HERD HEALTH MANAGEMENT AND QUALITY RISK CONTROL ON LARGE DAIRY FARMS

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ABSTRACT

Large dairy farms commonly differ from small-holder or medium-sized farms in the sense that they need to be well-structured and organized, and should be considered as enterprises. The entrepreneur-like dairy farmers show other characteristics than average dairy farmers. They also have other demands regarding the veterinary services on their farm. The "sick cow approach" is no longer valid. If veterinary practitioners like to play a substantial role like consultant-coach on these large farms, they have to invest in new knowledge, skills and technologies which are currently not part of European curricula. Among the investment domains are herd health & production management (HHPM) services focussing on reducing costs and/or increasing income through operational management advice, farm economics, marketing & communication.

In addition, new programmes of quality risk control based on the HACCP (hazard analysis critical control points) concept and principles emerge as a consequence of new EU regulations like the General Food Law and the Hygiene Directives. In these programmes, quality comprises both the product (milk) and the production process, while animal health, animal welfare, and food safety/public health are exponents of such production process.

Both HHPM and HACCP are addressed in this paper. Moreover, as a practical link between the two programmes SWOT (strengths–weaknesses–opportunities–threats) assessment sheets and GDF (good dairy farming) guidelines are presented. It is concluded that HPM and HACCP can be rather easily integrated on the dairy farm, and that the veterinary practitioner is best positioned to play a pivotal role, provided that he/she is well prepared and willing to invest in the new skills and knowledge presented. Then, a sustainable, new veterinary market segment lays ahead.

INTRODUCTION

Over the past decades we have seen a shift from small-holder mixed farms to more larger, mono-species, intensive dairy enterprises. New technologies-like for cattle housing, feed harvesting and feed mixing, milking – were introduced to meet the demands of increasing the milk production and labour productivity, necessary to cope with the smaller economic margins and to earn an income (Brand et al., 1996). At the same time it became clear that in order to manage large dairy enterprises, new skills and knowledge were paramount. Among these features are: [1] executing proper entrepreneurship, [2] set up an adequate organisation structure on the farm, including

assignment of responsibilities and tasks, and performance evaluation, [3] prioritising animal health and nutrition, and [4] design performance evaluation and risk analysis schemes.

The veterinary practitioner in this setting has to acquire new knowledge and skills too; the classical "sick cow" approach is no longer acceptable to the entrepreneur-like dairy farmer because diseases losses may be high and because the farmer is much more interested in disease prevention. The practitioner should turn into a consultant-coach for the entrepreneur-like dairy farmers to retain added value to these farmers (van Egmond et al., 2006). One way to perform this new task is to get experienced in herd health & production management services (HHPM) supporting the operational management. HHPM is founded on broad *clinical monitoring* of animals and their environment, searching for pending hazards and risk conditions, and evaluating herd performance data as well as the personnel.

A *SWOT assessment* is another crucial tool within HHPM. From available generic risk factor lists, a specific farm area like claw health or udder health is scored using area-specific SWOT sheets. At the end of such scoring, a *spider-gram* can be drawn showing the weak and the strong points of the farm. These results may trigger further action like interventions, further problem analysis or sampling for laboratory investigations.

Furthermore, because "quality" has become a leading issue in the EU, and hence in dairy farming, the practitioner should invest in skills and knowledge related to quality risk control. Quality must be considered in its broadest sense: from product safety (milk; meat) to animal health, animal welfare, public health. It has been stated earlier that the HACCP-like approach is the quality control concept best applicable to dairy farms as compared to ISO-9000-series and Good Dairy Farming guidelines, both for its farm-specificity and its merger with quality assurance systems further down in the food chain (Noordhuizen & Welpelo, 1996).

In this paper the forenamed programmes, services and concepts are addressed in a practical manner. Examples are given when appropriate. At the end it is concluded that veterinary practitioners could play a paramount role, once they are willing to invest for the future. When HHPM and HACCP are integrated, both farmers and practitioners can benefit.

