

# Quality Management Systems for Dairy Farming – Opportunities and Challenges for Recording Organisations

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## Abstract

In the European Union there is a strong increase in labelling systems for branding agricultural products and of course heavy competition in the food market. This has led to some demand-driven changes in agricultural production in general and in the cattle and dairy business in particular. About a decade ago it was sufficient for milk sold to fulfil quality standards defined by law for dairy sales. Since the termination of the European Quota scheme, production and competition have significantly increased. Nowadays each food company seeks to establish a unique selling proposition by defining and monitoring production conditions on farms and throughout the whole process – from the stable to the supermarket shelf.

For milk recording and breeding organisations this leads to new business challenges. Being a service provider within the food sector, we now face customers who have contracts for defined feeding schemes such as GMO-free production. These either prohibit the use of some animal feed or the farmer must fulfil special housing or animal welfare conditions to sell their products, hopefully at a better price.

All ICAR members are focused on providing the best services to their customers in terms of data collection and processing for breeding and management purposes. In the past this helped our farmers to gain competitive advantages over their neighbours. Now it is not enough to simply provide somatic cell counts of cows or to tell farmers how to keep herds in best udder health to produce and sell high quality milk or how to use the best estimated breeding values for herd-selection decisions.

Food quality and labelling schemes require a clear basic documentation on farm conditions and a plan-of-action where imbalances occur. Both areas are very common among recording organisations. It is therefore of the utmost importance to develop new services and to provide benchmarks for common occurrences in the form of udder health, fertility, animal welfare and production efficiency. The challenge we face is to discuss our knowledge with the food industry and with consumers who are looking to buy high quality products originating in the sheds of our farmer customers. In this context we are in fact confronted with a very different kind of question: one that is much more focused on animal welfare and health, the way farmers care about their herds and impacts on food quality.

It is time for milk recording organisations and ICAR to be more visible and, consequently, more recognised within the food industry. But there is an even stronger need for agricultural organisations to start defining some kind of best practice for dairy and beef production based on experience and knowledge gathered over generations. This applies to ICAR and its bodies and provides some sustainable answers to breeding and selection issues. But the data volume and quality levels required can only be maintained going forward provided farmer income is ensured through the best possible management support from recording organisations.

Keywords: Quality management in food industry, labelling schemes, milk recording as management support

## **Introduction**

The milk market has changed very much during the last decade, especially in the European Union. The decision to terminate the milk quota scheme was taken in 2008 and took effect during the recording year of 2016. This increased the volatility of milk prices and forced the whole industry to establish special unique selling propositions either by moving directly to reduce production costs or, as in the case of Austria, by trying to find different arguments towards an increase in domestic milk consumption. Since the first dairies decided to sell only milk from cows fed with not genetically modified food, it has not taken long until GMO-free production to become a kind of baseline for Austrian dairy farmers.

As a further step for providing clear checks of origin for the whole production process, “hay milk” (a new brand of milk and dairy products) was introduced into a highly saturated market and soon generated additional income through market diversification. In early 2016, due to decreasing milk prices and driven by the food retailers, a discussion started about how to declare feeding systems as well as rearing systems such as loose running and pasturing.

On the other hand, recording has always been a part of the quality management on farm. Information about somatic cell counts as parameter for udder health for each single cow is used to make decisions on separating milk and of course for culling cows. For this to improve income our farmer customers use recording results. Indeed, by using recording results effectively farmers have greatly improved feeding and even rearing conditions. Therefore, in Austria the next move on implementing a kind of quality management system came in 2011 with the launch of the voluntary single-cow based quality scheme “QS Milk” for recorded herds being part of the so called AMA Gütesiegel – the national quality labelling system. The main part of this system was to shift from providing information about high somatic cell counts for each single cow to implementing a documentation system and specific actions taken to improve or keep the high level of udder health and omitting milk with too high SCC from human consumption.

In 2015 a new programme started with a focus on measuring some kind of animal welfare by recording high somatic cell counts, the frequency of milk fever and retained placentas and documenting steps to avoid it. In tandem with the start of this quality scheme a discussion started in the dairy industry into how to provide additional animal welfare parameters and use it in communication with retailers and consumers.

## **The Austrian showcase – AMA Gütesiegel**

From 2009 under the national Austrian quality label strong connections began to be established with farms as GMO-free feeding increased. In 2011 recording started with the voluntary quality management module QS milk. Austria is a special example of how to provide a very strong link between recorded herds and commercial milk production as 85% to 90% of whole dairy milk originating in recorded herds. Therefore, the possibility of obtaining about 40% of the recording costs back through taking part in the QS milk programme was a great incentive for farmers, too.

For milk recording organisations it changed the way business was run. The switch from informing the farmer about imbalances in udder health to the requirement of documentation was challenging. But it provided clarity for employees, too. If one of the cows exceeded the benchmark, then a discussion had to take place about udder health, somatic cells and any steps to improve the situation. On the organisational level we faced for the first time an external annual evaluation of our own quality management and had to find ways of improving our systems in addition to the ICAR Certificate of Quality. Otherwise we would not have been able to pass on the financial benefits to our customers.

