XVII[th] World Congress of the International Commission of Agricultural Engineering (CIGR)

Hosted by the Canadian Society for Bioengineering (CSBE/SCGAB)
Québec City, Canada June 13-17, 2010

MILKING TECHNOLOGY ON MODERN DAIRY FARMS – ASSESSMENT FROM THE USER'S PERSPECTIVE

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CSBE10XXX – Presented at Section II: Farm Buildings, Equipment, Structures and Livestock Environment

ABSTRACT Within the framework of a questionnaire survey of Swiss dairy farmers, the prevalence of different types of milking parlours and their technical equipment as well as the reasons for the purchase decision and satisfaction with the milking technology are analysed. The results, however, can be considered on a global level, assuming that the growth strategies of family farms are similar throughout the world. At 53 %, the response rate was above average, which significantly reinforces the validity of the results.
In Switzerland, tandem and auto-tandem parlours are still the most common form of milking parlour, followed by herringbone parlours. Nevertheless, the survey shows that automatic milking systems and rotary parlours are becoming increasingly attractive for farms planning to invest in new milking technology.
Milk volume measurement and automatic milking cluster removal play an especially important role in the installation of technical equipment in the milking parlour. Whereas a waiting area is a common feature, little use is made of mechanical aids for moving the cows into the parlour. Such aids will be used more frequently in future, however, owing to increasing herd sizes and the increasing rationalisation of labour. Generally speaking, the farmers surveyed were satisfied with their milking technology and in particular with the customer service, which plays the most important role in the purchase decision. Despite this, 20 % of the surveyed farmers have problems with milking, which they put down to the occurrence of leakage current.
Keywords: Milking technology, assessment, functionality, satisfaction, future strategies.

INTRODUCTION The importance of modern milking parlours in Switzerland is increasing steadily. Whereas in 1996 stall milking systems (i.e. bucket-and-pipeline milking systems) still accounted for 96 %, this figure had fallen to 88 % in 2003 (SBV, 2007). Nevertheless, detailed information on the prevalence of the different milking technologies in the milking parlours on Swiss farms is scarcely available. In particular, little has been known to date about the needs of dairy farmers when purchasing modern milking technology, the motives for the buying decision, and the degree of satisfaction with the purchased product.

MATERIAL AND METHOD Out of a population of approx. 15,000 farms where the cattle was kept in cubicle housing systems, 2000 farms were surveyed by questionnaire regarding their milking technology. The survey focused on the milking parlours' current

technical equipment, reasons for the purchase decision, and the farmers' assessment. In addition, respondents were questioned as to future milking strategies. The questionnaire was in part modelled on a comparable survey conducted in 2005 in Germany (Fübbeker and Kowalewski, 2006).

RESULTS AND DISCUSSION A total of 1048 questionnaires were completed, corresponding to a response rate of 53 %. All of the data in the following report relate to these completed questionnaires, which represent a population of 100 %. Five per cent of the surveyed farmers still milk with a pipeline milking system. Their responses on current milking technology were therefore not included in the evaluation.

Farm structure 98 % of the surveyed farmers run their farms full-time. On average, the farms keep 40 dairy cows (Fig. 1) with a mean yield of 7501 kg milk per cow and year, as well as a delivery right of 257,666 kg. This does not correspond to the estimates of the Swiss Farmers' Union (SBV, 2007), according to which the average herd size in Switzerland is 18 cows and the average yield is 5770 kg milk per cow and year; however, the difference might be down to the fact that the milking parlour is chiefly used in the case of comparatively large herds.

