. However, they also mentioned that implementing such a system was a big thing, and not something which just should be done to please the consumers, like for example the farmer who kept them together for 3 weeks: *‘He could manage them at that time. One could say that one should not do this to please the consumers – but on the other hand: they are the ones buying our milk. No matter what we do, we are confronted with some dilemmas’.*

Change is a big thing

More of the participants mentioned that exploring and experiencing how things work in another country or among farmers whom they had not met before, was inspiring. Their expectations had been different, from just curiosity to a bit anxiety about what this was, feeling a bit pushed by the awareness that Danish consumers also asked for it. One farmer expressed it with a touch of humour: *‘Actually, I don’t think that all my negative expectations were fulfilled’* (Int-10B). Int-13B emphasized that the ‘group-effect’ was beneficial: *‘We lift each other when going for an experience together – walking around talking and exchanging’.*

At the same time, they were aware that nothing could be transferred directly to another context: Dam-calf rearing had to be developed specifically to the system in which it should take place and could not be copied across contexts. One of the farmers used the expression to not ‘start something where the failure is certain’: *‘It [dam-rearing.ed.] requires some conditions, but it has much to do with the organization of it, and the right people. Either we have to build or organize ourselves completely different, and I think this is limiting. There are some potentials in it, but I think we should be very careful, not to start something*

where the failure is certain. The right persons can maybe succeed, but we have to take care not to announce such systems as ‘something which you can easily do’. That is not realistic. ... We must be careful not to push a development that cannot hold water. It is a long process, and we cannot see the consequences from the first moment.’ (Int-10B).

After the tour, many had seen that it could work, and partly how, and a broad range of different ideas, such as how to make it work with milking robot and gate systems, or that it was possible to take the calves with the cows on grass, but there were many unanswered questions remaining. A few of the farmers had talked about starting a Stable School or some type of group to develop these systems. There was consensus that it should happen in a group of farmers who could understand each other’s goals.

More of the farmers started speculating at their return, how it potentially could be tried out in their herd and talked about having a ‘test’ with for example 20 cows.

Study C: Interviews of five farmers after a short study trip

Consumers and trends are drivers

The five farmers interviewed after the short excursion to North Germany all were very conscious about the market driven development of cow-calf systems and the fact that questions about calves’ time with their mothers was the most frequently asked question among the consumers. They had also experienced it themselves, e.g. at the annual ‘see the cows dance’-day, where organic farms open their doors for consumers to see the cows on pasture for the first time this year: *The interesting thing is the questions and requests from the consumers when we celebrate the ‘Organic Day’* (Int-18C).

Some called it ‘the ghost of the consumers’ and referred to the fact that consumers actually did not really know about the implications of implementing such a system, including the

increased prices. Some perceived the consumers as lacking some knowledge about cows, as e.g. expressed by Int-20C: *'It is important to explain the consumers that cows are not like humans - they do not moan in the same way, and after some days they go on with life ...'*. This also led to confusion – if they should live up to consumer expectations, they needed to 'decode' what was actually wanted, and obviously the complication was that consumers did not know enough to specify how they understood an animal welfare friendly cow-calf system. Some also feared that it was nothing more than 'a trend', and in the light of the many changes that had to happen on farm level to make such a system work sufficiently, they could fear as Int-15C expressed it: *'It takes time to develop such a system, and then one has to hope that the trend is not over'*. Some asked *'For whose sake should we do this?'* (Int21-C) and pointed to the fact that no matter how the development was driven, the system had to work on the farm, so it should be built up to fit each farm context.

As discussed below regarding 'calculations', there was no doubt that milk from cows in cow-calf systems would be more expensive to produce. More interviewees had a concern whether it could give them an option to develop a 'special and more expensive product', or it became a requirement, as e.g. expressed by Int-18c: *'It is a question of time, exactly like all that about eggs from caged hens – I fear that this will also happen with milk production'*.

Finally, there was also expressed an awareness that this debate – although taking much focus from the consumers point of view – should be seen in a bigger picture, e.g. in relation to climate debates: *'And as the climate debate are going crazy at the moment, it is important that we can defend the various ways in which we do things ...'* (Int-21C).

The calculations

The main concern for all interviewees was the amount of milk that the calves would drink. One of the participants had tried to have calves with their mothers in the summer before this excursion, and

admitted that it costed a lot of milk, at least in his case: *'It costs milk – it costs really much milk. The cows don't have much more than 5 liters when the calves are around, that is just how it is. If that should be what we want, we have to have it as a whole system, where they are together. Then one has to figure out what it costs, and then it has to cost more to buy such 'trend-milk' (Int-15C)*. This interviewee estimated that it would be feasible if the consumers were willing to pay 15-20 DKK per liter milk, and he emphasized that the small amount of milk for consumption was the only negative aspect of his experience: *'All in all, it is a positive experience, except from the milk. There are not many negative things to say otherwise about that system with cows and calves together – it was great to experience'* (Int-15C).

One aspect of costs was the working time. One farmer – who had not tried such systems – thought that it probably would need 1 hr. more per day to be sure that the calves were ok, and maybe even more if they had to be separated and brought together again twice every day.

Is it natural? What is natural?

This group of interviewees were generally challenged by the discussion about 'what was natural?' or 'what is most natural?', mostly because the whole set-up around dairy farming is not natural anyway, so how could this be 'made natural'. However, more of them emphasized that sometimes 'natural' was also about just letting them take care of things themselves, and not intervene or make it complicated for the animals. Calving could be a really natural thing: *'All my cows calve outside from 1st April and two months from then. Most of them calve during night, and in the morning, they are there, suckling. All those things about putting them in a box etc. – we intervene too much and make life complicated for them – they can do a lot themselves'* (Int-20C).

More interviewees high-lighted high milk yield as 'unnatural per se', and a challenge to cow-calf system, like expressed by Int-18C: *'Our cows are not reared for this, not at all – such a cow which gives 50 liters of milk – that would never work:*

Then one calf suckles a bit on it, and then the whole udder has to be emptied'. Int-21C expressed it: 'In relation to the organic principles, we are far beyond what is unnatural – and a cow is not created to give so much milk – there are really very many things under Danish circumstances that anyway are not natural at all anymore'. Int-20C, who had experience with suckler aunts, found that system ideal '... a calf should be allowed to suckle, and it might not be healthy to drink 15 liters of milk – then 3 calves per cow fits quite well. They get about 7 liters this way'. One of the interviewees (Int-15C) was hunter and parallelized the 'unnaturalness' in the farming, where udders sometimes were too deep, the calves too weak and the milk yield too high, with problems generally around reproduction: 'Now, well, I am a hunter too, and we rear phasans to set free – and they cannot find out how to have chickens anymore. That is bad. All that about naturalness and organic principles – it is difficult. And what about humans – all those fertility treatments ...!'

The interviews all discussed nurse cow / 'suckler aunt' systems versus dam-rearing, because one of the two herds seen at the excursion was such a system. One of these interviewees did not feel that it was 'quite right' with suckler aunts, and it could also be potentially difficult and 'unpractical': moving them back and forth, bringing them together and doing an effort to bond them, and then the debonding process, which had to happen anyway. Another farmer (Int-18C) emphasized that it was more difficult to keep calves with their own mothers, than to establish suckler aunt systems '*... If it was just about giving the calf an udder to drink from, it would be easy, but if it has to be the mother and the calf, then it is more challenging*'. He also referred to a Danish farmer, who had been in the media because he had calves in a 'mixed hybrid system', where each cow had their own calf and an adopted calf. He emphasized that this farmer was also not 'quite there yet anyway'. On the other hand, Int-15C guessed – based on his experience – that about 5-10% of the heifers would not be able to take properly care of their calf, and then it would

develop into a hybrid-system or feed them 'conventionally'.

'Naturalness' can also be perceived as letting things happen on the premises of the animals, as Int-20C explained: '*We often make it into 'human welfare' – and I don't think that is right – it has to be on the animals' own premises and one should understand what they actually need*'.

Two others had own experience with suckler aunts, one more sporadic, but positive, 'when there was a cow that did not make it well on the slatted floors', and another (Int-20C) who had had suckler aunts during 20 years. He had seasonal calvings, where 50 cows calved, and selected cows with 3 calves each stayed during the summer on seminatural grasslands. He experienced that it worked well, and the mothers called their calves for a day or maximum two, but since they did not get any response, they stopped again. Another farmer had tried this system, but the calves became more anxious and fearful, and still today he could identify those cows, which were with suckler aunts as small. Int-20C had also tried to keep the calves with their mother: '*I tried to have calves with their mothers, and it did not really work. They were together during the entire milk feeding period. They ran under the fence wire, and through the hedges etc. The cows were too busy taking care of their calves to come into milking*'.

Some of the other farmers also experienced that there was some 'noise' after separation, no matter whether mother and calf were together for 1 or more days, but the calves quite quickly got used to drink from a bucket, and then it stopped. Some had experience that it was worse after 2-3 weeks. One remembered that when the grandfather had the farm, cows and calves stayed together for some time – probably weeks – and then they were abruptly separated, after which the cows were taken down to the field furthest away, and both calves and cows were calling the whole night. More of the farmers were concerned about the weaning and thought that it was worse the longer time they had stayed together.

'Nobody is there yet'

In the light of nobody in Denmark apparently being 'quite there' regarding cow-calf systems, and most experience originating small herds with lower yields, all interviewees asked for more knowledge under conditions comparable to Danish dairy herds. Int-21C expressed it: *'I see a bit more problems than solutions with regard to this type of systems, right now ... [...] ... there are really many things that we need to clarify – and I am actually open to that – there is a range of things to which we need more concrete knowledge'*.

A need for knowledge from systems which were more comparable to Danish systems was pointed to, and then it was emphasized that a development work could maybe happen in farmer groups: *'The development-work could happen in such concrete Stable Schools or 'development groups' – I would probably name them differently – but I think that is where things will happen. When people are getting together, and getting together around something which they burn for, then things can happen really quickly'* (Int-21C).

It is great to experience

Some interviewees had joined the excursion mainly because they were curious and felt that they needed to explore these types of systems, mainly driven by the interest from society these days. Based on this, they needed to identify what they could do, practically. There was a general consensus that it was good to see such systems, and the farmer who had tried it in their own herd, also characterized it as a 'great experience'.

Make it simple or make it complicated ... it is a matter of choice

The essence of this theme was a discussion of how to balance trust in the system and ones own abilities to keep the overview, and to make it simple. Some perceived 'systems with iron' and gates and computerized systems as 'complicated'. Int-15C said: *'It should be working with minimum work – not all those things bout boxes, where they should go in and go out. As simple as possible. All those gates – ok, fine, but - ... really, as simple and easy as possible ...'*, and this interviewee also

stated that it should be made in a 'good way', but 'simple' can also be good for the animals. Others referred to the 'natural abilities' of calves and cows to manage things.

However, some found that if a given system should fulfill all criteria regarding 'possibilities to stay together', milk to sell, and not spending too much time or money, then a system had to be organized which 'organized' the flow. Such a system could be with smart-gates, or it could be with routines of separating and bringing cows and calves together, or just 'leaving them together'. The overall conclusion was that it was a matter of taste, farming systems 'logic', and choice.