Herd Health & Production Management, HHPM, services

HHPM have been developed from single area (fertility) schemes to more holistic farm management approaches. However, still many farmers drop out because veterinarians tend to stick to their technical skills too much, instead of adding e.g. data or problem analysis protocols, biosecurity guidelines, or risk analysis schemes to their HHPM product.

HHPM must be **structured** and needs **planning** ahead; the 'product' must be **transparent** and clear to the farmer, it must be founded on **farmer's demands** and priorities.

A ***SWOT assessment*** of the various farming areas will assist in determining the areas for improvement and prioritize them according to the farmer's wishes. Through www.vacqa-international.com you can get access to a website with, for example, such SWOT sheets for on-farm use. The SWOT assessment sheets function as follows (Cannas et al., 2006):

Suppose you like to assess claw health problems. First of all, diagnoses have to be set (pictures provided in the website). Then the SWOT takes you along several clusters of items to be scored. Among these clusters are: Clinical Monitoring; Housing; Climate; Management; Other health disorders. The items within each cluster can be scored, commonly from 1–3–5 ranging from good–moderate–poor. Several of the items refer to risk conditions contributing to claw disorders, others refer to adjacent farming areas (e.g. lameness ~ oestrus expression ~ reproductive performance ~feed intake ~milk production). Scoring is conducted for a sample of

cows in each of 4 lactation stages or as a group/herd average without lactation stage. At the end of the assessment the results are presented in a spider-gram and a histogram with colours from green (okay) to yellow(moderate; needs attention) to red (poor; immediate action required), while the items for improvement are listed for further interpretation and advice/intervention. Spider-grams can be used for evaluation of trends once a new assessment has been conducted both within farms as well as between farms. The data can be saved, and exported to PDF or printed.

Figure 1 shows an example of a screen of the VACQA-International website for the area of udder health

Currently SWOT assessment sheets are available in the areas claw health, udder health, herd fertility, milk production & nutrition, and calf rearing (4 periods). New SWOT sheets on Welfare & Cow Comfort, and on Public Health respectively are to be issued before the end of 2007.