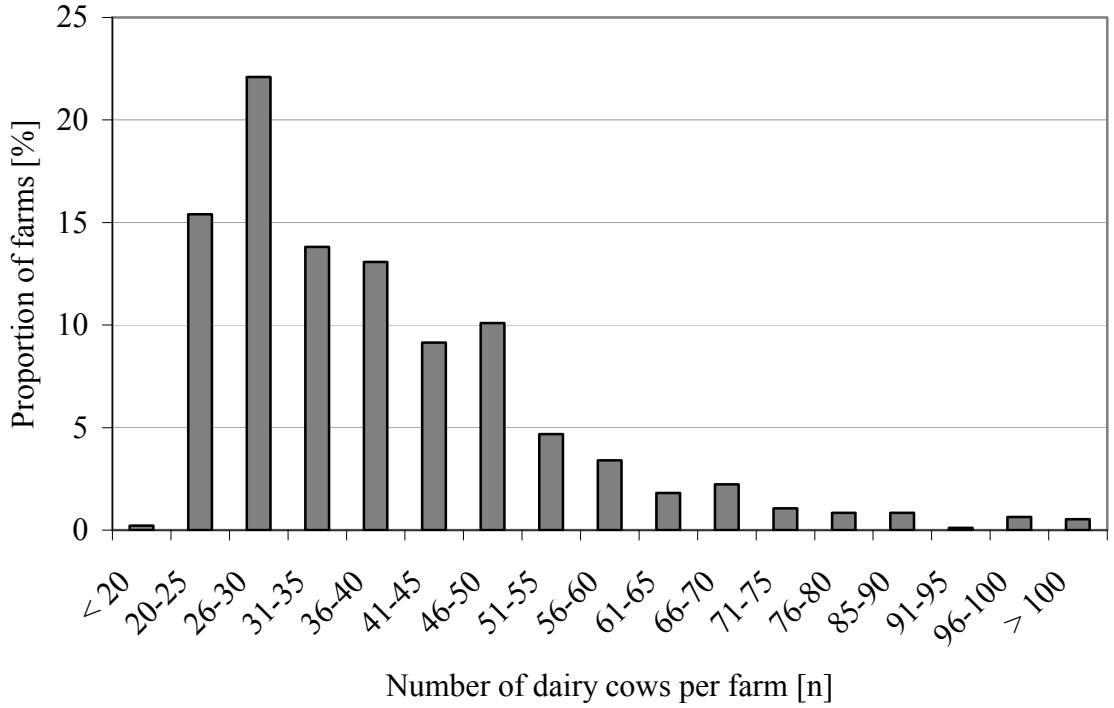

Figure 1. Size of the dairy herds on the surveyed farms.

The average number of manpower units (MPU) is 1.8 MPU/farm. 83 % of the manpower units consist of family members, whilst 17 % are outside MPUs; this agrees with the Swiss Farmers' Union figures (SBV, 2007).

Current and future milking technology The current milking technology is on average 10 years old. At present, tandem and auto-tandem milking parlours (TD and ATD; Fig. 2) are the most common, with over a third of farmers using these types of milking parlour.

Also common with a 32% share are the herringbone milking parlours (HMP) with a 30° angle.

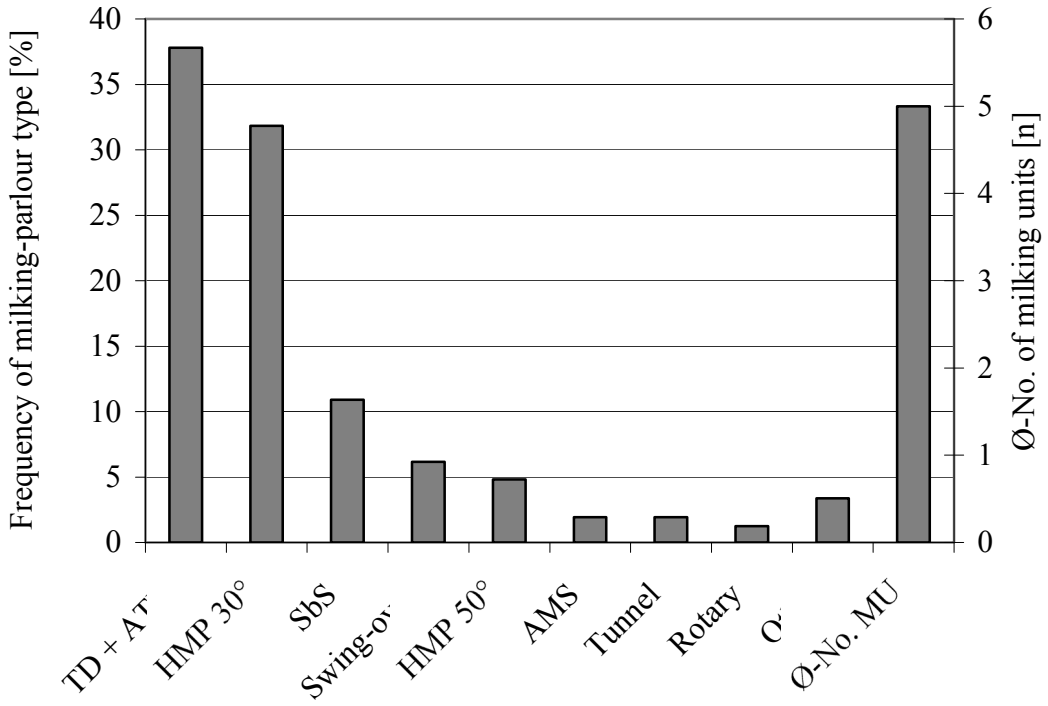

Figure 2. Prevalence of the different types of milking parlour and average number of milking units (MU) per milking parlour today.