Another aspect mentioned was the necessity of flexibility – things would happen such as cows getting high SCC or not accepting the calf. Both those situations should be possible to handle in the system.

The practical possibilities

The first question to be answered was whether it was possible and feasible to have such systems at all, under Danish conditions, as expressed by Int-19C: *'We are more producers in the dairy company who could be interested in converting to such systems, if it has a future, and it is possible'*. More interviewees mentioned herd size as important – having 300 cows in such a system is very different from having 50.

There was a consensus that there is need for practical solutions, and broad knowledge about how such systems can work, e.g. whether it is manageable and feasible to have them together halftime, or fulltime. More expected that it would require time to convert, because it was a profound system change and not just something, which could be done while maintaining the same management routines as before. It might even require more daily time than the traditional systems with separated cows and calves.

Time to develop

There was general consensus among interviewees that converting to a dam-calf-contact system was not 'just something one did over-night', and that

the changes had to be quite fundamental, and required time to develop. There was a curiosity and as said by Int-21-C: *'I do not have any concrete plans at the moment, but I am interested in being part of the journey'*.

One of the interviewed farmers was biodynamic and did not see any conflicts or distinctions between organic and biodynamic farming regarding cow-calf-systems, or generally: *'Actually, I cannot see any differences between biodynamic and organic herds regarding human-animal relations. I think that we are as much for naturalness as the organic farmers, and for example, we want the animals to be outside as much as possible. The animals have a very central role for us in biodynamic agriculture. We are accused of many things regarding climate, but I think that we have to have that carbon stored in the soil, and it does when they are grazing.'* (Int-20C).

Trust the animal and the system ...

Much of this theme is covered in the discussions about systems, naturalness and practical possibilities, and was basically about 'trusting that the animals can find their own way' and supporting them in that by making systems for them, where they could move freely and perform as natural behavior as possible. The essence was that we as humans should not make life complicated for the animals but let them guide us to build up a good, flexible system.

A couple of the interviewees raised concern that the calves became 'wild', and one had previous experience with calves at suckler aunts, which were more fearful to humans. One farmer, who had tried dam-rearing just one summer, experienced the opposite: *'They were not wild at*

Summary of the studies in Norway

There has been an increasing awareness and expectation among Norwegian consumers that calves should spend more time together with their mothers, and that it is unethical to separate cow

all – they are after all together with the group, and they walk with the others also when we take them inside. So, mine were not wild. They learn about electric fences and they eat grass'.

The bigger perspective – the climate

More of the farmers mentioned climate change issues, and the requirement to produce milk and meat more climate friendly, both as something, which could be potentially contradictory to cow-calf-systems, or be higher on the agenda at the end.

However, building up of a system to manage cows and calves together, required a bigger change than 'just putting calves into the system', as expressed by Int-18C *'We have seasonal calvings, and we intend to continue with that, so it would be a short period where we would have to deal with such a system. But it would require more or less two housing systems ...'* and Int-21C: *'I learned on this excursion that I couldn't see it work at home in my system. I have deep litter, and I cannot see that we can have the calves there – we will have to organize a special area for them'*. A couple of the interviewees pointed to the need to completely change systems, like *'...This will require a complete change and have a completely different type of farming system than we are used to'* (Int-19C).

One of the interviewees emphasized the importance of keeping a diversity between farmers and systems, to keep developing: *'... and that [to represent various ways of doing things.ed.], no single system can do. All what we have around us, can mirror the area that we live in – and it is good that there is a diversity. It is important that we keep developing as farm managers and keep the diversity'* (Int-21C).

from calf right after birth. Most farmers believe that removing calves from the dam right after birth and keeping calves in separate pens involves the least stress for both. Farmers have also always

argued that letting the calf spend more time with its mother would reduce the amount of milk delivered, and thus also income. Furthermore, dam-calf contact systems were considered to be more labour-intensive, and they would require more investments in new housing solutions that ensure a practical workflow for the entire operation.

However, many farmers seem motivated to try out solutions that enable calf and dam to spend more time together and call for more research on practical solutions for livestock housing, indoor mechanisation and pasture management strategies, analysis of the financial effects of such a transition and documentation of what actually is best for both calf and cow.

Interview results

Our interviews and observations showed a broad range of different experiences among the five interviewed farmers, who had either tried to keep their calves together with the dams, or still did at the time of the interview:

- There was great variation both regarding the length of the period until calves were separated from their mothers ('immediately' and to up 3 months after birth), as well as the use of nurse cows.
- The interviewees experienced that the calves with dams had no parasite and disease problems, and generally believed that keeping cow and calf together results in less use of antibiotics, lower somatic cell count and generally improved health.
- Calves were experienced to drink 10-20 liters per day. Calves had high weight gain, which compensated for decreased milk delivery, at least on farms where milk products and meat were directly marketed.
- It was generally perceived that calf-dam rearing was easier to practice in herds with seasonal calving in spring, to utilize pasture resources in Norway. At the same time, farmers pointed to the need for more pasture in these systems, also

because more cows were needed to fulfil the milk quota. Year-round-calving would require both indoor facilities for the winter, as well as outdoor access suitable for cow and calf during the summer. Despite the option of outdoor calving, most Norwegian cattle farmers presumably prefer to keep dams and calves indoors for parturition and the first few critical days thereafter, before turning them to pasture together. This ensures the calf's intake of colostrum and the establishment of cow-calf bonding. As a result, calves have a better chance of herd socialisation when they are turned to pasture. Farms with plenty of grazing land use the same pasture for cow-calf co-grazing each year. After separation from their dams at about 1-3 months, heifer calves are kept on separate pastures for the remaining grazing season. However, if separation occurs late in the season, heifer calves are moved indoors.

- Calves were experienced to learn grazing and other behaviours from their mothers.
- Some found human handling of calves more difficult after keeping calves and dams together for a longer time, whereas others found it un-problematic. It was also experienced as more difficult to teach calves to drink from a feeder after they had spent eight weeks with their mother.
- Some experienced that keeping calves with dams gave less work, some more. This seemed to depend on housing design, pasture management, and other strategies.
- In summary, farmers experienced two opposing viewpoints regarding this issue in Norway, and questioned whose opinion on animal welfare should guide the future development: animal protection organisations and consumers, veterinarians and scientists, or the farmers themselves, based on many generations of experience?

Five interviews with farmers with experience on dam-rearing in Norway:

Farm 1

The first farmer had 20 dairy cows with an average milking yield (milk delivered) at 7 531 liters per cow in 2018. The cows were kept in a loose housing system with a milking parlour. They kept cow and calf together for the first three to five days in a straw bedded calving pen. The calves were moved to separate calf pens with two or more calves per pen and near other animals, where they were fed fresh milk for three months. The farmer also had some experience with having cow and calf together for three to five weeks because of an experiment with totally 22 cow-calf-pairs that was conducted on his farm.

Farmer experiences and motivation for this system: The loose housing system for the cows in this barn were not suitable for having calves with the cows, among other things, because of too big openings in the slatted floor area. When the farmer had cow and calf together for 3-5 weeks under a experiment, they were together in a calving pen the whole period. When cow and calf were together for this long in a calving pen with straw bedding it became more work with cleaning/bedding and with milking because the cows then were milked on milk cans inside the pen. The farmer experienced that the cows reacted stronger than the calves to the separation, and he did not notice any big difference in vocalisations after they were separated after 3 days or 3 weeks. He meant that they quickly bond with each other, but this is also individual. When the barn is not built for having cow and calf together it may be a lot of extra work if you have them together. The farmer also experienced that it may be more difficult to learn the calf to drink from a bucket then they have been suckling the cow for three to five weeks compared to three to five days.

Farm 2

The second farmer was the only conventional farmer among the interviewees. He had 15 dairy

cows of the old Norwegian breeds called Sidet Trønder- & Nordlandsfe and Vestlandsk Fjordfe and some crossbreeds. The cows had an average milking yield (milk delivered) at 3 314 liters per cow in 2018. The cows were kept in a tie stall. Usually, they were on pasture from May to October. The rest of the year, the cows were allowed outdoor access for a period almost every day. For 5-6 years, most of the calves in this farm were together with their dams or nurse cows all day for 2-2½ months. But, from 2018 they separated cow and calf the first day after birth and allowed them to be together for one to few hours after milking every morning and evening for 2½-3 months so that the calf can suckle the cow. This farmer estimated that the calves would drink about 8 liters per day, and adjusted the milking to this.

Farmer experience and motivation for this system:

The farmer found that this method worked better on his farm, compared to having them together all day, because the cow and calf did not form so strong bonds, when they were only together for two shorter periods every day. By being used to being away from each other, they showed less signs of stress, and both the separation and the weaning became easier for the calf. Furthermore, the farmer found that the risk for calf disease in connection with weaning was lower. The farmer experienced that they as caregivers had less work in this system, and that the cows had better milk let down. Finally, the calves also became easier to handle and more attached to humans.

Farm 3

Father and son were both interviewed at the third farm. They had 19 dairy cows in a straw bedded loose housing system with free access to pasture all year. The average milking yield (milk for cheese production + milk delivered) was 6076 kg/cow in 2018. They kept cow and calf together for five to six days after calving in a calving pen, and then moved them to the other cows and calves. In this herd, there were designated calf shelters to which the calves could retreat to get away from the cows. Cow and calf spent two months together

before being separated (see below regarding procedure). Heifer calves were gradually weaned, some of them from an age of three months, but most of them at four months of age. Bull calves were given milk until they were slaughtered at about six months. Older heifers were kept on a separate pasture a bit further from the farm. The percentage of concentrates fed was 20% and has been reduced considerably because the farmer has had focus on increasing grazing and use of forage and reducing use of concentrates. The farm processed its own milk and meat, and the farmer found this setup both profitable and resulting in excellent animal welfare and health, especially for the calves. The herd was awarded the Norwegian Animal Protection Alliance's animal protection label.

Farmer experience and motivation for this system:

The farmers let cow and calf together with the other cows and calves in the loose straw bedded area after 5-6 days alone in a calving pen. When doing so, they experienced that the calf would run around while the cow was following her calf everywhere the first day. Therefore, the other cows and calves did not bother a newborn calf with its mother. The farmers thought that cow and calf should not spend more than two months together, because it then becomes increasingly difficult for the calves to become accustomed to drink from a bottle or bucket. Also, when then the calves are two months old there is almost no milk left in the cow's udders, and the farmers have to get milk for cheese production and for delivering. Separation of cow and calf happened in a two-step process over 5 days, based on the farmers' experience: First, the calves are collectively moved to a calving pen adjacent to the loose stall area where they stay for 5 days. Between this calving pen and the loose stall area there is just a fenceline of wood, so that cow and calf can have physical contact, but the calf cannot suckle the cow. They experienced that calves and cows were calm on day one after separation, but stressed on day two, and calmed down again from day three, and on day five they do not notice any stress from them. The farmer explained: *'Now they are*

completely calm during the first day after separation. On the second day, they make more sound and they seem more stressed and restless. On the third day they are calmer, and on day 4 they are really calm, and on day 5 you do not notice anything. One could ask whether they stress which they experience at separation is so bad that it makes it wrong to keep them together for 2 months, compared to separating them just after the calf is born. Researchers and consumers have to determine that.' After the calves have stayed in the calving pen for 5 days, they are moved to another pen to the other side of the barn.