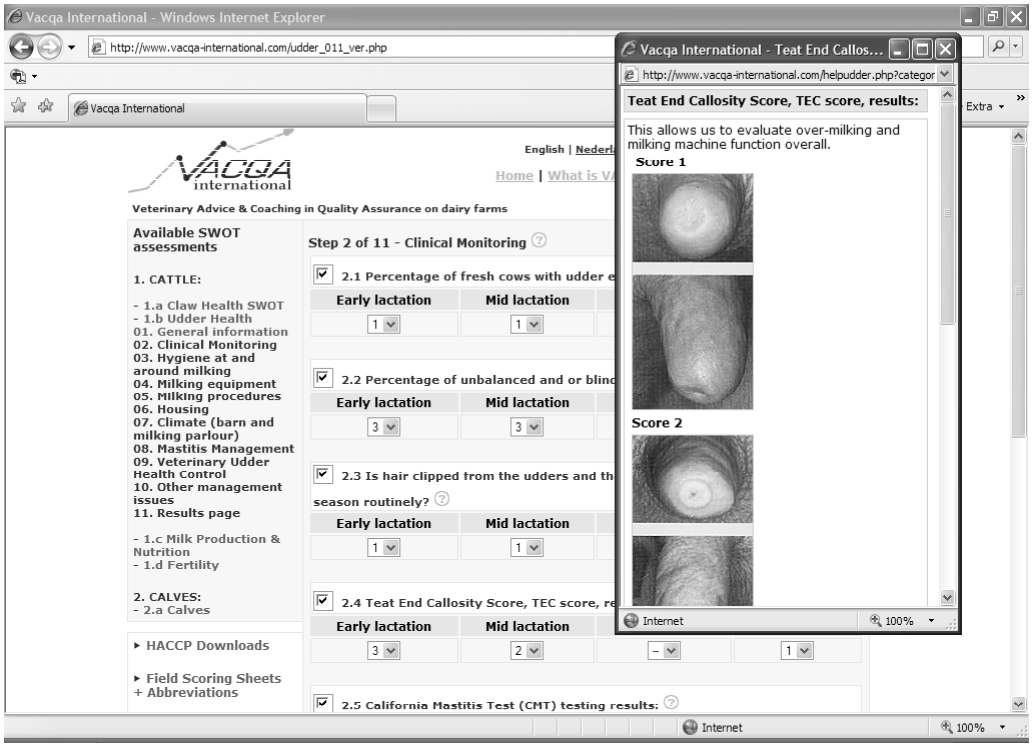

Figure 1. An example of the SWOT sheets from the VACQA-International website; the area of udder health monitoring

Once the hazards have been determined, the HHPM product contents can be designed.
Broad ***clinical monitoring*** is the basis for each HHPM; it regards animals/herd, their environment and the management, and the data of the herd/farm. Monitoring is a rapid, cheap, and sufficiently reliable tool to track down deviations in performance, to assess potential hazards and risk factors,

to detect trends in performance, and to evaluate the effects of advice or intervention given earlier. Monitoring results trigger further action like problem analysis, expert consultation, risk analysis schemes, development of biosecurity assurance plans, design of specific working instructions, etc.

Farm visits, every 1, 2 or 4 weeks, depending on herd size, are pivotal in HHPM because the forenamed monitoring is conducted during such visits; the discussion with the farmer and farm workers about the results is crucial for proper understanding and follow up.

Farm visits have 3 components:

[1] preparation while checking the latest events, the earlier advice given, and the state of herd performance;

[2] the execution of the visit and the monitoring, including the interventions and the discussion with the farmer and farm workers;

[3] the follow-up, comprising ***problem analysis***, expert consultation, reporting. A written report of a farm visit is an essential element of HHPM. The same applies to the written reports regarding the problem analysis.

These 3 components are also the parts that need to be paid for in a commercial setting. Commonly only the [2] and [3] are the most relevant ones. Follow-up can comprise up to 2 to 3 hours after a farm visit.

Preventive actions, after routine monitoring and farm visits the third primary component of HHPM, are mainly focussed on tailor-made vaccination programmes, risk analysis schemes, biosecurity assurance plans, and, finally, quality risk management programmes. It must be stated here that investments in cattle welfare economically pays off. Adjustments contributing to optimising cow comfort (with the areas of housing; climate; feed & feeding; health; behaviour) result in less health disorders and better milk production (Noordhuizen & Lievaart, 2005).

Quality Risk Management programmes

As stated above, "quality" in this context must be considered broadly. For the EU it has become a major drive to consumer protection (EC 178-2002; EC 852/853/854-2004). The European Commission has suggested to farmers to implement a HACCP-like programme to demonstrate the status of public health, animal health, animal welfare of their herd as well as of their products (milk; meat) to third parties (consumers; retailers; authorities). Earlier benchmarking also pointed to the HACCP concept as best applicable to dairy farms (Cullor, 1995; Noordhuizen & Welpelo, 1996) because of its simplicity, farm-specificity, low labour input and low documentation demands, low costs, and its basis in risk identification and risk management during the production process. The latter items have been named above under HHPM already.

Applying the HACCP-concept on dairy farms implies the following 7 principles (adapted after Cullor, 1997):

- A detailed description of the production process on the farm with all its steps in the format of flow charts and diagrams (which should be done anyway on large farms for organisational purposes!) by the HACCP-team which comprises the owner, the manager, the chief veterinarian, the nutritionist, the farm-economist.
- Identification of major hazards (diseases) and their associated risk factors in the areas of animal health, animal welfare and public health/food safety. (This is usually done in a more qualitative and generic way during HHPM services, but must be done here in a much more formal and structured way!)