46 % of the surveyed farmers plan to invest in new technology in 8 years at the earliest; 23 % intend to do so within the next 8 years. The current types of milking parlour installed as well as the future strategies for choosing milking parlours on these 23 % of farms are shown in Figure 3. For the response on the type of milking parlour planned, multiple mentions were possible. One-cow milking parlours such as tandem and auto-tandem parlours will continue to play an important role in Switzerland, indeed their share could even rise to over 50 %. Despite higher investment costs, longer walking distances for the milker and limited opportunities for expansion, these types of milking parlour are very popular with Swiss dairy farmers, owing among other things to the good overview of the animal they provide, and above all the excellent udder access they afford the milker. Side-by-side milking parlours (SbS), herringbone parlours with a 50-80° angle and rotary parlours are currently fairly uncommon (Figs. 2 and 3), but will increasingly gain importance. The percentage of swing-over parlours will also increase, although the type of milking parlour was not narrowed down further. Tunnel milking parlours are fairly uncommon, and will only play a minor role in future. There will be a significant increase in automatic milking systems (AMS). Nearly 20 % of farms planning on investing in new technology within eight years can envision an AMS in their milking barn.

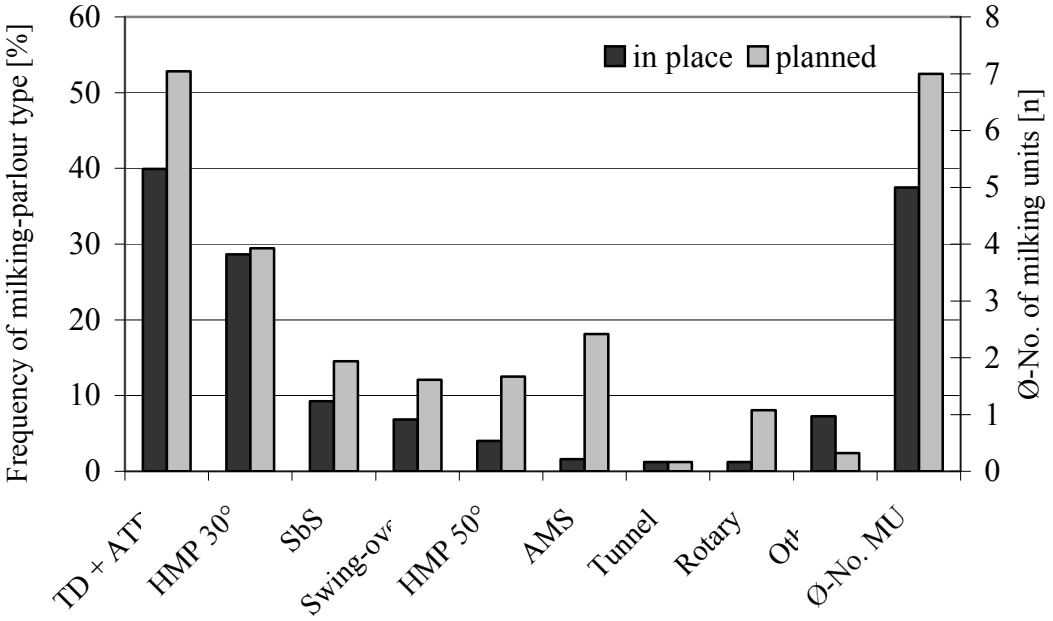

Figure 3. Current and future prevalence of the different types of milking parlour and average number of milking units (MU) per milking parlour in farms planning to invest in new milking technology within eight years.

Figure 3 also shows that milking parlours are being expanded by 2 milking units on average. This points to greater growth of Swiss dairy farms, or to a greater rise in work productivity because of farms growing whilst the number of manpower units remains the same.

