Productivity through health or how to improve your return on investment

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The dairy industry, like any other industry, is faced with changing situations that sometimes seem to make profitability challenging.

Alongside the growing demand for dairy products consumers are getting more aware about the limited resources and demand for value added products. Scandals have shaken the food industry regularly and short term consumer behaviour changes lead to long term influence via regulatory changes. Recently, awareness about the use of antibiotics has increased and already leads to some programs, especially in Europe to reduce this dramatically in the upcoming years. Another 'trend' is the longing for sustainably produced food.

Sustainability includes the whole production chain and one very important part of this is animal sustainability. Animal sustainability and animal welfare are strongly related and dependent. Improvements in genetics and housing have a great impact on the rising level of production. Nevertheless, this potential can only be used if conditions are optimal. Any changes to these conditions lead to changes in individual animal behaviour and should be recognised as soon as possible.

Animal welfare is defined by the absence of five conditions:
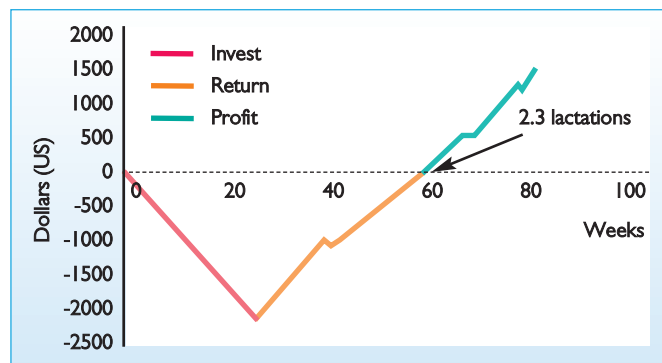● Freedom from hunger or thirst by

Fig. 2. The profitability of a cow (adapted from Lührmann 2009).

ready access to fresh water and a diet to maintain full health and vigour.
● Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area.
● Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment.
● Freedom to express (most) normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind.
● Freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering.

If pain, injury or disease cannot be avoided completely we are obliged to recognise and act accordingly. In growing installations and increasing cow numbers per farm this is a challenging task that needs:
● Staff educated and trained to recognise this.

● Time for cow behaviour observation.
● Management techniques to act after identification.

It is very likely that one of the three is not optimum or available at a given time. The solutions to this are cow behaviour observation management tools.

Economics of disease

The bigger the herd grows the more the individual gets lost. Poor performance by one cow will be compensated by her group mates and not make a big impact on the overall performance.

Nevertheless, an individual can spread disease and lead to a higher impact when the group is affected. Additionally, feeding costs and heifer raising costs are detrimental to the overall profitability on farm. Keeping the cows longer on farm is the message that makes a difference.

Identifying health disorders and treating them early contributes a lot to increasing a cow's lifetime and profitability on farm. In the sum the individual does make a difference as drug use will be more and more limited in the future.

The crucial part of every disease event that happens on a farm is that it causes extra work and economic losses. The costs associated with diseases are often underestimated and the distributions of these costs are not very obvious.

Humans tend to recognise what is obvious, in diseases these are direct costs like treatment, extra labour and discarded milk. Like the example of the iceberg, the big proportion lies below the surface and the main cost driver to most diseases is milk that is not being produced because of the disease. This contributes to 32% of disease costs like in lameness (see Fig. 1).

The other very important aspects of costs associated with disease are culling and replacement and effects on reproduction.

This leads to the fact that most of the cows are leaving the farm too early. Fig. 2 shows the profitability of a cow. Money is generated after the birth of the first calf. The break-even point of a cow is around 2.3 lactations.

Unfortunately the average dairy cow's life lasts around 2.4 lactations. The conclusion is that this is still profitable. But the question should rather be: how can we improve this to be even more profitable as most of the cows are leaving the farm when they just become a cash cow.
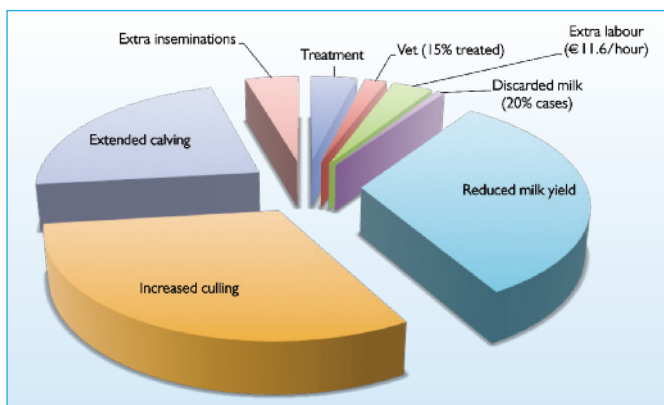
Detection and intervention

It is desirable to prevent diseases which are in some cases possible by vaccination or other methods of prevention. Some cases are inevitable. This means the affected cows have to be identified early to:
● Avoid deterioration of the condition of the animal.
● Avoid suffering.
● Avoid further spreading of the disease.
● Check/adapt management.