From 2011 to 2014 the focus was on milk quality and udder health. Therefore single benchmarks were applied to somatic cell counts and the requirement for documentation of improvements. The results of the five-year QS milk scheme are obvious in:

- 6% decrease in average SCC across all breeds
- 10% decrease in single recordings above the benchmark of 400,000 cells
- Improved awareness of related health traits and breeding values
- Better visibility of MROs in the dairy production process and recognition within the industry as a whole
- Implementation of a new and structured quality management system for milk recording – clearly based on the ICAR Guidelines

As this programme is part of the European Rural Development scheme, Austrian MROs are obliged to issue improvements after 5 years. The re-launched module known as “QS Kuh” (Cow Quality Scheme) started in 2015. Emphasis is now being placed on addressing various animal welfare issues.

- The aim for udder health, as measured in SCC, is to implement an early warning system that would continue the decrease in SCC. The documentation of steps has more or less remained unchanged. But the welfare argument is that every inflammation of the udder causes pain to the cow and affects the quality of the milk. Any attempt to reduce this improves animal welfare and the quality of milk for human consumption.
- New traits are now in place for calving: frequency of milk fever and retained placentas. For each single recorded birth, if a benchmark of 20% is exceeded the farmer must then outline the actions that will be taken to improve the situation either through preventive measures, improving the mineral supply or giving special consideration in mating by using the specific available breeding values.

The aim of reducing the frequency of birthing difficulties and mastitis involve:

- Improving the animal welfare of cows through less inflammation and illness
- Reducing the necessary use of drugs (esp. antibiotics) and therefore lessening the risk of residues being found in the food chain
- Reducing additional care for ill cows, which in turn improves quality of life for farmers.
- Using the recorded traits for breeding values to maintain sustainable improvements.

Management system tools for achieving these aims are:

- After calving, a report is quickly provided. This allows paternal breeding values on calving ease and milk fever for mating to be taken into account for long-term results.
- An early warning is then given at the drying off stage of the cow, giving the farmer time to prepare the animal for the next birth using optimised feeding and any necessary mineral prophylaxis.

In the starting phase (2015) about 85% of the milk-recorded herds took part in the scheme, regionally almost 100%. This confirms the aims are adhering to the farmers’ animal-rearing objectives. Of course financial incentives have a noticeable impact on participation, too.

After the first year conditions are reported, even where improvements on the animal level are not expected to be visible yet. But as the challenging year of milk prices and increased pressure on organisations showed, finding answers to questions asked of food safety systems is very useful for MROs and further improves visibility within the industry.

## Recording as quality benchmarking for the production process

The QS Kuh scheme shows that an extended approach for quality works, surely not only under the special circumstances of milk recording in Austria. For our customers breeding is always part of the answer to challenges, which means health and fitness traits are recorded and breeding values must be available within a manageable time.

The self-image of our farmers is about taking care of animals and to earn a living. Therefore any efforts are taken to improve health, especially udder health. The main reasons can be economic, in terms of less payment for milk with higher SCC. But the factor of less workload with healthier cows has to be taken into consideration, too. Farmers take pride in being able to keep their herds to the best standards possible.

Improving feeding to meet the genetic level of performance is very challenging. Evaluations for metabolism and feeding are in high demand from our customers, e.g. traditional evaluations such as fat/protein ratios or additional benchmarks, e.g. from infra-red spectra.

Implementing management use of traits such as feeding evaluation or early warning systems, e.g. for milk fever, necessitates honest recording of those traits and will in future be the key to new breeding values. The management use of these traits impacts on incomes much earlier as a potential use of breeding values in the mating process.

## Next step for integrated evaluation – animal care and recording

In recorded herds a lot of information is available for different management and breeding use. Our customers are constantly searching for new management tools to improve the performance of their herds. On the other hand, in Europe critical discussions about performance figures occurred, which necessitate new recording and breeding measures as a way of delivering the right answers for our society of consumers. For this a welfare quality approach seems to be useful (EFSA, 2012).

Looking at the 11 OIE principles of animal welfare some answers easily can be provided directly from recording results with only little additional efforts necessary as discussed below. This is even more promising as the EFSA sees animal-based measures under herd-monitoring and surveillance programmes appropriate, where changes are documented over time. This is exactly the case in recording, as the draft report of the animal welfare recording WG of ICAR shows (Berry et.al, 2014).