More than 60 % of the farms have a waiting area in front of the milking parlour (Fig. 4). To date, very few of them have been equipped with mechanical cow-moving aids, but in future these will become much more common. 26 % of the farms planning new investments within 8 years state that they would invest in these aids (Fig. 5). The mechanical mover not only enables a constant flow of cows into the milking parlour at milking time, and thus a higher throughput, but at the same time improves work quality, since the milker is no longer obliged to leave the milking parlour as often, or indeed at all, in order to move the cows into the parlour. Over 70 % of the farms possess a milk meter (Fig. 4). This high percentage could be due to the fact that the survey did not distinguish between fixed and mobile milk meters. Fixed milk meters only makes sense in combination with automatic animal identification. It may therefore be assumed that the percentage of farms with fixed milk meters devices is similar to that of farms with automatic animal identification, i.e. approx. 30 % (Fig. 4). Unlike automatic cluster removers, automatic udder stimulation systems are fairly uncommon. This is due, inter alia, to the fact that the use of an automatic stimulation system, particularly in auto-tandem and rotary milking parlours, can lead to an efficient increase in milk yield. According to Schick (2000) it allows for a savings of 20 % in the routine times.

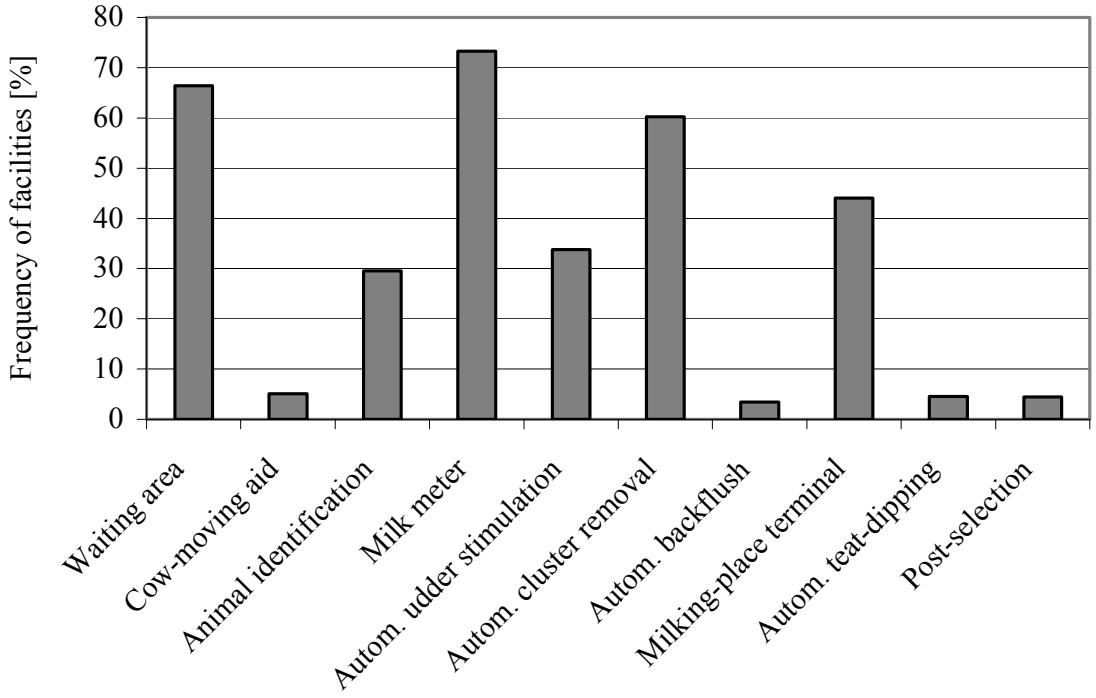

Figure 4. Current structural and technical facilities.

In farms planning to invest in new milking technology in the medium term, automatic cluster-removal devices would become far more common (Fig. 5). Although automatic intermediate disinfection has been uncommon to date, it would be considered by over 10 % of farmers purchasing new milking technology (Fig. 5). Slightly less than half of the milking parlours are equipped with a milking place terminal which is linked to the herd management system. Neither automatic teat-dipping devices nor automatic post-selection devices are considered by the farm managers to be of importance.