- Definition of critical control points (CCP) and points of particular attention (POPA) to control the risks of concern throughout the production process.(POPAs fail to meet all the formal criteria as set for CCPs but still are considered relevant for risk reduction)
- The setting of standards and their tolerance level (physical entities) and targets (for biological entities) around each CCP and POPA.
- Design of a monitoring system involving CCPs and POPAs, frequency of monitoring, method of monitoring, the related record, and person responsible for it (this item too is somehow addressed in HHPM but again is formalised here).
- Definition of corrective and preventive measures at each CCP and POPA (is commonly addressed in HHPM once a [pending] problem has been detected).
- Verification of the proper functioning of the HACCP-like plan through internal reviews and screenings, and by external audits; the provision of necessary records.

These 7 principles are to be translated into the 12 steps of developing a tailor-made hence farm-specific HACCP-like plan. These 12 steps are addressed during the conference workshop to show its feasibility and practicality. Parts and examples from the handbook on a HACCP-like plan will be shown also. Fig. 2 on the next page shows an outline of a dairy farm production process flow chart; Fig. 3 shows a part of the HACCP-like handbook.

A crucial element in the **HACCP**-like approach is the fact that we **need to structure and formalise** what we –maybe- have not yet done so far in HHPM.

In order to determine whether an identified risk on a dairy farm is an actual risk or not, we can follow one of 3 possible routes:

- conduct a qualitative risk weighing in the HACCP-team on the basis of its probability of occurrence X expected impact (R= P*I) (Lievaart et al., 2005)
- apply methods of adaptive conjoint analysis (from marketing sciences to assess experts'opinions on a certain issue) yielding a ranking of risk factors in a semi-quantitative way (van Schaik et al., 1998)
- apply formal, quantitative observational-analytic epidemiological studies yielding odds ratios or relative risks (Noordhuizen et al., 2000).

A CCP can only be defined as such if formal criteria are met; these are that the CCP is associated with the hazard of concern; that it is measurable or observable; that standards/tolerances are known; that corrective measures are available; that these corrective measures restore full control of the process again after a breakdown. POPAs usually are lacking the third and the last criterion; the main reason is that animals are biological, not physical, entities, and that, hence, biological variation exists (e.g. sero-titres distributions).

In animal husbandry, standards and tolerances known for physical processes are not very common. An example however is the temperature of the water for cleaning the milking machine (80ºC +–2ºC) which is a true CCP. Therefore, in dairy farms we will have much more POPAs, which at least can be supportive to reduce the risk. Moreover, items like breed

or houses can be risk factors for e.g. lameness, but a farmer will not accept our "advice" to replace them.