Farm 4

From the fourth farm, the Norwegian team interviewed a couple who had 16 dairy cows in a loose housing system with a milking parlour. They had all-year-round-calvings, but tried to work towards a more concentrated calving season pattern. The cows had an average milking yield (delivered milk) at 5 797 liters per cow in 2018. The current owners since 1st January 2017 did not want to separate the calves from the cows after the minimum requirement of 3 days, and they were thinking they would separate them after 5 weeks together, but it became a system where cow and calf were together for 8 weeks. In the beginning they kept the cow-calf-couple together in the calving pen for the whole period, but reduced it to one week, and after that they go into the loose housing system with the other cows and some calves. They have a calf hide in the corner of the loose housing system, and the farmers observe that the calves often lay down in the front part of the cubicles, with most straw. They had also noticed that from an age of 2-3 weeks, the calves seemed to spend really much time together and seemed less attached to the cows. They were playing, jumping and sometimes leaving the fenced field. The cows and the calves who are with them had free access to pasture day and night from the middle of May till the end of September. Heifers grazed on a big fenced-in rough grazing land.

Farmer experience and motivation for this system:

The farmers found that this setup with cow and calf together clearly gave less work, since the dam takes over calf-feeding, which is a big part of calf rearing. When a cow has mastitis and they have to feed the calves manually, they could clearly see how much extra work is involved, although it is not always easy to start bottle-feeding a two-month old calf from a bottle. They found it easier, though, to begin bottle-feeding of calves in a group, and start at the same time, where the calves seem to learn faster when they are with other calves. The farmers thought that the advantage of having cow and calf together was that they could follow their natural behaviour and have maternal care, as well as the increased weight gain and generally improved health. The calves learnt to eat roughage and to graze from their mother.

Farm 5

The fifth farmer had 16 dairy cows in a tie stall, but the cows had outdoor access all year and only had to be inside for milking twice a day. They kept cow and calf together for at least 14 days after calving, depending on what time of the year the calves were born. Calves born in spring or summer stayed with their mothers until autumn (2-4 months). Dairy cows, young stock and calves graze on the same pasture. Yearlings were kept on a separate pasture. Bulls are kept and fed indoors but have access to an open-air run.

Farmer experience and motivation for this system:

The farmer experienced that keeping calves with the cows gave less work, because the cows 'do the job'. Positive effects of having cow and calf

together was that it increases their well-being, make the calves to grow faster, and it improves animal health both mentally and physically. The farmer had experienced that calves fed by calf feeders and kept in group pens become more accustomed to human contact than calves which are together with their dams at pasture. She stated that the effort to make them easier to handle had to be done later. Calves on pasture with their mums tend to run away. The farmer was of the opinion that separating calf and cow right after birth involved the least stress for both, but some cows react stronger to be separated, and she saw individual variations. The farmer's grandfather took the calf away right after birth, based on the argument that the calf itself does not really know anything else and therefore does not react. She had once separated calf and cow after four months and experienced that both cow and calf were restless for many days. She concluded that the longer dam and calf stay together, the harder it gets to separate them. The farmer's father separated calves and dams after three days, but the farmer experience that these calves, which are together with the cows for longer time, are bigger and stronger than those who were separated after three days. She also experienced that there was less milk delivered to dairy, when keeping the calf with the dam. The cow which was with the calf for four months was empty for milk at milking time, so if all cows had spent so much time with their calves there wouldn't have been much milk to deliver to the dairy.

Overall summary of experiences related to dam-calf contact systems, based on the Norwegian farmer interviews about their experience and perceptions on dam-rearing systems

CONS:	PROS:
<ul style="list-style-type: none"> - The calf will eventually empty the udder - You have to separate them to deliver milk - Greater stress response after later separation (should use a method that gives least stress) - Separation and weaning can be challenging - Less milk to deliver – maybe need more cows to deliver same amount of milk - Milk yield registered is wrong (may lead to lower production subsidies) - Maybe poorer profitability (less income from milk, but better weight gain and health) - With some systems – can give more work, problems with hygiene and disease - Can be problems with milk let down - Have to avoid overmilking of empty teats - If the calf is suckling the calf – Difficult to learn the calf to drink from bottle/bucket later - Calves with cows, especially on pasture – Become shy/will run away - Can be more challenging to tame the calves - Should have a housing solution that is suitable (but, if you try, it may work fine even if you are afraid it won't) 	<ul style="list-style-type: none"> - Better calf weight gain – robust, good looking calves, more meat - Optimal development for calf as stated by Farmer 4: <i>'The calf is able to take milk when it wants and in the amounts it wants – very important for the development of the calf which should be optimal'</i> and <i>'The calves have their need for suckling satisfied'</i>. - Better cow and calf health (mental and physical) - Natural behaviour – instincts – can be lived out especially on pasture - Mother care, licking, stimulation - The calf learns from cow – to graze, to be in a herd - Calm and confident animals, as experienced by Farmer 3: <i>'Calves that have been with their mother become calm and confident as grown-ups'</i>. This was also the experience of Farmer 4. - Less work with calves when the calves suckle the cows – cows do the work - Calves in organic production must have natural milk for three months anyway - Better welfare, wellbeing – best if outside - Motivates the farmer, as explained by Farmer 3: <i>'Incredibly inspiring and nice to see when they are together instead of having the calves alone. Cow and calves together give motivation. I am prouder of being a dairy producer'</i>.

Table 3. Different arguments for or against having dam-calf contact systems from the Norwegian farmer interviews.

Summary of the studies in France

Introduction to the French farms where interviews were conducted

In France, there is a growing, although still limited, interest for rearing systems, which encourage the development of maternal bonds between calves and cows, mainly based on health concerns. Dam-calf contact systems are not that much developed, whereas foster cow systems are more often practiced by conventional as well as organic dairy farmers. These systems are indeed promoted in farmers' technical groups which were originally formed around grazing systems and with the aim to gain autonomy in feeding system (that is, to use the farms' own feed resources rather than feed imported to the farm). Dam-calf contact systems and foster cow rearing systems are quite different. Even if farmers tell that they experience that calves grow better in both systems, and health status and welfare is better, each system present some specific issues. This presentation of the French results focus only on motivation and experience of farmers that let calves with their own mother for more than a couple of days, which is the main focus of this report.

	Farmer A	Farmer B	Farmer C
Age	34	38	60
Date of conversion	1996	2010	2009
No. dairy cows	80	40	35
Litres milk/year, sold from farm *)	490.000	200.000	175.000
Litres milk/year per cow **)	6125	5000	5000
Agricultural area, hectares	170	50	52
Permanent pastures, hectares	140	48	49

Table 4: description of French farms practicing dam calf-rearing

Results of the interviews with farmers that have implemented systems with nurse cows taking care of calves are presented in Belluz & Hellec (2018⁵).

Some characteristics of the three participating farms can be seen in Table 4.

Detailed description of the three French farms

Farm A

This farm was a mixed crop-dairy farm with two farmers in partnership (Pays de la Loire region) since 2007. One of them had started farming in 1994 on his parents' farm and he has converted it to organic farming in 1996. The second partner, who was the farmer we interviewed, had joined in 2007, because he had the opportunity to take over a farm which was next to his partner's farmland. He had previously been apprentice on his partner's farm during many years. He came from a family outside the agricultural sector, and had done all his work experience in organic farms. Both farmers belonged to a 'progress group' of dairy farmers, which was coordinated by an advisor of the local chamber of agriculture. In this group, farmers shared their experience on different techniques, like grazing, and they received continued training on different subject (for example, homeopathy).

This dairy herd was about 80 cows of different breeds: one third of Montbéliard cows (a breed coming from the east of France, and close to red Holstein), one third of Prim-Holstein cows, and a few Brune cows. The other cows were crossbreed cows. There was no bull on the farm. The interviewed farmer inseminated the cows in the dairy herd himself. Some of the cows were inseminated with semen from cattle breed bull (Blanc Bleu Belge and Limousine breeds). These

⁵ <http://orgprints.org/34000/>

calves were sold at the age of 15 days, which gave a better price.

The dam-calf contact system was introduced in the herd after a an episode of severe health problems among young calves (cryptosporidiosis, rotavirus). When the second farmer arrived on the farm, the herd doubled in size. The calf housing system was too small and full of calves throughout the year, and therefore never completely cleaned. So the farmers had been faced with a very high calf mortality rate (about 20 calves have died in on year), and decided to let calves with their mother just after birth.

Calving occurred all year long, although with two peaks (in spring and in autumn). Female calves intended to stay in the herd as replacement cows stayed with their mother 3 weeks. The other calves stayed with their mother cow 15 days before they were sold. All calves stayed all day long with their mother inside the housing, or outside during the grazing period. They were separated only during the milking, twice a day. From April to December, the whole herd stayed outside night and day, when the weather was favourable. There were 30 ha of pasture all around the farm, and farmers practiced rotational grazing: dairy cows stayed 2 days on a paddock of 3-4 ha and returned on the same paddock 15 days later.

When separated, female calves were placed in a different building from the dairy herd, so calves and cows could not see each other, but they could hear each other and they called each other loudly during 3-4 days. Farmer had to teach the calves to drink from a bucket. He tethered calves during one week (although this is not legally permitted) in order to 'making them tame'.

After separation, female calves were placed together in a common box. They were milk fed with buckets (4 litres per day, 2 litres in the morning and 2 litres in the afternoon). They were also given hay ad libitum, grain mixtures (meslin or müsli) produced on the farm and alfalfa pellets bought outside (about 1 to 1,5 kg of grain mixtures and pellets per calf at the age of one month). They

were weaned at the age of 6 months and began to graze at one-year-old. First calving occurred at the age of 36-40 months for the heifers. Farmers aim was that heifers should calve at an age of 30 months.

In the past, the older farmer used to rear calves with foster cows: 3 or 4 calves per cow (normally high somatic cell count cows), being together part-time together (2 hours in the morning and 2 hours in the afternoon). After separation, the cows most often returned in the dairy herd, and they did not have problems any more. The farmer interviewed was not sure why his colleague had stopped this rearing system. He thought that calf-nurse cow rearing was not possible because the new dairy herd building was not big enough.

Farmer experience and motivation for this system:

According to the interviewed farmer, calf-dam rearing had many advantages. First of all, the calves were healthier, because *"milk is always at the good temperature, and digestion is best"*. They had not problems with hygiene in the calf-dam rearing system. Sometimes they observed diarrhoea, but it normally stopped without any human intervention. The interviewed farmer told that the saliva produced when suckling, protected calves from parasite introduction in their digestive system. After separation, there were sometimes some health problems that the farmers explained by different reasons: stress of separation, grouping of calves, and insufficient bucket hygiene. The farmer considered the growth of calves to be important.