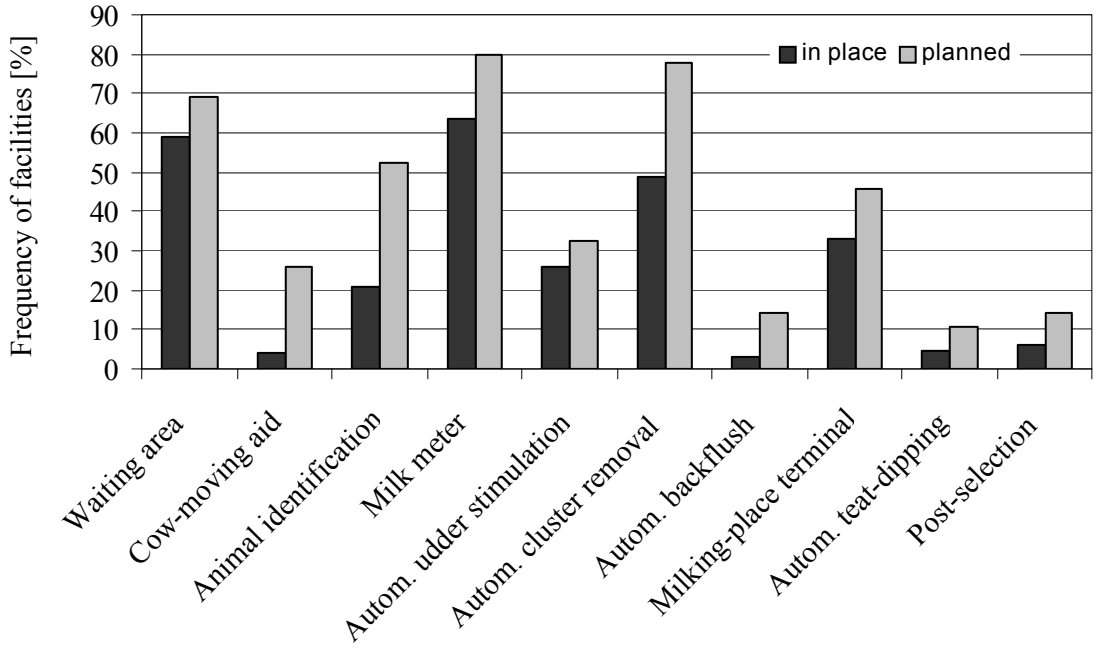

Figure 5. Current and future structural and technical facilities for farms planning to invest in new milking technology within eight years.

Reasons for the purchase decision For the farmers, the most important criterion for the purchase of a milking system is the quality of the customer- and after- sales service (Fig. 6). Workplace comfort, technology, price/performance ratio, purchase price and trading partners are likewise deemed to be very important considerations. Of less importance in the purchase of new milking technology is the experience of professional colleagues or the assessment of the specialist press.