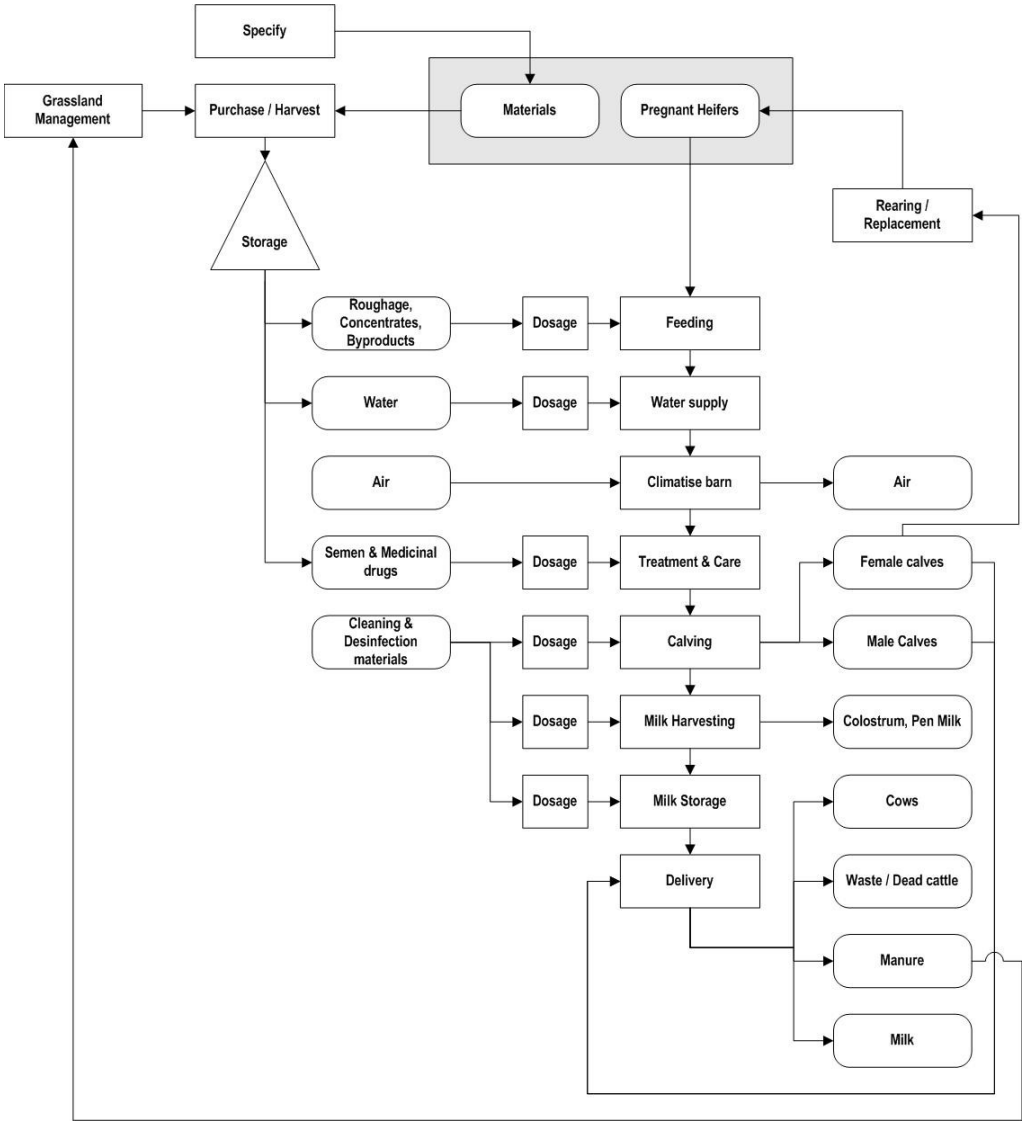

Figure 2. Example of an overall dairy farm production process diagram (flow chart)

Item no.	CCP/ POPA	Standard Tolerance	Monitoring How	Freq.	Who	Instruction (prevention)	Corrective measures	Records
T_1	POPA	Use only proper drug	Check label	At use	Farmer	"Use of drugs"	Use proper drugs Evaluate other drugs Consult the vet	"Drug Record" (R_t)
T_2	POPA	No residues	Check drugs (R)	At delivery	Farmer	"Use of drugs" "Drug delivery"	Respect the with-drawal periods	(R_t)
T_3	POPA	Dosage in DAP.	Check syringe	At use	Farmer	"Use of drugs"	Adjust dosage	(R_t)
T_4	CCP	Cow ID No tolerance	Visual	At drug use	Farmer	"Use of drugs"	Mark the cow	(R_t)

T= cow treatment step in the process; POPA= point of particular attention; CCP= critical control point; DAP= drug advisory plan of the veterinarian for the herd. R = records. R_t = Records regarding treatments

Figure 3. Example of a part from the HACCP-like handbook, regarding the process component of cow treatment ($T_{1, 2, 3, 4}$ refer to items in the handbook)

An on-site monitoring scheme involves the CCPs and the POPAs. Its function is fully comparable to that used in HHPM, but under HACCP it is –again- much more structured and formalised.

The HACCP records, needed to prove to third parties (authorities; retailers; consumers) that the quality risk management plan is in place and adequately functioning, comprise components like a Daily Events & Calamity Log; Intervention Sheets; Herd Treatment Advisory Plan e.g. for mastitis; a Good Medicine Application code of practice; Performance Records; Quality Control Sheet; Laboratory Examination Sheets.

Several of these records will already show up in a properly designed and functioning HHPM service. They are also available at www.vacqa-international.com.