Table 1: The OIE Principles of Animal Welfare and Possible Figures from Milk Recording

The 11 OIE principles of animal welfare	Possible figures from the recording system
1. Genetic selection should always take into account the health and welfare of animals.	Fitness (calving ease) and health traits (mastitis) shall be recorded and evaluated in breeding values.  But first of all the management use of the records will secure if necessary improve the situation of the animal.  The recording database can provide both the actual status and benchmarks for (positive) developments.
2. Animals chosen for introduction into new environments should be suited to the local climate and able to adapt to local diseases, parasites and nutrition.	Are recording results an appropriate measure for the adaption? For nutrition for sure, for parasites and diseases the answer depends on the symptoms and their impact on the animal's performance like fertility or longevity.
3. The physical environment, including the	Again recording of traits like lameness or claw

<p>substrate (walking surface, resting surface, etc.), should be suited to the species so as to minimise risk of injury and transmission of diseases or parasites to animals.</p>	<p>health might be a useful step to improve the situation. Many Organisations do already use lameness and claw health data which give benchmarks for the walking surface as well as for metabolism. The importance of cleanliness and hygienic state of the resting surface can easily be communicated in the reports of milk recording, for example if an increased somatic cell count occurs.</p>
<p>4. The physical environment should allow comfortable resting, safe and comfortable movement including normal postural changes, and the opportunity to perform types of natural behaviour that animals are motivated to perform.</p>	<p>This is a clear management need. But a cow not able to move safely and comfortably will, for example, show less noticeable heat behaviour. Therefore any consideration of this principle may have impact on fertility figures.</p>
<p>5. Social grouping of animals should be managed to allow positive social behaviour and minimise injury, distress and chronic fear.</p>	<p>To identify factors with regard to animal behaviour recordable traits have to be identified and if possible implemented.</p>
<p>6. For housed animals, air quality, temperature and humidity should support good animal health and not cause adverse effects. Where extreme conditions occur, animals should not be prevented from using their natural methods of thermoregulation.</p>	<p>Performance is only possible under good conditions, knowing that in summer and vice versa in winter the weather has impact on housing conditions. Construction and advisory services must take the needs of the animals into account. Seasonal figures of recorded traits and performance variations in combination with summer heat can help to implement external support for animal thermoregulation.</p>
<p>7. Animals should have access to sufficient feed and water appropriate to their age and needs in order to maintain normal health and productivity and to prevent prolonged hunger, thirst, malnutrition and dehydration.</p>	<p>For dairy cows any unusual change in milk performance might be an indicator of poor water or feed access or quality. Adding body condition scores to the recorded traits leads to more sophisticated monitoring.</p>
<p>8. Diseases and parasites should be prevented and controlled as much as possible through good management practices. Animals with serious health problems should be isolated and treated promptly or killed humanely if treatment is not feasible or recovery is unlikely.</p>	<p>Recording and reporting of health traits for monitoring. Veterinary and advisory services are to be included to improve the situation.</p>
<p>9. Where painful procedures cannot be avoided, the resulting pain should be managed to the extent that available methods allow.</p>	<p>Advisory and veterinary services in combination with responsible breeding aims.</p>
<p>10. The handling of animals should foster a positive relationship between humans and animals and should not cause injury, panic, lasting fear or avoidable stress.</p>	<p>Recording of behaviour traits for temperament and docility might improve monitoring.</p>
<p>11. Owners and handlers should have sufficient skill and knowledge to ensure that animals are treated in accordance with these principles.</p>	<p>Interpretative assistance on reports and any interactive tools such as web platforms and smartphone apps will help to improve knowledge and skills (mainly in advisory services).</p>

## **Conclusions and future steps**

Our farmer customers have the most useful tool for improving production and product quality at their disposal in the form of recording results. Developing our services to these needs will help to ensure the future of recording and breeding, delivering higher incomes for our customers, better production processes and of course better products for consumers.

We, as organisations, can support our customers in providing on-demand documentation as a means of improving quality and off-setting imbalances. For additional benefit, these efforts must be streamlined into supplying quality labelling that is recognised within the dairy and beef industry and at the supermarket.

Given that any recorded herd provides management information in terms of figures and allows conclusions to be drawn with regard to feeding, watering and housing conditions, it is obvious that our customers have more than basic figures to measure animal welfare.

Especially in regions such as Central Europe with a surplus supply of human food the industry is looking for ways of developing unique selling propositions for its products. As products such as beef and milk originate from farms (many of them recorded), these newly formulated promotional messages and quality schemes are sometimes very challenging for farmers as they conflict with traditional breeding practice.

Recording fitness, health and quality traits and transforming them into breeding values will at least partly form a way of innovatively responding to challenges of breeding and changing markets. But over the short-term, interpreting recording results through the employment of quality schemes is a necessary step towards reducing overall inspection times on farms.

Integrating the reports and results of the recording business into quality schemes helps our customers earn their living. To this end a kind of supra-national labelling scheme will support all recording organisations looking to move into this field of business. Referring to a broadly accepted interpretation of the principles of animal welfare, for example, provides new possibilities for both our customers and our organisations.

Indeed with the ICAR family representing this supra-national level, this step will clearly improve the visibility of ICAR and its bodies throughout the entire food industry.

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