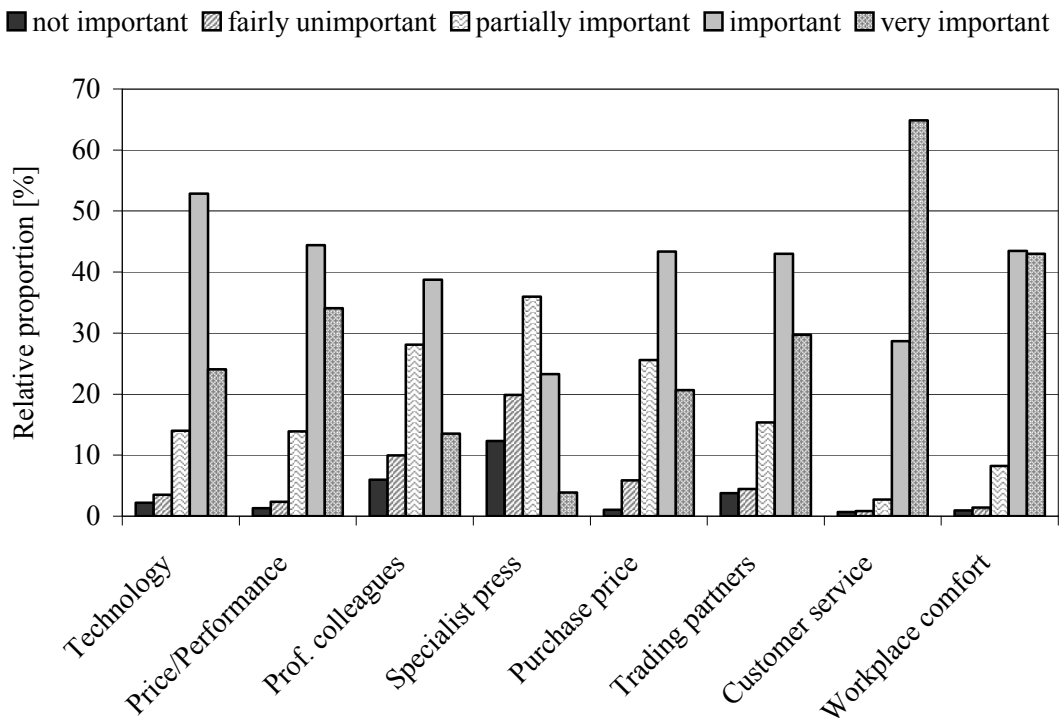

Figure 6. Reasons for the milking-technology purchase decision.

Satisfaction with the technology When purchasing a milking system, the farmer has certain expectations of the milking technology. Whether these expectations were met and whether the farmer is satisfied with his milking technology is reflected in the assessment of the milking technology already in place (Fig. 7). All of the assessment criteria of the current milking technology were given an average rating of 'good'. The respondents rate functional reliability and customer service the highest, with the latter being rated as 'very good' by 45 % of the questioned farmers. 85 % of the farmers are 'satisfied' to 'very satisfied' with their milking technology, and would buy the same product again when investing in new technology. The satisfaction of the farmers is also reflected in the assessment of workplace comfort, with 55 % and 22 % of the surveyed farmers perceiving the work environment as 'good' and 'very good', respectively. The farmers scarcely find themselves exposed to high noise levels at work. 39 % of those surveyed rate the noise level as 'very good', 23 % as 'good'. This can be attributed to the measures for the reduction of noise and vibrations recommended by Nosal et al. (2004) and implemented in the guidelines for the installation of the milking systems (Swiss Industry Standard, Appendix 3, 2006) (max. noise limit: 70 dB(A); max. intensity of vibration: 0.3 m/s^2). Frequent problems with non-functioning work equipment during milking are also quite a rarity. Nevertheless, every fifth farmer reported the suspected or proven presence of electrical immissions (stray or leakage currents) in the milking parlour. These currents can flow through the cows, and depending on their intensity, can have a negative effect on the animals' well-being. Since, however, the survey reveals neither how, nor how much, electrical current was measured in the milking parlours, this result cannot be quantified. Nevertheless, it is clear that 20 % of the farms questioned have problems with milking.

