THE GROWING ROLE OF ANIMAL HYGIENE FOR PRODUCING FOOD OF ANIMAL ORIGIN

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THE CHANGES

It is striking that the changes in food production (especially in the production of food of animal origin) in the last 15 years have by far exceeded the changes that took place in the period of time from the turn of the 19th until 1990. It has been mostly speculated that the reason for that is the endless sequence of real and perceived food crises such as the BSE episode, the sudden Salmonella Enteritis emergence, and many other so called food scandals like dioxin in feed and food, resistance in bacterial pathogens and so on. I dare to argue that the underlying "problem" of the changed attitude of consumers and the society towards food is a very positive one: in many parts of the world, food production exceeded the demand for food. Figure 1 shows a very simplified graph demonstrating the effects of the relationship between population growth and food production. The solid line in Figure 1 symbolizes the population growth over time; the dotted line symbolizes the growth of food production. Due to a more rapid growth of the population than the growth of the food production, there has been until recently always a need for more food – wars and a rapid urbanisation (fewer farmers have to produce food for more urban people) have even widened the gap between the two lines until we decided to purposefully intensify food production (first arrow). As the Figure 1 shows (second arrow), it has been only for a very short period of time that food is being produced in a way that almost everybody (unfortunately only in the developed countries) has access to an abundant food supply.

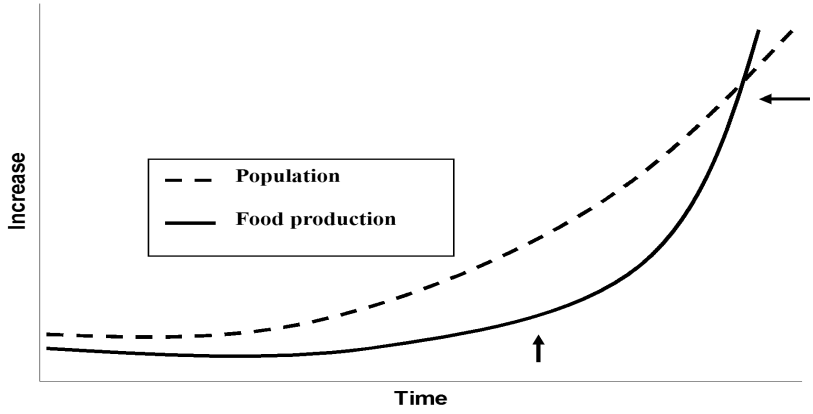

Figure 1. The theoretical relationship between population growth and the increase of food production

In contrast to many a modern "consumerist" I think that intensifying food production has been one of the great achievements of mankind – although it has to be admitted that, as so often, this achievement has its price: **we have to learn how to produce food in a way that supplies everybody with abundant, wholesome, nutritious and safe food AND to simultaneously maintain our recourses, protect our environment and keep animals for food production under conditions that allow them a decent life fulfilling their needs for animal well being** – in other words, the task is: building up an efficient and yet sustainable animal production for a socially acceptable food supply feeding the world.

These changes have both an impact on the market that are mainly due to the growing free global trade with feed, animals, and raw material for food and food itself, and an impact on the legal framework that are responding to the growing demands of the society.

The market has started to look not any more only for the lowest price, but also for superior quality, traceability, guarantees for safe products and for ethical values such as "environmentally sound", "sustainable production", and "animal friendly".

The legal framework for the new conditions under which food production is expected to take place has started to change with the new definition of the principles for food safety by the Codex Alimentarius in 2000. Accordingly, the rules of the World Organization for Animal Health (O.I.E. – since recently also responsible for food safety and animal welfare), the rules of the World Trade Organization (WTO) and of the Agreement on Sanitary and Phytosanitary Measures (SPS) reflect the new expectations as well as the legal framework for feed and food safety in the now 27 EU-member states, which is summarised in the Reg. (EC) 178/2002.