The farmer wondered if it was good for the calves to drink so much milk, as it could lead to a less development of the rumen. He estimated that calves at the age of one month would drink 5 to 6 litres milk/day. On the other hand, he observed that calves began to graze and eat hay as very young, as they imitated their mother.

Separation was a difficult step for calves. Farmer said that calves became *'overstressed'* and *'scared'* (in the farmer's words), and stayed two days without drinking. In this farmer's mind, separation

was too late, and the calves were too wild. It was more difficult to teach them to drink from a bucket. He perceived it as better to separate calves from their mother just after the colostrum phase. However, they kept on separating at this age, because it was easier for them to have calves fed directly by their mother.

Before, some heifers were suckling each other (especially Montbéliard cows), which made them use nose-flap to prevent cross-suckling. However, they did not observe this problem anymore, since they implemented calf-dam rearing system.

The farmers thought that it took more time for cows than for calves to recover after separation: the interviewed farmer expressed it in the way that the cows were 'nostalgic'. However, he observed different reactions between mother cows: some of them did not seem affected, and some of them were still looking for their calves for a week. After separation, cows were in estrus very quickly. When they were with their calves, some cows did not give their milk at milking. In this case, farmers would separate them from their calves earlier.

This farmer considered this calf-dam rearing system as easy, which did not need much work. They just needed to ensure that the calf suckled as it should. According to him, 2% of the calves needed assistance to learn to suckle, but 98% of the calves did not. This farmer expressed that he felt pleasure when seeing calves suckling their mother. For him, it is more natural. However, he also emphasised that he saw his main work not to rear calves, but to produce milk.

Farm B

Farm B was a diversified farm with direct selling for part of the production (Brittany region)

The farm B has been converted to organic farming since 2010. He had set up in farming on his parents' farm, and he was alone on the farm. The main production was dairy production, and milk was sold to an organic co-operative. The farm included also vegetables, meat and apple juice, all for direct sale. The farm landscape was mainly

pasture. The farmer belonged to a group of dairy farmers inspired by an advisor from the local chamber of agriculture, like farmer A. He had also made many study trips with the group in order to discover dairy farming in different countries (e.g. Spain, Austria, Swiss, Germany).

The dairy herd was about 40 cows, mainly in Prim'Holstein breed. The farmer tried to make cross-breeding, to get animals more fitted to its rotational grazing system. Therefore he had crossed 20% of the Prim'Holstein dairy herd with other breeds like Alpin Brune, red Holstein and Normande. He also crossed some cows with wagyu breed, and those calves were only reared for meat. His long-term project was to stop dairy production and to convert to meat production, to have less work. Calving occurred all year round in calving boxes. Only the female calves intended for later replacement in the cow herd went into a calf-dam system. The farmer began to milk the cow twice a day after two or three days, to make sure that it has recovered from calving. Calves stayed with their mother from two to three weeks and went with them to pasture. After separation, calves went to group housing systems, where they were fed with teat bucket. It took the farmer one day to learn calves to drink for these buckets. Calves were weaned at the age of 6 to 7 months. They received also cereals produced on the farm and hay ad libitum. Heifers were outside all year long and calved at an age of about 26 months.

Farmer experience and motivation for this system:

The main motivation for the farmer to let calves and cows together was that it was "more natural". He wanted to rear the animals as natural as possible, and also considered to stop dehorning.

The farmer observed that calves seemed susceptible to disease at an age of 15 days: some of them got sick at this age (coccidiosis for example). He considered it to be a transition period between the immunity given from the mother, and the immunity system which the calf developed after birth. Generally in his experience, sick calves, which stayed with their mother, would recover naturally. He had only a few calves that

died from diarrhoea. He decided to wean calves late because he thought that milk is the best food for calves and allowed continuous growth, which was important for the calf. After separation, the farmer did not meet difficulties to tame the calves, because he was the one feeding them. The farmer said that Prim'Holstein cows were easier to approach than cows from other dairy breeds like for example Montbéliarde. It was easier to learn them to drink from teat buckets.

When going to pasture with their mother, calves learned many things like grazing, respecting the fences, and social relations within the herd. It also helped calves to gain immunity against parasites of the pasture.

In the opinion of this farmer, cows made less noise when being separated from their calf just after birth, because they were too sad. When separated later, like he did at three weeks, cows were angry and expressed easily their stress and fear. According to the farmer, cows seemed more stressed than the calves, and kept looking for their calf. It happened once that a cow tried to adopt a calf from another cow. The farmer had difficulties being confronted with the cows' sadness. That was one reason why he considered stopping dairy production, when his economic situation would permit it.

The farmer had seen a Youtube video on systems where calves were with nurse cows, and he thought that this was not a good system, because the nurse cows were 'sacrificed' in his words: they were often culled after separation with the calves.

Farm C

On this grassland farm in the east of France, a couple was working together. They had settled there 20 years ago. The husband did not come from a farmers' family, but he had worked as farm worker for 15 years before having his own farm. He converted to organic farming in 2009, and they expected to retire in a couple of years. Their son was doing agricultural studies, but was not yet sure whether he want to take over the family farm.

There were 35 dairy cows in the herd, of Montbéliard breed. Since 2017, they did not feed any concentrate, only hay during the winter (high quality hay, dried on the farm), and grazing during the summer. A third of the herd was inseminated with cattle breed (Blanc bleu belge). Calving occurred all year around. All calves stayed with their mother after birth, but only 6 or 7 female calves were kept on the farm, intended to become replacement cows (replacement rate: 20%). All the other calves, male and female, especially cross-breeds, were sold at an age of 2 or 3 weeks. There were calving boxes in housing system, but they were used only in the winter. The cow and its calf stayed together in the box for 24 hours, and then joined the dairy herd. During the summer, calving took place outside. After birth, calves stayed with their mothers in the dairy herd day and night, and followed them on pasture. Cows and calves were separated twice a day during milking. Cows were milked 24 hours after calving for the first time, and there was a calf hide in the housing system.

Calves that were sold, were separated from their mother at the age of 2 to 3 weeks, and female calves which were intended to stay on the farm were separated at the age of one month. Separation was made by tethering the calf during 3 to 4 days in a box. The farmer gave them also a homeopathic remedy, Ignatia, to help them to grieve. After separation, calves were milk fed in teat buckets, and stayed in groups until the age of 8 months. Calves received 6 litres of milk per day (3 litres in the morning and 3 litres in the evening) the first month and then they received progressively less and less milk (only 1 litre per day at the age of 7 months). The farmer gave them also hay ad libitum, but no concentrate feed. Calves were weaned at the age of 8 months. Heifer would calve for the first time at the age of 36 months.

Calves were de-horned at the age of 15 days. Previously, this had been done at an age of 1-1½ month, but the farmer considered it to be too stressful for the calves to manage de-horning and separation from their mother at the same time.

The first time where this farmer had heard about calf-dam rearing system, was during a training course given by a homeopathic veterinarian (the subject was global approach of animal health and there were focus on rearing systems that prevent from health problems on the herd). The farmer kept in contact with this vet, and did not hesitate to phone him for advice.

Farmer experience and motivation for this system:

For the farmer, calf-dam rearing system had many advantages: calf could drink as much as they need and grew well, and the system favoured immunity development of the calf.

They experienced that calves born in the summer were wilder than calves born in the winter, as they had less contact with the farmer. Sometimes young calves did not follow cows to the pasture by themselves, or they stayed or even slept outside and did not come back with their mother. The farmer therefore had to look after the young calves, to make sure that they were not lost. He trusted the mother cows: according to him, a cow always would know where her calf was. He was sometimes faced with problems with heifers: when the calving was difficult, the heifer did not take care of her calf and the farmer would have to help the calf to suckle.

The farmer explained that he had to tether the calf after separation from its mother because otherwise, the calf would jump everywhere. Usually, calves would begin to drink the day after the separation. The calves had to learn to drink from teat buckets, and the farmer preferred this because the calves kept on salivating, just like they did by suckling their mothers' teats. The farmer gave a young calf a new nipple which would be slow, to help them to learn suckling in this system, from a bucket. The farmer had stopped the concentrate feed for calves, based on the advice from the homeopathic vet, and observed that the calves' hair looked better. He said that calves should 'adapt to humans'. In his opinion, a good farmer should inspect every animal every day. Before he implemented calf-dam rearing, some

heifer would suckle each other. Now he did not have this problem anymore.

According to the farmer, calves began to graze very early or to eat hay, at the age of 8-10 days for some of them. He had not treated calves for disease problems for 15 years. He observed that some calves got diarrhoea at an age of 8 days, but they recovered without medicine.

One cow was so sad after separation from her calf that she refused to eat and to lie down. She lost weight and was very tired. Based on advice from the homeopathic vet, he gave it homeopathic *Ignatia* for two days, and the cow finally recovered. After this experience, he decided to give this remedy systematically to cows and calves after separation. He observed that animals made less noise.

The farmer had heard about calf-nurse cow rearing system, but in his perception, it could only be done in herds with seasonal calving patterns. He pointed out that it would be difficult for the nurse cows, who have to produce a lot of milk to feed the calves. He said that '*you have to be even more breeder when you have nurse cows*', because it required more intense attention. As he just kept 6-7 calves each year, he thought it was easier to let them stay with their mother, than to have nurse cows. He did not know other farmers in the neighbourhood who practiced calf-dam rearing.

[Summary of experienced advantages and disadvantages in calf-dam rearing systems](#)

Calf health and welfare

According to farmers' experience, the main advantages of calf-dam rearing system concerned impacts on calf, that is calf health, growing and welfare. One of the interviewed farmers adopted this system because he could not manage important health problems on calves, but these problems disappeared with the introduction of the dam-calf contact system. The two other farmers also emphasized that their calves were healthier when reared with their mother.

Naturalness

The three farmers interviewed told that they chose this system because they perceived it as more natural for calves to suckle their mother. One says that it was a pleasure for him to see calves suckling their mother. One farmer talked about calves learning from their mother, for example he experienced that his calves learned to respect fences.

Wild calves

All farmers talked about the risk of 'wildness' of the calves. They all experienced that calves were 'wilder' after being separated from their mothers, than calves reared in a conventional system. In particular calves that were born outside during the summer. However, in their experience, this was not a problem, and they had the experience that it was easy to make them 'tame' after separation.

Positive impact on the farmer's work

The fact that they had less health problems, had a general positive impact on the farmer's work situation, since they had to intervene less on calves. One farmer explained that even their calves sometimes had diarrhoea, they recovered quickly and without medicine. All farmers considered calf-dam rearing to be less work consuming, compared to systems with bucket feeding. It required daily monitoring, and there is some work after birth, as they have to make sure that the calf suckled properly and had sufficient amount of milk. In their experience, they only had to assist few calves to learn to suckle, and problems occurred for example when the cows' udders had a bad shape.

Separation the biggest challenge

The experienced main difficulty of this rearing system was the separation of calves and their mothers. However, farmers did not want to let them be together during a longer period based on the argument that they would lose too much money by selling less milk. The age of two weeks to one month for separation was a compromise between the two conflicting interests.