Numerous articles have shown that early detection and intervention is necessary and helpful to be able to reduce the number of affected animals on farm dramatically. The perfect example for this intervention is lameness: A sole ulcer also leads to changes in behaviour at a very early stage. If this is detected and treated the only effort it takes may be hoof trimming. If not detected and treated it will lead to consequences, severe lameness, drop in milk yield, inflammation of deeper tissues and require more intensive treatment,

Fig. 1. The true costs of lameness (Adapted from CAFRE, 2006).

eventually with block, bandage and injections. Research has shown that lameness prevalence can be reduced to 5% with early detection and intervention and 87% of animals treated for lameness do recover.

Fig. 3 shows the comparison of lactation curves from healthy cows compared to cows with an early or late detected disease. This is the major contributor to the economic losses. The goal of early detection and intervention is to avoid the deep drop in milk and speed up recovery to be able to reach the yield potential for this specific lactation.

Furthermore, although a minor contributor, treatment costs can be reduced as subsequent treatment may not be necessary and only minor intervention is necessary at the early stage.

If the drug use is and will be limited furthermore the need for early disease detection is rising and can contribute to a rather prophylactic intervention to avoid necessary treatment. Economic losses can be reduced dramatically.

Early disease detection and intervention is one key to increasing a cow's lifetime and therefore profitability. As most of the causes are multifactorial, optimum environment, climate, hygiene, comfortable and stress free surrounding are prerequisites for a comfortable environ-
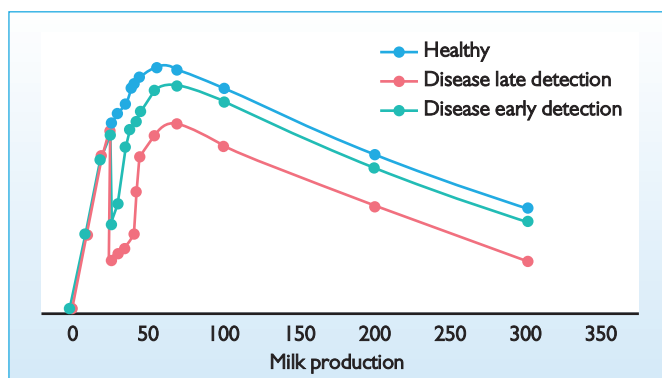

Fig. 3. Comparison of lactation curves.

ment that reduces the predisposition to get ill.

Identify disease early

Cow behaviour has been observed and analysed since the 1980s for identification of heat.

In the era of precision livestock farming more and more systems are being developed that offer an insight into the cow's status. Some are attached to the cow, some are integrated into systems like milking machines.

According to Rutten (2013) these can be distinguished into four different categories depending on the level of information they provide:

● Presentation of data.
● Interpretation of data.
● Integration of information.
● Decision making.

One very simple method to distinguish if a cow is ill or not is what is performed on a day to day basis by herd managers and veterinarians: cow behaviour observation.

Observing a cow not behaving like she usually does or like her mates do leads to a decision like checking her for certain conditions.

Cows tend to hide their discomfort as long as possible because in former times the weaker members of the herd would have fallen prey to predators. This means that identifying a cow with abnormal behaviour requires time and talent.

Due to the fact that time and educated staff may be a limiting factor on most farms the identification of sick animals often happens when profound changes in the behaviour have already occurred or performance has declined dramatically (for example milk yield drop).

GEA CowView uses the very simple methodology of cow behaviour observation in a holistic approach: walking, standing, eating and resting behaviour is observed, analysed and compared to the cow's and the group's history. The intelligent algorithms inside GEA CowView generate alarms when the cow's behaviour distinguishes from her normal behaviour. This is possible because the cow's complete behaviour is observed 24/7 in a standardised manner. Maybe she is able to hide her lame leg while walking to the parlour, but the 24 hour observation reveals that her total walking distance and resting or feeding behaviour has changed.

Farmers will be able to detect cows at an earlier stage and get guidance on how to apply procedures to handle them. Early disease detection and intervention will improve the health status of the herd and contribute to an increased lifetime and therefore profitability. ■

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References are available from the author on request