The major new principles of the paradigm shift that is reflected in this new regulatory framework are:

- strengthening of the responsibility of the producers for safe products and state of the art production procedures
- process optimisation rather than end product inspections
- risk-oriented safety procedures (e.g. HACCP) and risk-oriented controls and inspections
- setting targets rather than prescribing every detailed procedure
- the "third eye principle" (auditing and certification)
- public-private partnerships (self controls, neutral controls and governmental control of the control)
- the primary production (feed production, animal husbandry) has to be part of the food safety system along the food chain.

THE CONSEQUENCES

These changes have, of course, quite drastic consequences, which mainly put pressure on the farming community that has never been exposed to such a speed of change in the past. It is by far not any more sufficient to produce "as much as possible at as low as possible costs". Agricultural production becomes more and more market-oriented. The probably most drastic change for the farmers is the fact that, with abundant food available and with the possibility for food processors and retailers to buy any raw material and any food from everywhere, the need of national self-sufficiency is gradually decreasing. In other words: affluent societies that buy food from all over the world lose their willingness to pay farmers for overproduction and/or for products that do not meet the demands of the market. There is also a decreasing willingness of the government to "fix

all the problems" that farmers may run into (contagious animal diseases, improper production processes leading to economic losses and suboptimal products).

To maintain a sound livestock production as basis for a competitive production and supply of food of animal origin, the following major tasks must be fulfilled:

1. eradication of contagious (notifiable) diseases and protection of the national livestock against the introduction of foreign and emerging diseases;
2. controlling and minimising the multitude of endemic (multi-factorial) diseases impairing animal performance and animal welfare;
3. controlling, minimising or eradicating zoonotic pathogens and chemical and physical risks to human health at herd level (pre-harvest food safety);
4. optimising the husbandry and animal care conditions to ensure animal well being. (including transport and stunning before slaughter);
5. protecting the environment against adverse effects stemming from animal husbandry (emissions, improper waste management, ground water pollution);
6. assuring the compliance with the necessary measures to be taken (internal and external audits, certification and traceability) to tackle all these tasks.

ANIMAL HYGIENE'S CONTRIBUTION TO ANIMAL HEALTH

"Animal Hygiene" is the discipline of veterinary medicine that is not focussing at animal disease, but on animal health. In the last decades, especially in the framework of the International Society for Animal Hygiene (ISAH), the scope of "animal hygiene" has been broadened from "just" animal disease prevention to:

- **animal health** in the widest possible sense (freedom from disease, freedom from suffering and pain, freedom from pathogens harmful to animals and humans);
- **food safety** at herd level (no microbiological, chemical or physical contamination of meat, milk and eggs, and minimisation of bacterial resistance);
- **environmental protection** in all areas that are affected by animal production (waste management, protection of soil and ground water and minimisation of emissions from animal husbandry).

Figure 2 shows a graph that tries to illustrate that animal health is not a "Yes" or "No" issue, but a quantitative criterion that can be classified as ""Low" or "High", which makes it possible to define improvements.

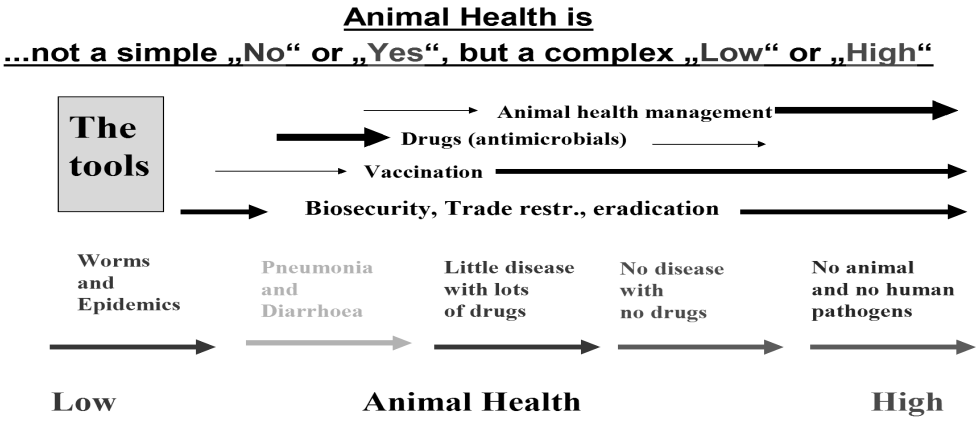

Figure 2. Improvements of animal health over time and the major tools of the animal health management

In the light of this definition, animal hygiene is involved in all "new" challenges that the farming community is increasingly facing.