Debate about age for separation

Farmer A thought that it was better for calves and cows to be separated very early, after the colostrum phase, at the age of two weeks. Calves were less stressed and they learned easily to drink with feeding bottles.

The cows' perspective

Two of the farmer perceived that cows were more depressed when separated early after birth from their calves. In the opinion of farmer B, cows made less noise because they were too sad. When separated later, at three weeks, they are angry and express easily their stress and fear. Separation was a difficult step for cows, and according to farmers A and B, cows seemed more stressed than the calves. All farmers observed that cows came quickly in heat after separation from their calf. Otherwise, the impact of the calf-dam system on cows was little addressed in the interviews.

Farmer A sometimes experienced that cows did not give their milk in the milking parlour when they feed their calf. Farmer B mentioned that some cows were strongly motivated to nurse calves and sometimes tried to 'steal' the calf of another cows after separation from their own calf.

Dam-calf contact systems not much supported or encouraged

There is presently no incentive in France for organic farmers to adopt dam rearing systems, neither from public regulation, nor from dairy industry. Very few advisors recommended farmers to let calves stay with their mothers, mainly homeopathic veterinarians gathered in an association called "GIE Zone verte", which provide farmers with advisement and training courses on global management of animal health. Some farmers who adopted this rearing system did it after meeting these advisors. Some others had the idea by themselves, as they were looking for a solution to solve health problems on their herd.

Overall summary of experiences related to dam-calf contact systems, based on the French farmer interviews about their experience and perception

CONS	PROS
<ul style="list-style-type: none"> - Calves can be too wild after separation from their mother. - Separation is difficult for mother cows. They express their pain in different ways (e.g. mowing loudly, looking for their calf in the housing system, trying to adopt the calf of another cow, refusing to eat). - Separation is a difficult step for calves too, and two farmers tether them to make them less wild. There is a need of conception of softer separation techniques. - The farmer has to teach calves to drink in bucket or teat bucket after separation (which is similar to the conventional system, just after birth). - Question on the amount of milk the calves drink: maybe it is too much? 	<ul style="list-style-type: none"> - Calves received as much milk that they need, at the good temperature, and have a good growth - Calves are less sick, and when they are, they recover without medicine - Calves acquire good immunity status. - Heifers who had contact with their mother do not suckle each other anymore. This problem occurs specifically in the Montbéliard breed, in which animals seems to have important sucking needs. - A calf-dam rearing system does not need more work than a conventional system. It is different work: more attention to the animals. - Calf-dam rearing is perceived as more natural. - It is pleasant to see calves suckling their mother. - Calves learn to eat hay or to graze very early, by imitating their mothers. - Calves learn to respect the fences in pasture, and to be in a herd.

Table 5. Different arguments for or against having cow-calf-systems with dam-calf contact systems, coming from the French farmer interviews

Summary of 12 years of studies on cow-calf systems in The Netherlands

The Family Herd project (2007-2011)

The Family Herd was formulated in the early 2000s as a new sustainable farming system for keeping dairy cattle. The core of the husbandry concept was to make the accommodation as functional and animal-friendly as possible, based on the needs of the animal to better meet the needs of the cattle, and the wishes of society.

Peace, space and comfort are paramount in the concept, approached as much as possible from natural group formation and living conditions, which means in practice that the animals should live in stable herds, the calf stay with the cow and the animals keep their horns. In this way, the concept of 'The Family Herd' was formed to provide a win-win-win-win: a smart barn layout, which should allow the cows to live a long and healthy life. In various ways, it should also promote the welfare of the farmer and take economic and environmental aspects into account.

Experimenting in practice

A group of 15 dairy farmers, some of whom already had experience with parts of the Family Herd concept, researched how they could keep dairy cattle in ways, which were as natural as possible, together with scientists, architects, engineers and other experts. One aspect of this was to keep the calves with the cow for a longer period of time, having horned cows, and keeping the dry cows with the flock. They also kept a bull in the herd for natural mating instead of AI, and some had a stable, which could move with the herd to different places of the farm.

Prolonged suckling system

In the Family Herd calves can suckle with their mother and roam freely in the group of milking cows. This means that calves can have access to the dairy cattle ration. In addition, they should also have access to a separate area for calves (calf nursery), to give them rest and special calf feed.

Ideally, weaning should be as natural as possible, and not happen before around 3 months of age.

Challenges in prolonged suckling systems as described in the Family Herd Project

Applying a prolonged suckling system showed to be difficult due to practical problems. The constructions in some cow barns were unsuitable for prolonged suckling systems where the calves were kept in the dairy herd. This was e.g. slatted floors, where the slot dimensions were not dimensioned for the calves' hoofs, so they could get stuck.

Also, the calves need a separate water supply, because they cannot reach the drinkers for the cows. Without accessible water, suckling milk is their only alternative in case of thirst, which may lead to excessive nutrient intake and obese calves.

Other experienced practical bottlenecks in raising calves with cows were:

- the start-up of the suckling calf, that is, to ensure bonding between dam and calf,
- the milk consumption of suckling calves (sometimes very high),
- the milk letdown in the milking parlor, where some cows tended to keep the milk for the calves,
- the handling of young cattle / dairy cattle, because they were not used to being handled, and
- various animal health aspects, among others arising from a constant influx and outflux of calves in all age groups, where they could infect each other in some cases.

Various solutions were explored in the project, especially when designing new barns and practical solutions such as special water drinkers, gates and feeding options. More information from this project can be found in Van Dixhoorn et al. (2010) and several reports on www.louisbolck.org.

In-depth personal interviews (2008-2009)

In-depth personal interviews of 20 dairy farmers with several years' experience in dam-calf contact systems were conducted with the main focus on pros and cons, challenges and opportunities when practicing a dam-calf contact system. All interviewees joined a meeting, in which the results of the interviews were presented and discussed among them. This included a first analysis of the costs and benefits of such a system.

Main message from the interviews

'As every farmer is unique, every suckling system is unique. The basis of a suckling system lies in the attitude of a farmer towards its animals and its accompanying management system. The housing circumstances are of great importance, as well as knowledge, courage and perseverance'.

Many different types of systems with prolonged suckling for dairy calves

Very different systems were described:

- Some farmers applied a maternal prolonged suckling system, in which dam and calf are housed together in a separate area or within the herd. The calf can suckle unrestrictedly and the cow is usually milked along with the other cows.
- Other farmers applied a foster mother suckling system, wherein two to four calves were housed together with a nurse cow in a separate area from the dairy herd. Although those calves can in theory suckle unrestrictedly, milk intake is naturally limited because the total milk supply is shared.
- In restricted suckling systems, suckling and milk intake is limited through limiting the calves' access to the dam or foster cow. Calves might e.g. be placed with their dam just before or after milking, or half-time: only during the day or night.

Next to these main types of dam-calf contact systems, all kinds of different combinations within a system existed, e.g. different periods of time with the mother, after which calves would be

transferred to a foster dam until the end of the milk feeding period.

Modifications in the dam-calf contact systems could also happen e.g. in relation to changes between season, in the herd, or based on individual differences between cows and calves. Based on the type of cow barn and the ideas of the farmers, different prolonged suckling systems have been described (Verwer and Bestman, 2012).

Consensus was not reached regarding a cost-benefit analysis for a nursing system

Setting up a cost-benefit analysis for a nursing system was definitely not easy, due to wide diversity and dynamics in the different nursing systems, as described above. At a meeting where 'dam-rearing farmers' came together to share knowledge and experiences, much discussion arose. Which factors must be included in such an analysis and with what weight? The proposed cost-benefit analysis compared the aforementioned three suckling systems with the regular rearing of young cattle in areas such as housing, feed, labor and health. The following considerations were taken into account:

- For housing there was a discussion about the occupancy rate of the stable. Calves in a couple or other box-systems also required space, but how does that compare to the use of cubicles and litter in the cow barn area?
- What costs do you charge a foster mother?
- How much milk do you miss, and how do you take the higher milk production of the cows when suckled into account?
- Doubts about the standards used in the 'Handbook for cattle husbandry' also were discussed, regarding the calves' intake of liters of artificial milk per day and concentrate intake.

Due to these questions and uncertainties, no concrete proposal for an analysis is yet available. Several farmers noted that many benefits of

nursing systems - such as enjoying your work with cows and calves, and animal welfare - are not possible to express in economic terms. Hence, consensus regarding values to insert in a cost-benefit analysis could not be reached.

Dam-calf contact systems entering the political debate

In September 2010, members of the Lower House (The Dutch Parliament) visited the Louis Bolk Institute and a dam-rearing dairy farmer. They wanted to see the project activities in the context of "Calves with the Cow" in practice. The message to the visitors was that "Calves with the Cow" is well applicable, but not suitable for all dairy farmers. There is also no golden formula, which can be followed by every dairy farmer. It was concluded as important to give motivations and examples of specific working methods to inspire the development of a context specific suckling system in every unique farm environment. Fitting "Calves with the Cow" can go well, but is constantly subject to change, which are necessary to solve bottleneck challenges of a different nature, such as reducing the fertilization of the calves or the relapse of calves after weaning. During the visit, these bottlenecks - and potential associated solutions – became clear.

Results from online questionnaire (2009)

An online questionnaire was sent to all Dutch organic dairy farmers, and returned with a 40% response rate. Main focus of the questionnaire was to get insight in the rearing methods practiced on organic farms and the pros, cons, challenges and opportunities of such methods. If farmers practiced or had practiced a dam-calf contact system, more emphasis was put on their experiences and perception.

From the questionnaire, it became clear that weaning and separation were the biggest challenges for farmers practicing dam-calf contact systems. This was also the main reason for farmers to resign from such a system, and the main reason for farmers not to adapt such a system. Second main reason was the 'loss' of saleable milk. Improved calf health, development and welfare

were the main reasons to apply a prolonged suckling system.

On-farm research on different weaning and separation methods (2009 – 2012)

Based on the results of the in depth personal interviews and online questionnaire, in which weaning and separation was mentioned as one of the biggest reasons for farmers not to implement a dam-calf contact system, on-farm research was conducted in 2009 – 2012 into different weaning and separation methods.

On-farm research on weaning and separation

In this study, the behavioural response of organic dairy calves to three methods of weaning and separation after prolonged suckling were investigated, to find out if, and to what extent, the different methods succeed in minimizing discomfort. , In summary, the results of this study show that most behavioural changes after stages of weaning and separation were most pronounced in the abrupt weaning treatment. This was described in terms of weight losses during the week post weaning, as well as abnormal behaviour, vocalizations and lack of calmness over the whole treatment. More gradual forms of weaning made the application of prolonged suckling systems more feasible for the farmers, as they main reason to resign from such systems is the stress experienced by the cows and calves after weaning and separation expressed in vocalizations, restlessness, loss in weight and production. Calves' wellbeing therefore seems to be better in the alternative weaning treatments, both in terms of biological functioning and affective states.