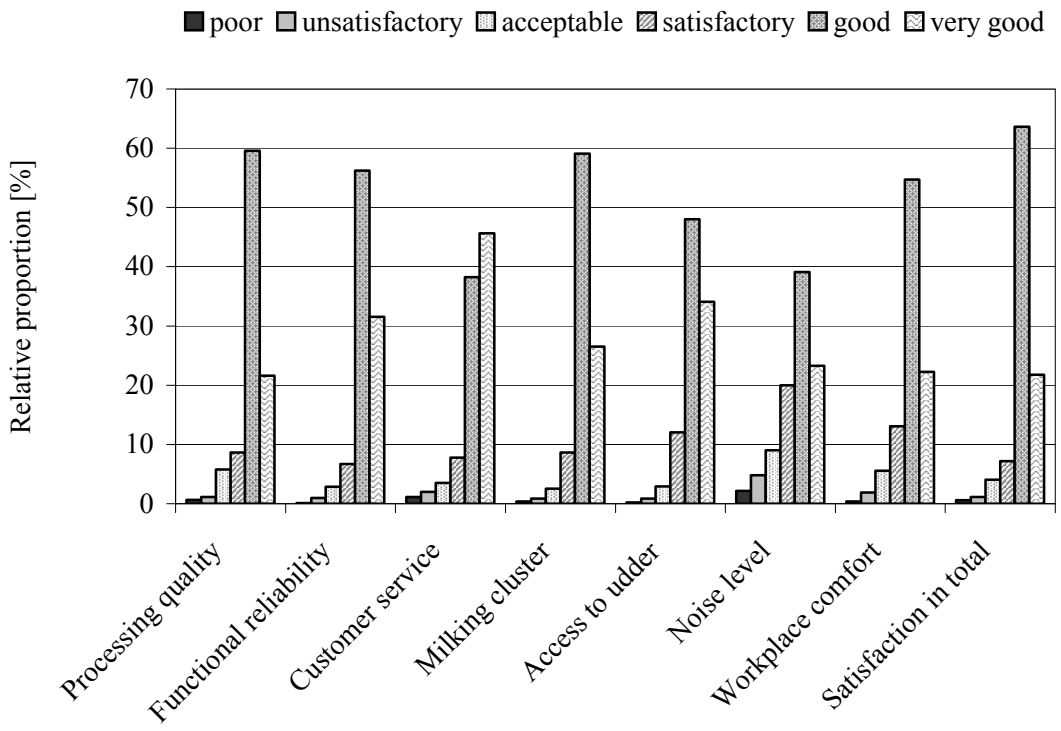

Figure 7. Assessment of the current milking technology and after-sales service

Comparison with survey results from germany With an average herd size of 80 cows and a mean milk yield of 8280 kg per cow and year, the 3000 farms surveyed by Fübbeker and Kowalewski (2006) were considerably larger than the Swiss farms. This is also reflected in the prevalence of certain types of milking parlour. Accounting for over 50 % of all milking parlours, herringbone systems are significantly more common than in Switzerland (Fübbeker and Kowalewski, 2006; Liste, 2008). By contrast, tandem or auto-tandem milking parlours are found on fewer than 20 % of the dairy farms. This difference can be attributed to the larger farm structure in Germany. Because of the higher space requirement, longer walking distances for the milker and limited opportunities for expansion, one-cow milking parlours are especially suitable for herd sizes of up to 60 animals (Schick, 2004; Ordolff et al., 2004; Kühberger et al., 2009). In future, the number of tandem milking parlours will continue to fall. The herringbone parlour will remain very common, although the 30° angle will increasingly be replace by the 50° variant. Every fourth farm with over 100 cows will invest in a rotary parlour (Fübbeker and Kowalewski, 2006).

In Germany, 75 % of the surveyed farm managers planned new purchases for milking technology in 2005, which allows us to conclude that future milking systems would probably be replaced earlier than was previously usual (Fübbeker and Kowalewski, 2006). The authors put this down to the increasing farm sizes. In addition to the obsolescence of the milking technology, fairly long milking times are frequently the reason for contemplating an investment in this area. Comparing their future plans with those of the Swiss dairy farmers questioned, at first glance the German farmers would seem to be keener to invest. It must be borne in mind, however, that the survey was carried out in Germany in 2005, and hence before the worldwide slump in milk prices

that has persisted for several months now. Furthermore, measured against farm size, milking parlours in Switzerland are already technically very well equipped. In addition, pressure for growth appears to be very high in Germany. 60 % of German farm managers plan to increase their herd size by 30 animals on average, which in the case of the same number of manpower units will necessarily lead to increasing mechanisation and automation. Owing to the higher growth of farms in Germany, comparisons of milking technology on farms in Germany and Switzerland are only of limited helpfulness in the long term.

A survey of German dairy farmers conducted by Liste (2008) likewise revealed a high level of satisfaction with the customer- and after-sales service. German farmers frequently criticise the thin staffing levels and the very long travel distances, however. By contrast, the network of service professionals in Switzerland is quite dense, so that help is quick to arrive in the case of problems.

CONCLUSIONS The high response rate of this survey shows the great importance of milking technology for Swiss dairy farmers. Customer service and technology therefore decisively influence the purchase decision. Farmers are highly satisfied with their milking technology, with over 80 % rating processing quality and functional reliability as 'good' to 'very good'. This is also reflected in the loyalty to the manufacturer of their current equipment of farmers planning to invest in new technology. Tandem and auto-tandem milking parlours will remain the most common types of milking parlour in Switzerland in future. At the same time, however, there is a clear trend towards automatic milking systems, and the percentage of rotary parlours also seems set to increase in future. This in turn indicates a trend towards larger farms. More than two-thirds of the surveyed farms already have a waiting area, and can thus make better use of milking capacities. To date, however, little use has been made of mechanical cow-movers, although these could significantly optimise traffic to the milking parlour.

The direct comparison with survey results from Germany shows that although the Swiss farms are significantly smaller and will remain so in future, milk production in Switzerland is highly advanced in technological terms. Also particularly noteworthy is the customer service, which is of above-average quality in Switzerland owing to the spatial proximity of the service professionals.

In view of the current economic situation for dairy farmers, it is to be assumed that structural development will lead simultaneously to falling farm numbers and rising herd sizes worldwide. Among other things, this will necessitate a change in the demands made of technology, which must fulfil different requirements as a function of structural conditions and farm sizes.

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