This website comprises many templates of a HACCP-like handbook (about 100 pages) and provides examples of hazards & risks lists; flow charts and diagrams; CCP & POPA lists; monitoring schemes; intervention schemes. These templates can be used for adaptation to the regional and local (farm) situation. Risk factor lists are generic examples.

It must be stated that the application of quality risk management according to the HACCP concept would be senseless if not the proper attitude and mentality has first been adopted by both the farmer/owner and the veterinarian as well as the farm workers. A way to properly deal with such adoption refers to the marketing of "protocols" of Good Dairy Farming codes of practice (GDF) and working instructions associated with these protocols. GDF codes are guidelines and address different farming areas like Hygiene, Feed Harvesting, Feeding Management, Milk harvesting, Colostrum Management.

GDF guidelines largely encompass the more generic types of risk factors which are hence not specific for a certain disorder. The veterinary practitioner is well-positioned to design such guidelines, market them and start training and coaching in implementing these on the farm with the manager and the farm workers. When these type of working instruction are adopted on the farm, the foundation is built to expand to HACCP-like applications.

On the www.vacqa-international.com website different examples of such GDF guidelines can be found too. They can be adapted to the particularities of the local (farm) situation. By the end of 2007 a book on the various applications of HACCP with many field examples will be issued by Wageningen Academic Publishers.

DISCUSSION AND CONCLUSIONS

Applying HHPM to large dairy farms means more than involving veterinary technology alone. If we like to keep these enterprises as our client, we have to enter other domains (van Egmond et al.,2006).

The first domain is that of the farm organisation: How is it set up as a business? Are there different farm units being distinguished for better management? And if so, are tasks and responsibilities defined for farm workers? How is performance being evaluated? etc

Next domain is the marketing and business administration. We need to be able to follow the entrepreneur in his ways of thinking. A particular element of this domain is communication in its broadest sense (oral and written communication; raising the proper questions; adequate listening; conflict handling; investing in contact moments; moderating discussions; properly convincing people).

The third domain is –next to adequate veterinary-zootechnical knowledge and skills – animal health economics. A veterinary coach-consultant must be able to deal with disease loss estimation and cost-benefit assessments of advisory programmes or interventions. A specific area in this domain is "behavioural economics", the irrationality in decision-making processes based on issues like perceptions, emotions, vision on the outside world, social standing, pleasure in his enterprise. Again, the practitioner should be able to follow the entrepreneur and recognise the signs of such behaviour in order to discuss at the same "wave length" as the farmer/manager.

If the practitioner detects during a self-evaluation session several blanc spots in his professional profile, related to the forenamed domains, he better invest first in acquiring such knowledge or skills before jumping too quickly and too deep into HACCP-like applications. A client is lost more rapidly than won. Different courses on these subjects are given, most probably by branches other than veterinary…..

From the preceding paragraphs it is clear that HHPM and HHCP-like applications can be easily integrated. They both have the same client, the farmer; the scope of quality risk management through HACCP is wider and more at the tactical/strategic level, while HHPM is at the operational management level. HACCP is also much more structured and formalised than HHPM. When conducting HHPM and/or HACCP it must be absolutely clear to everyone that clinical intervention activities (like claw trimming; calf dehorning; treating endometritis) must be strictly separated from coaching-consulting activities. The farmer should not be confused and his concentration must be focussed on the work under hand; on the other hand, the practitioner should not loose too much time being distracted by such clinical work while coaching/consulting. For the same reason, the veterinarian should leave his mobile phone in his car, not being tempted to denigrate the farmer!

The main reason for integrating HHPM and HACCP – for example in a developmental pathway – is that quality control on dairy farms must be conducted in a "bottom up" sense instead of a top-down approach. The latter will never lead to full adoption by the farmer unless being forced by e.g. authorities or retailers. By integrating the two, the benefits for the farmer are much bigger.

SWOT assessment tools and Good Dairy Farming codes of practice as proposed here are the practical links between the two types of services.

The contemporary veterinary practitioner can play a paramount role in these new services if he/she is willing to invest in new knowledge, technology and skills first. Then, a new large market segment lays ahead, while his/her pleasure in new activities will increase.

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