'Investigating marketing opportunities for dairy products from dam rearing systems' - research into marketing strategies of milk derived from dam-calf contact systems (2013)

Introduction

This study investigated the marketing opportunities for dairy products from Dutch farms with a dam rearing system, since the extra effort of farmers on animal welfare is not valued at the moment by other stakeholders in the supply chain. A stakeholder analysis was undertaken, involving dairy companies, certification bodies, a dairy farmers' interest group, farmers operating with dam rearing systems and retailers from the organic sector. A systematic qualitative approach was used with semi-structured interviews, and an online questionnaire for retailers. The data was coded for commonalities and differences in opinions, and analysed separately for each stakeholder group.

Results

Results revealed that a 'golden standard on dam-calf contact systems' could not be described across the diversity of systems. This makes it difficult to determine the financial added value of these systems, and how to market them. With respect to the marketing, the small base of farmers operating with dam rearing systems does not allow for product marketing on a larger scale yet. Therefore, direct and regional marketing seem to be best suited, while children and mothers are considered to feel most attracted by products from such farming methods. Nevertheless, the added value of dam rearing systems was described by the actors in the following ways:

- improvements on animal welfare for both calf and cow,
- the image of the marketable products from the farms with this system, irrespective of which type of system they apply. This includes the farmers' voluntary

- extra effort on top of the required minimum standards for organic farming.
- Improvements of the animals' performance, especially concerning the calves' development and growth, and
- Decrease in the farmers' workload.
- The disadvantages were described in the following points:
 - the risk of direct disease transmission,
 - the separation process between calf and cow and
 - "losses" in saleable milk.
- Control is lost over both the cows' performance and the calves' milk consumption,
- extra attention is required during the milking and with respect to the calves' health and nutritional status.
- Adjustments might be necessary regarding the housing facilities, and
- A certain expertise and long-term experience often needs to be built up, to ensure a more successful dam rearing system.

'State of the art Dam Rearing of Calves – a sector-wide assessment of scientific and practical knowledge on dam-rearing systems' (2016-2018)

All the above mentioned studies led to a survey in which globally available scientific knowledge and Dutch stakeholder opinions were investigated with regard to dam-calf contact systems (<http://www.louisbolk.org/downloads/3322.pdf>). This report gives an overview of available knowledge in scientific literature on raising dairy calves with cows, statements and opinions of advisors, actors in the chain, researchers and policy makers, as well as the experience of practical experts (vets and farmers). The investigation covered the following subjects: housing, weaning and separation, nutrition, microbiota, health, management & labor, well-being, behavior, image, public health, environment, economy and ethics. In two summary chapters, the researchers respectively

made a system analysis on the basis of the input provided and gave a rough sketch of the future of the dairy sector, imagined by the participants in the survey. Finally, knowledge gaps and tips were included in a separate chapter.

The exploration clarifies the complexity of a rearing system where the calf is kept by the cow. The success of such a suckling system depends on many factors, but also offers opportunities for the calf, the dairy farmer and the sector. However, based on all the different elements of this investigation, the groups behind the report concluded that a number of issues – presented below – needed to be clarified and resolved, before the opportunities can result in a fair change for such a system in The Netherlands.

Identified main issues that prevent large scale implementation of dam-calf contact systems

- Knowledge is missing and knowledge development goes slow around this topic.
- It is questioned whether the present dairy cow is suitable as a dam as a result of domestication
- There are many different interpretations about dam-rearing.
- Within the agricultural- and veterinary studies dam-calf contact systems are hardly mentioned, resulting in advisors and vets that are confronted with husbandry systems on which they hardly have knowledge of.
- Each farmer has to develop its own dam-calf contact systems, as there is no golden standard
- The education of the farmers is mainly focused on management skills and economics. Farmers generally lack skills needed with dam-rearing.
- The present production systems and their monitorings- and management systems are not suited for dam-calf contact systems.
- There is no added value yet for dam-calf contact systems

- For the dairy industry it is difficult to separate the different milk channels
- Within the dairy sector itself dam-calf contact systems are hardly accepted
- Consumers demands are not realistic

Furthermore, farmers who already practiced a dam-calf contact system, came up with these questions. They were concerned about how such systems would get a chance to be implemented as long as entities as the Dutch Animal Health Services (Gezondheidsdienst voor Dieren), Royal Dutch Society of Veterinary Medicine (KNMvD), Quality Assurance Dairy Farms (Keten Kwaliteit Melk) and dairy companies, amongst others, advice against it (KbK 2008).

The MSc study 'Visions of Dutch dairy farmers on cow-calf rearing - Farm characteristics, calf management and visions of farmers on dairy farms with and without cow-calf rearing systems' (2019)

Farm characteristics of the 15 interviewed farmers

The 15 farmers came from the four types of dam-rearing as introduced in M&M: 7 with long-term history of established dam-rearing ('experienced'), two who had dam-rearing but stopped ('stopped'), two were in transition towards dam-rearing ('transition'), and four with no wish and no experience on dam-rearing ('traditional'). On average the investigated farms had 104 dairy cows with 28 heads of young stock under 1 year and 30 heads of young stock above 1 year old. Farms had a cubicle- or free range housing system. Ten of the 15 farmers milked in robots, and the other 5 use a milking parlor.

Perceptions on future of cow-calf rearing in the Netherlands

In general, the interviewed dairy farmers did not think that cow-calf rearing in the Netherlands would change in the coming years. Four farmers (1 experienced, 1 stopped, 2 traditional) hoped that cow-calf rearing systems will not be 'obligatory' through political demands, although one farmer from the group 'stopped' envisioned that legislation for cow-calf rearing would be

formulated in few years, e.g. that keeping cow and calf together the first 24-48 hours of life would be standard. Seven farmers thought that cow-calf rearing in the Netherlands would not change, among others because cow-calf-systems are not suitable for all farms. Furthermore, revenues were mentioned four times as a limiting factor to increase the group of farmers that will implement cow-calf rearing. Three farmers mentioned that dairy farmers should be more aware of benefits of a cow-calf rearing system, and that it is good to have more research on advantages and disadvantages of cow-calf rearing systems.

Considerations when choosing a dam-calf contact system

Six farmers mentioned that farmers should take into consideration 'what is good for cow and calf' as the most important consideration when designing their calf rearing system. Four farmers found it important that consumers are happy with the system, since they are the ones to pay for their products. Five farmers thought that the most important consideration should be what fits the farmer and the farm. One traditional farmer told: *"I have to work with these cows every day in this stable. It should make me happy. When there is stress in the barn, I also get stressed. Maybe I've build this animal-friendly stable more for me than for the cows. Because I have less problems with my cows and that makes me much happier in my work. Some farmers listen more to society than others do. But how do you make a profit model with that? That's what farmers are trying, and then the profit model is not the only thing, you also have to get the government on board."*

Reasons and expectations

Farmers had different reasons to start cow-calf rearing. Two farmers started just "by accident", one farmer had a busy period on his farm and a cow calved in the herd, and it worked out well, so he decided to try it again a next time, and it worked well several times so he made a system based on this. The other farmer who started by accident was talking with another farmer about illness by his cows, and got the advice from the

other farmer told to try and keep the calf with the cow, and that worked out really well. Two farmers were searching for a good calf rearing system on their farms. They had problems with colostrum and milk intake of calves and started with cow-calf rearing to increase the colostrum and milk intake of the calves. The three remaining farmers often had questions from citizens about the separation of cow and calf directly after birth, and started thinking about and questioning this practices by themselves. One farmer mentioned specifically that he started to think in possibilities to make the system work, instead of fears why it would not work, and then started cow-calf rearing. Two of these farmers had contact with other farmers who had such systems. They heard stories about better animal health and immunity, and decided to start trying the system.

When asking the farmers if they had any expectations before they started the system, they generally answered that they did not have specific expectations on beforehand. One farmer expected that growth of the calves would increase, and this expectation was partly fulfilled, because not all calves were drinking so well in his suckling system. Another farmer expected that a cow-calf rearing system would not work out in a cubicle stable, but he tried anyway, and now - 15 years later – it still works really well in his cubicle stable.

Vision of Dutch dairy farmers on cow-calf rearing

The vision of the Dutch dairy farmers regarding cow-calf rearing varied substantially. Most farmers have an image of cow-calf rearing systems where cow and calf were happy together; 'an idyllic image'. Farmers with experience in dam-rearing in particular described this image, where farmers in the 'traditional' group were mostly concerned with the animals' health and welfare. The views of veterinarians and the 'Animal Health Service' reflect this too, and they generally advise farmers to separate cow and calf directly after birth to reduce risk on transmission of diseases (GD, 2019e). Overall, and not surprisingly, the experienced farmers are more positive than the

other farmers about cow-calf rearing. However the honesty of the experienced farmers on the fact that the system is not always easy showed that in their view, the systems often still needed improvements.

Suitability of cow-calf rearing on Dutch dairy farms

Eighty percent of the interviewed farmers did not find cow-calf rearing systems suitable for Dutch dairy farms in general. One reason mentioned was a certain story mentioned in the media about 'Boer Bart' and the feralization of his herd, which gave the 'dam-rearing sceptics' good arguments. Although it is only one story of a failed project, it seemed to have big influence on the vision of the Dutch dairy farmers. The farmers who had stopped with the dam-calf contact system, had experiences with heifers being highly protective to their own calf, and therefore aggressive towards people.

In cow-calf rearing systems, farmers have less interaction with the calves, since they are fed by their mothers. In farms with milking robots the farmer has also no contact with the cows during milking. This together was mentioned as a cause for feralization towards human in a herd, and required active human socialization and interaction with the animals. Several interviewed farmers mentioned that they did not have enough time to allocate additional time with calves, due to other responsibilities.

A different way of farming

Depending on farming type, the way of working differed, and according to interviewees there was a big difference between cow-calf rearing systems across type of system, and traditional systems. All experienced farmers and all stopped farmers mentioned that they switched from 'being in control' in their way of working, to an observing

way of work. In other words: they did not have direct control over the calves anymore. Farmers mentioned that it is less easy than to control if something is wrong with the calf. At the same time, the interviewees emphasized that the way of working should make the farmer happy, and it was important that the system fitted to the farmer's interest, and that it was necessary that the farmers invested time to work in the 'new ways' in dam-calf contact systems.

Opportunities and challenges within cow-calf rearing systems

The experienced farmers – included those who had stopped with the dam-calf contact system - were asked on positive and negative experiences on cow-calf rearing and on opportunities and challenges on their farms. The positive experiences and negative experiences were mainly animal related, however the challenges and opportunities were mainly society and economic related. Most mentioned opportunity is the sale of meat and dairy products on farm because of the good story behind their products. However, this is contradictory to the current profit model in the Netherlands, where they get paid for the amount of milk delivered to the dairy company. The experienced farmers were convinced that consumers would be willing to pay more for their products, but were not able to these consumers at the time of the interview.