1. Biosecurity

Apart from complying with the international regulations for the trade with animals and animal products, and the national regulations on the protection of the national livestock (monitoring, surveillance and early warning systems), a set of precautionary measure have to be taken at farm level. First of all, there is a need to maintain at all times the awareness of farmers and veterinarians, that any symptom of disease might be a symptom of a contagious (notifiable) disease. It must be stressed that the "first line of defence" against the tread of outbreaks of contagious diseases is the farmer and the field veterinarian, not the state veterinarian, who can only take actions if somebody indicates a suspicion of disease. It has been experienced in the last decades that statistical sampling for monitoring for antibodies and/or causative agents of contagious diseases are rather providing a false sense of security – the targeted diagnostic clarification of any clinically suspicious case is in all events more likely to early detect an outbreak. If such targeted diagnostic measures are part of the daily considerations of the farmer and the consulting veterinarian, a major condition of animal hygiene, i.e. preventive veterinary medicine is fulfilled.

Additionally, of course, animal hygiene is teaching the basic rules of biosecurity such as shower-in, changing of boots and overalls, restriction of visitors, quarantine and isolation measures for animal replacements etc.

2. Endemic diseases

If epidemic diseases are eradicated and "kept out" of our herds and flocks, the impact of animal specific pathogens (that often only together with adverse factors develop disease) must be minimised. GAP (Good Agricultural Practices – good stockmanship and good husbandry) and GVP (Good Veterinary Practices) need to be implemented. Only if the animal and people flow is

oriented towards a constant reduction of infection chains within the herd or flock and along the animal production chain from breeding up to slaughter, and only if the living conditions of the animals (ventilation, cleaning and disinfection, care and proper feeding and watering) are constantly being optimised, there is the chance to maintain and even improve the health of the animals. Appropriate vaccinations of the animals and the prudent use of antibiotics (no prophylactic use, and in case of disease: as much as necessary and as little as possible) are major components of GVP.

3. Pre-harvest food safety

After having brought the "classical" food safety risks (tuberculosis, brucellosis, trichinellosis) under control, more and more "new" food safety risks emerge that cannot be controlled by the traditional meat inspection, which depends on inspecting the carcass. Risks such as Salmonella, Campylobacter, Listeria, residues and toxins, do not result in clinical disease (which could be detected in the flock or herds), and they do not cause any pathological-anatomical lesion (which could be detected at the slaughter line). And, even if they could be detected at the slaughter line (e.g. bacteriology or any other analytical test), they cannot be removed from the carcass. The only way to deal with these risks to human health is to prevent their entering the flock or herds of animals. Observing the basic hygienic requirements (shower-in, change of boots and overalls, rodent and pest control, cleaning and disinfection between production cycles, vaccinating where appropriate, compliance with withdrawal times and prudent use of antibiotics) are the major preventive measures for reducing the at-herd-level food safety risks. Additional monitoring and surveillance systems to identify higher risk flocks herds and to implement measures in these high-risk flocks and herds for mitigating the risks in question, will contribute further to reasonable and effective pre-harvest food safety programmes.