Another often mentioned challenge is many 'management system tools' do not fit the cow-calf rearing systems⁶. These assessment or control systems do not include animal behavior, the housing system and other profits of cow-calf rearing systems (e.g. calves with better growth), and therefore farmers score low in these systems,

⁶ Examples of such management systems mentioned were "KalfOK" (sector wide program to improve calf rearing systems on-farm: <https://www.knmvd.nl/app/uploads/2018/10/NZO-4621345-FOLDER-KALFOK-V3-HR.pdf>), milk control system in which the 'bsk' (bedrijfs standaard koe = farm standard cow) is often taken as

the parameter to measure the effect of farm management on milk production (<https://www.crv4all.be/wp-content/uploads/2014/08/Bedrijfsstandaardkoe-BSK.pdf>), and "CRV" (breeding organisation which keeps track of breeding value of cows; <https://www.crv4all.nl/>).

which are based on milk production, mortality rates and production based factors.

The group of cow-calf rearing farmers in the Netherlands is small and therefore innovations and research are rare for this system, which is mentioned as a challenge. Some research is done on weaning systems and decreasing stress during weaning. For the other challenges, farmers would

be grateful if more information would be gathered on these topics.

Positive and negative experiences of cow-calf rearing systems

A summary of the positive and negative experiences, as well as challenges and opportunities are given in Table 6.

Positive experiences	Negative experiences
<ul style="list-style-type: none"> - Improved calf health (4x) - Improved societal image (4x) - Natural behaviour cow + calves (4x) - Improved growth calves (4x) - Always good milk quality at cow (2x) - Less labour (1x) 	<ul style="list-style-type: none"> - Problems with calf health (8x) <ul style="list-style-type: none"> o Diarrhoea in calf herd (4x) o Calves died (4x) - Difficult to see if something is wrong (3x) - Separation cow and calf (3x) - Feralization (2x)
Opportunities	Challenges
<ul style="list-style-type: none"> - Sale meat or dairy products on farm (4x) - Improved resistance and animal health (2x) - (Work) satisfaction (2x) - Better start-up period cows after calving (1x) 	<ul style="list-style-type: none"> - Value model does not fit system (3x) - Management systems do not fit system (3x) - Not much innovations/research in cow-calf rearing (3x) - Difficult to find good weaning method (2x) - Difficult to see if calf drinks enough (2x) - Time let calf get used to people (1x)

Table 6. Results from the Dutch MSc study by van Wijk (2018) on dam-calf contact systems, mentioning some of the experienced and perceived positive and negative experiences, as well as opportunities and challenges.

General conclusion

The visions of Dutch dairy farmers on cow-calf rearing varied substantially and was dependent on their own farming system and experiences with cow-calf rearing. Most farmers have an idyllic image of cows and calves together in these systems, however feralization was experienced and perceived as a disadvantage, and had made farmers stop with cow-calf rearing. Farmers see

opportunities in sale of cow-calf reared animal products. However, at the moment the biggest challenge of the farmers is that there is no market specifically valuing their effort and products. Besides farmers experience problems with management systems, and more consistent knowledge as well as actual implementation of improvements which are in accordance with farming systems, are still needed.

Overall summary of Dutch experiences related to dam-calf contact systems, based on 12 years research with focus on farmers' experience and perception

<p>CONS:</p> <ul style="list-style-type: none"> - Calves escape from the dairy herd, - Lower roughage uptake experienced among calves due to being in favour of suckling - Excessive growth among calves in ways that calves get fat and too heavy regarding their size - Calves are not always accepted in the cow herd and therefore in danger - Weaning is more stressful for both cow and calf after long time together, among others expressed in weight loss - Excessive milk uptake and thereby less saleable milk, - Poor milk let-down among some cows, - 'Wild' calves that are difficult for farmers to handle as calves, and later, - Depending on the type of barn, the climate in the cow-housing areas might not be suitable for calves - Calves take up extra space in the dairy barn, so other dimensions needed - Calves are less easy to keep an eye on when they are in the herd - Labor intense if calves need to be fetched from the pasture - Higher in between calving interval 	<p>PROS:</p> <ul style="list-style-type: none"> - Fewer cases of pneumonia among calves - Lower calf mortality up to a year of age - Fewer cases of diarrhea, and in case of diarrhea no or less treatments necessary - Animals seem more resistant against nematodes - Better and more balanced growth and development among calves - Better roughage uptake - Fewer udder problems - Calmer herds, more social animals - Heifers that grew up as calves in the herd are more relaxed when reintroduced in the herd, seem to know the environment, and there seem to be less fighting for their position in the hierarchy, - Cows raised in suckling systems are better mothers themselves, - Easy and less labour consuming way of rearing youngstock - Less feeding costs, less labor, less energy use (no need to warm up milk) - You get a keener eye on your cows and as a result a better selection of your cows - Better acceptation from the surrounding society - Beautiful to see cow and calf together, and experienced as a more satisfying way of rearing youngstock.
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Table 7. Different arguments for or against having cow-calf-systems with dam-rearing, as summarised from conclusions of the 12 years of research in The Netherlands.



Analysis and discussion across countries

Introductory remarks

This report is based on a broad range of very different types of data collection, mixing research over years as well as very recent interviews of different types. This mixture brings many perspectives to the topic, but also challenges the ideas of scientific analysis of qualitative data, some of which is quite superficial and does not

include in-depth understanding of the different farm contexts in all their aspects. Nevertheless, we consider the collection to bring up a wide spectrum of actual lived experience, and to inform a number of ethical and systems related questions and important debate points.

Perspectives from the calf's point of view

Based on the interviews, it became clear that many arguments in favor of dam-calf contact systems have the calf in focus. When emphasizing the calf related aspects, especially three main arguments in favor of giving calves access to contact with cows, either their own mothers or other grown-up cows, came up:

- 1) Nutrition: here especially the frequent access to milk of the right temperature and consumed by suckling instead of 'unnatural ways' of drinking (such as buckets). When this is highlighted, it is based on a precondition that the calf

actually has access to drinking milk at all times (that is, not restricted access e.g. twice daily x 1½ hrs – where it is only the right temperature and the natural way of drinking which is fulfilled). On the more challenging side is highlighted among others by Danish farmers who are skeptical to cow-calf systems, that the very high milk yield of today's dairy cows makes the potential milk intake 'unnaturally high', and make the calves fat. Norwegian farmers estimated for example that the calves drank 10-20 litres

per day, and had very high daily weight gains. Here it is emphasized that the calves must have access and be stimulated to eat an increasing amount of feed.

- 2) Care: Many farmers described the 'care aspects', e.g. licking, stimulation by the mother, and seeing the mother cows guard their calves, and emphasized that they perceived this as a natural need of both.
- 3) Learning: This aspect is emphasized by many farmers as an important aspect. However, the goal for learning was viewed differently. It could target 'immediate useful things' such as 'learning to eat roughage', which can happen in any area with a feeding table for the cows, to which the calf has access. At a higher level, 'learning to be a cow' was mentioned in different ways. This could be 'learning to be in a herd', which can only happen if the calf has access to an area where life is lived in a herd, or 'learning to graze', as some Norwegian farmers were convinced that they had observed, and which obviously only can happen when the calf is grazing with the cows. Norwegian

Perspectives from the cow's point of view

Some farmers mention the mother cows' perspectives and their awareness of giving the cow access to her calf. However, many systems are designed to meet the needs of calves, e.g. every foster cow system avoids to question whether the mother cows' needs to nurse her calf or not. For example, 'Farmer 3' in Norway had observed how the cows watched over the calves during the first days in the herd, to make sure that other cows or calves did not bother them. This could be interpreted as an expression of the mother cow's strong motivation to nurse, protect and take care of her calf.

Following the above point about the needs and potential traumas of bull calves, this of course also

farmers highlighted for example that cows, which had been with their mother, were more calm and confident.

On the challenging side, the separation was experienced and described as traumatic, and weight losses and other effects of separation were mentioned as something, which should be paid much attention. Farmers described many different methods of separation, and gave many different pieces of good advice. Gradual separation, e.g. dam and calf together part-time and restricting it more and more, or using fenceline or nose flap separation, has been tested by several and could be a good solution, requires adaptations of housing and pasture systems. A Norwegian initiative (SmartCare) is currently investigating options to have automatic gate systems for gradual separation.

One overall perspective on calves, which needs to be emphasized and left for future ethical debates, is the fact that many actors largely ignored the needs, welfare and traumas of bull calves, although they highlighted that they had a cow-calf system: the cow-calf system is in some cases only for heifer calves and their mothers.

involve the mother cows who were 'unfortunate' to give life to a bull calf in systems where only heifer calves were allowed to stay with their mothers. French and Norwegian farmers had observed that the cows reacted heavier than the calf on separation, and many pointed to the gentleness of gradual separation, also for the cows.

The mentioned three main arguments in favor of cow-calf-systems, seen from the calf's perspective, namely nutrition, care and learning, can also relevantly be discussed from the cow's perspectives. The interviewed farmers talked mostly about the cows' needs to care for the calves, and less about learning (learning was

mostly described as an advantage for the calves, and less in terms of seeing the cows being motivated to teach or 'educate' her calf or calves. The Danish farmers visited a Dutch farm where they in the morning – before breakfast – saw how the cows went over to the calves, which were sleeping together in their 'kinder garten' occupying some cubicle beds, and 'woke them up'. To them, this showed that it was not only the calf, which sought the mother when needed, but also the mothers which 'involved' the calves in the diurnal rhythm of the herd, and showed that 'now it was time to be active', maybe before milking.

One interesting perspective given by one of the Danish farmers with cow-calf systems, was about 'the timing of suffering' for the cow. In the

experience and opinion of this farmer, the mother cow benefitted greatly by not having the trauma of separation on top of all the other overwhelming effects of the calving experience. When keeping the calf at her side, she would come through the period of hormonal, physical and physiological changes in a better condition than if the separation added to the trauma. The fact that she had to nurse the calf, kept her active, hence also stimulated her metabolic system and body to recover. One further aspect was that in this particular herd, separation took place after 4 months, and the farmer experienced that it went quite smooth and as quoted in the results above, the cow had started 'getting tired of the calf' at that point.

The humans' point of view: the care givers, farmers and farm managers

Some interviews focused on 'why not having a dam-calf contact system', and many concerns came up, mainly stressing on 'the lost milk', risks of disease or damaged calves, the separation process with much noise, and the worries about calves getting too wild. However, also considerations about animal welfare and naturalness were questioned, e.g. 'is it really better welfare when they have to be separated before they naturally would have separated anyway?'

However, as a contrast, it was striking that many farmers with the system claimed that when first having introduced it, they would not like to go back to 'the old system', because it gave them much personal satisfaction to see the interactions between animals. Other arguments, such as feeling that the cow herd developed to become more and more harmonic.

In terms of time consumption, contrasting view points came up and made any statement on time requirements for these systems inconclusive. Taking the perspectives below on farming systems into account, this will of course be very context dependent, but the most consensus being reached

can be summarized as 'it does not save time, it does not require more time, but it requires a re-organisation of time and attention'.

One very interesting perspective brought up by the group of Danish farmers (and other actors), who visited Dutch and German systems and were confronted with different types of cow-calf systems, was about the attitudes regarding 'trust', 'being in control' or 'being too loose' ('being laissez-faire') in the supervision and attendance to the calves and cows in the system. They were generally amazed that the farmers could make it work and the calves apparently grew so well and were so strong under what one of them called 'miserable conditions'. They saw that not much additional effort was done in the herds regarding keeping the calves within the dairy cow area, and yet the calves generally looked fine as long as they were with their dam. So the balance between 'trusting' that the calf actually could manage finding its way and accepting that things were out of the type of control, which they were used to when bucket feeding the calves and being able to tell exactly how much milk they consumed, was a point of concern and amazement at the same time.

Another interesting aspect came up when the Danish farmers, who previously had told about their concern regarding 'wild calves', were suddenly confronted with Dutch herds with long-term experience with cow-calf-systems. They

Framing the farming systems for dam-rearing

We need to emphasise that so many factors in the farming system and way of handling the dairy herd potentially influence the design of the housing system as well as the grazing system. We have chosen to focus on some main aspects regarding milking system (robot versus milking parlour), herd structure (mainly herd size and whether the calving patterns are seasonal or all-year-round), choices regarding access (unlimited or restricted in some ways or another), and whether milk-fed calves have pasture access.

Milking system and dam-rearing

Milking in robots versus milking in parlour potentially require different ways of handling dams with calves. Where milking parlours builds on the synchronic behavior of cows, it means that they all do more or less the same thing at the same time, and need to leave the calves at the same time. In a housing system where the calves are left on their own for a while completely 'free of cows', this gives the calves the opportunity to play when the cows are gone, as experienced by some farmers. It also stimulates the calves to synchronic behaviour.

In contrast, the milking robot allows cows to move around in the system as they find space and need for. The housing system may be busy all 24 hours of the day, and there might be sources of light close to the robot during 24 hrs, which may call for a need to place calf 'kinder-gardens' in places where they can find longer periods of time to rest in darkness or low light.

Calving patterns, herd size and dam-rearing

Cattle herds naturally would calve in spring, so seasonal spring calving patterns could be regarded as 'more natural'. In a dairy herd, seasonal calving and keeping all cows and calves together will

started questioning their view on how cattle should react, and open up for a view on that 'alertness' and 'being awake and interactive' was maybe not so bad after all.

require a period of full attention to make sure that calvings are going right and being ready to assist where needed, and it would require space enough to let every cow-calf couple bond in peace. Furthermore, the housing system necessarily has to be dimensioned to this, if the calving season also includes the housing period.

For year-round calving, the barn must be designed to accommodate both indoor and outdoor calving, facilities for bonding between cow and calf, and calf-rearing as well as de-bonding. All age-groups will be present in the herd, and all stages of the cow calf contact take place at the same time.

Regarding herd size, the Danish farmers visiting Dutch farms, noted that they were all smaller than an average Danish dairy herd. They emphasized the fact that it might be easier to overview such a complex system when the number of cows and calves was smaller. They furthermore expressed concern regarding diseased calves: if it went wrong in a big herd with e.g. 75 calves at the same time in the dairy cow area, then it would go 'out of control' with so many animals.

Pasture access

In organic farming, cows need to be grazing during the summer, which should be taken into account when developing a cow-calf system. The following choices were explained and discussed by the interviewed farmers and others:

- Systems in which cows and calves have access to pasture, and can walk in and out together,
- Systems where cows are grazing and the calves stay inside during the day, and they are together during the night,

- Systems where calves stay inside with no outdoor access, but the cow can return to the housing system and nurse her calf at all times. This is not always accepted under organic rearing, if the farmers cannot prove that the cows are grazing sufficiently.

The organization of pasture access will interact with other herd factors, e.g. farmers in Norway and other places may want to utilise the grazing season to let calves stay with their mothers, because the housing systems often need severe changes to accommodate both cows and calves. In those cases, they have to have seasonal calvings at spring (April-May). This requires other things too, such as having enough pastureland close to the barn, or a mobile milking robot that can be moved between different grazing areas. Calves should have access to some form of shelter, if staying outdoor for longer periods of time.

When the calves are turned to pasture in spring, they will be in a mixed-age group. This might affect the acreage required for grazing and have implications for calf health (parasites).

Full time contact or part time contact, determined by calves, cows, or humans?

Where some systems include cows and calves, with no calf hide or other separation others than when the cow is milked, other systems have some type of restrictions for either cow, calf, or both during certain times of the day. Variations over this type of systems were observed in Denmark (half time access), and Norway (around milking).

The reactions from the group of Danish farmers visiting Dutch herds with calves which walked into the cow area, was concern about the iron bars and slippery slatted floors, cows in heat and other elements in the system which could be dangerous for the young calves. This calls for design of calf friendly cow systems, or instead making a parallel system, where the calves are all the time, and where the cows have access, either when she wants, or when the herd manager has planned that she should have access.

Looking at the above mentioned arguments for cow-calf systems, seen from the calves' perspective, the three arguments were connected to nutrition, care and learning. One could argue that in restricted systems, only the nutritional aspects are fulfilled, and partly the care aspect although maybe not always when the cow or the calf is motivated for it. The learning aspect can almost exclusively be fulfilled in systems where the calves actually are confronted with and allowed to explore the environment of the cows.

Breeds and breeding

One issue which was almost only raised by the French farmers, was the issues of breeds and breeding. In France, there are lots of dairy cow breeds, and Salers and Montbéliard¹ are highlighted regarding suckling and maternal abilities. It is normal for cows of Salers breed to only accept milking when at the same time being suckled by their calf. In the Montbéliard breed, suckling needs seem to be more developed than in other breeds, but there is also a problem with heifers suckling each other, and farmers who have implemented calf-dam or nurse cow systems, do not experience this.

'Wonder what consumers actually want?'

It became clear especially with the group of Danish farmers who were on a short study trip, that they were concerned about and felt more or less pushed by 'consumers wishes' and citizens being increasingly critical to the dairy industry because of the early separation. One of the Norwegian farmers practiced direct marketing of both milk and meat, which compensated for more time used in the system and the 'loss of milk' that many of the farmers talked about. French farmers did not implement calf-cow rearing systems (either calf-dam or foster cows) for marketing reasons, and they did not talk about premium price for products from systems with cow-calf rearing. This was different from some of the other farmers, who were motivated or felt pushed by an increasing public debate and concern, among others from consumers.



Conclusion and future perspectives

Interviews and on-farm studies across The Netherlands, France, Norway and Denmark showed that dam-rearing is practiced in a wealth of different systems, and four main angles should be considered when organizing a dam-calf contact system to fit the context and work well: calf, cow, farmers and farming system.

Dam-calf contact systems can be seen as contributing significantly to the physiology and natural behavior of calves as well as of mother cows. Three important qualities in dam-calf contact systems were described from animals' perspective: 1) nutrition, 2) care, and 3) learning. The priorities and perceptions of the importance of these three qualities influenced very much the farmers' choices and priorities of systems. A focus on nutrition could for example motivate the choice of part time systems and strongly restricted systems (e.g. two times two hours daily access to each other), whereas a focus on care and learning would motivate a more full-time access system.

Some perceived the calves to be equipped with capacities and skills through learning from the

dam and others in the system, adding to their life opportunities, and they would favor a system where mother cow and calf were together with as little restriction as possible, although such systems require major efforts to organize and keep the overview.

Farmers, who were introduced to dam-calf contact systems, but without having prior experience of these systems, pointed to the need for developing systems, which were much more 'friendly' to both cows and calves than what they saw. That is, develop dairy systems, which allowed cows and calves to be together, and the calves to learn about life in a dairy herd (e.g. indoor and outdoor life, and eating solid feed and grass), and with minimum risk.

Among some interviewed actors, the needs of the calf seemed to be more in focus and of higher priority than the natural needs and the motivation of the mother cow. This is clear when talking about foster cow systems (where the mother cow is separated early after calving from her calf), but also when talking about dam-calf contact systems,

many seemed to focus most on the benefits of the calf, although many noticed that the mother cow often reacted strongly to the separation and showed much distress.

Seen from the farmers' points of view, it was remarkable that most farmers, who had dam-calf contact systems, were mainly driven by the pleasure of seeing it work, and seeing the interaction between calves and cows. They articulated how they were touched and impressed e.g. by the mother cow's consistent 'watching over' her calf, and the pain of separation. A number of the farmers had never been motivated by premium price or consumer demands, but just did it because they found it right, or 'easier' in combination that it brought them other qualities being farmers.

Farmers, who were confronted with dam rearing systems for the first time in their lives, pointed to the necessity of finding a balance between 'trusting the animals' (because they could clearly see that the calves found their way), and 'being in control', because they used to know exactly how much milk the calves were drinking on daily basis. This points to the need for the humans in the system to redirect efforts and focus when observing animals, and when spending their time with cows and calves.

ⁱ Salers breed is a mixed breed from Auvergne. Salers cows are mainly reared as meat cows today, except for a small group of farmers who reared Salers cows as dairy cows. This concern only 2 900 cows and 66 farmers (compared to a total of 3,8 million of French dairy cows and 67 000 French dairy farmers in 2016). In the Salers breed, cows accept to be milked only if they are suckled at the same time by their own calves. At a consequence, milk production levels are very low in comparison with those of current dairy bovine breeds. The milk from Salers cows is used to

There was a repeated questioning of 'naturalness' in relation to dam-rearing. Whilst acknowledging that mother cows and calves were strongly motivated and it was 'natural' for them to be together, some farmers also pointed to factors which partly made it 'unnatural' for them. This was especially the very high milk yields of dairy cows, which could lead to overdrinking for the calf, or deep udders, which made it difficult to drink for the calf, or the fact that daily life in a large dairy herd might not give a newborn calf sufficient peace to rest.

Some issues remained unsolved at the current moment, and they need future solutions. One is the difference in many herds between 'calves to stay in the herd' versus 'calves to leave the herds' and not least their mothers, which had to go through early and abrupt separation.

Another aspect is whether it is best to aim at farming systems in which the calf can find its mother, or the mother find her calf, or how they both have more or less unrestricted access to each other, but then with no opportunity to seek peace in a calf hide.

manufacture cheese, in particular Salers Protected Geographic Indication (PGI). The milk price is higher than for normal milk for consumption. The Montbéliard breed comes from the Franche-Comté region and whose milk is used to manufacture cheeses under Comté and Morbier (PGI). But there are many Montbéliard cows in other regions, mainly in the north east of France where they are reared with Holstein cows. Through selection process and genetic crossing, Montbéliard breed now has features from Red Holstein.



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The CORE Organic Cofund project 'GrazyDaiSy' aims to give relevant answers to burning questions in organic dairy systems. We work with novel strategies, and dam-calf contact systems is one of them. Organic animal rearing focuses on allowing animals to meet natural requirements, and considering a systems approach, but nevertheless, early separation of dam and calves has been accepted as a common practice although increasingly questioned. Different dam-calf contact systems are under development in many European countries, and in other countries, some farmers have had cow-calf contact systems (including foster cows or suckler aunt systems) for many years. There are still many knowledge gaps, and local conditions down to farm level require many different ways of implementing such systems.

This report take the starting point in our baseline qualitative interviews and investigates how farmers and other actors perceive and experience rearing calves with their dams.

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