4. Good Agricultural Practices (GAP)

Apart from disease prevention, the animals deserve a decent life and any prevention from suffering and pain. The animals physiological needs need to be met and the species-specific behaviours need to be taken into consideration to guarantee. It goes without saying that the husbandry system is having the highest impact on the degree of the "animal friendliness" of the rearing conditions. However, whereas in recent decades the husbandry system has been almost exclusively made responsible for the well being of food animals (e.g. poultry batteries vs. free-range, sow crates vs. sow group housing etc.), it has become increasingly obvious that the intensity and quality of the animal care (the degree of stockmanship) can even override the positive or negative effects of certain husbandry systems. Optimal feeding, water supply, veterinary care and intensive observation of the animals and taking care of their needs are at least as important as the husbandry system.

5. Environmental protection and waste management

Sustainable production methods for food of animal origin ask for minimisation of adverse emissions from any livestock production facility and for a responsible waste management. Appropriate feeding strategies (e.g. phytase supplementation), reducing emissions from waste storages (e.g. covering of slurry tanks), and emission reduction by using filtering systems (e.g. biofilters), are as important as a responsible use of veterinary drugs and disinfectants that potentially contaminate animal wastes.

6. Traceability

Any market-oriented food production is only competitive and providing trust, if the production procedures are completely transparent. The major precondition for transparency is a seamless system for tracking and tracing back and forth along the production chain from "plough to plate". Modern identification, data recording and information systems provide more and more possibilities for a transparent production flow. Third party auditing and certification procedures will "produce" as much trust for consumers and markets as the guarantee that recall actions are possible in case of any failure in the production chain. Fully integrated, corporate production systems such as certain poultry, egg, milk and pork production chains have already started to implement their own data recording, tracing and information system. However, first independent tracing and tracking systems provided by third party companies start to be offered in the market such as the software system "ScoringAg" (Scoring System, Inc., USA), which can be used by groups of producers that have a steady product and information flow without being fully integrated in corporate terms.

Figure 3 shows the theoretical change of the animal care management systems over time from curing single diseased animals to the sustainable production of high quality food.

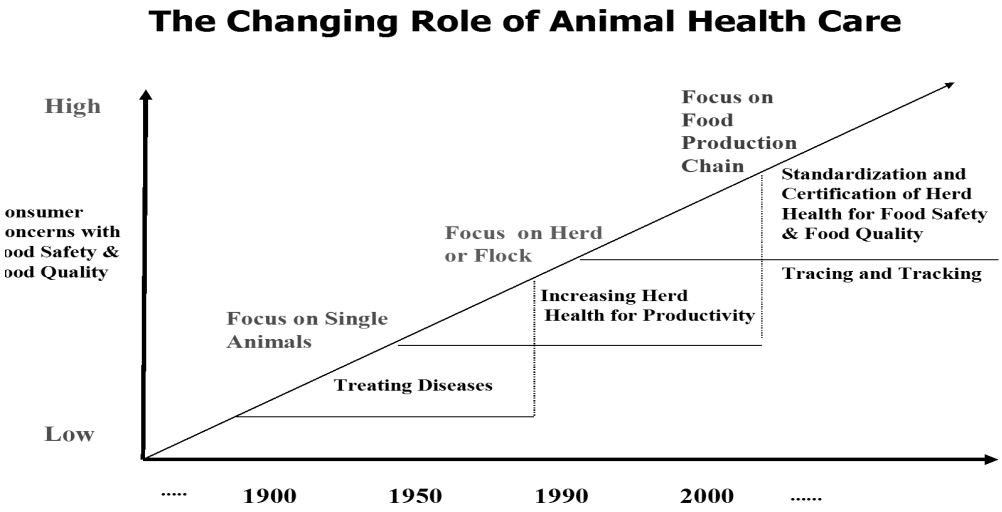

Figure 3. The changing animal care systems over time

Implementing all components of **"Animal Hygiene" as integral parts of Good Agricultural Practices and Good Veterinary Practices into the daily production procedures in livestock** and into the veterinary service, the production of food of animal origin will continue to change from single animal care actions for curing diseased animals by therapeutic efforts to flock and heard health improvements for maximising the economic output of the livestock operations on to a **transparent and socially acceptable production of wholesome, healthy and safe food produced under sustainable production conditions.**