



# Livestock health, management and production

**Author:** Dr Mary-Louise Penrith

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## Background

Human civilization became established as a result of the domestication of plants and animals; their propagation to provide food and clothing enabled a more settled existence in fertile areas and the need to manage them and improve production was the incentive for skills and technology development that ultimately led to industrialization with only a small percentage of the population involved in food production. Domestic animals are kept for a variety of reasons. In developed countries farm animals are mainly produced for food and clothing, while there are also important animal industries that revolve around sport and recreation, companionship and security. In less developed countries livestock are also an important source of fertilizer, fuel and traction, contribute to social standing and may play a vital role in ceremonies. Many people worldwide derive their income from livestock, varying from subsistence-level farmers in the poorest countries in the world to the many role-players in highly developed livestock industries in the wealthiest countries. With an ever-increasing human population to feed, increasing the efficiency of production of healthy food derived from animals has become an imperative. This depends crucially on improving livestock production in poorer countries, especially countries in sub-Saharan Africa, which are not competitive in terms of the quantity or quality of livestock and livestock products. Failure to address this situation will increase marginalization and poverty among the vulnerable poorest countries in the world, most of which depend either periodically or permanently on food aid from abroad. Managing animal health is key to improving the productivity of

food animals and ensuring the safety of the food derived from them.

Domesticating animals has resulted in immense changes in the animals themselves as well as their introduction into environments that differ greatly from those in which their ancestors evolved. Over time humans have applied genetic selection to derive a wide range of domestic animals that are uniquely suited to the various purposes for which they are used. In the process of specialization some traits like innate resistance to pathogens may have been lost. International trade in animals with desirable characteristics and the imperative for higher production have resulted in displacement of animals into environments to which they are not adapted. Imbalances have been created between animal hosts and pathogens that result in diseases, many of which have a high impact on animal health. For example, sheep evolved in dry areas where the harsh climate enables a balance between them and their internal parasites; raising them on irrigated pastures creates an environment in which control of helminths has become a major challenge. Some diseases are zoonotic and therefore have an impact on human health as well, like 'mad cow disease' (BSE), attributed to the unnatural feeding of ruminant protein to ruminants. The challenge is therefore to improve production efficiency without compromising its sustainability in terms of animal, human or environmental health.

## Concepts

Animal disease control depends on preventing exposure to pathogens or, failing that, on managing the interaction between the pathogens and their animal



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hosts. Protecting humans from zoonotic diseases can be achieved by minimizing contact between humans and animals or their products, but for the great majority of people who need to have contact with animals and/or eat their products other approaches are required. These include ensuring that animals are as healthy and free from zoonotic pathogens as possible, and putting safety measures in place that minimise the risk of humans being infected by animal pathogens.

Preventing exposure of animals to pathogens usually involves segregating them from possible sources of infection e.g. wildlife, domestic animal populations of different or unknown disease status, humans, polluted water or feed, and arthropod vectors of disease. This is achieved by the erection of physical barriers, for example fences, buildings and insect-proof netting, and creating and maintaining an environment that is unfavourable for disproportionate proliferation of pathogens. It includes providing appropriate water sources and ensuring that the water is of good quality as well as ensuring that feed is adequate and wholesome. Often preventing exposure is not practical, and in this case methods to neutralise or eliminate the pathogen, such as vaccination and medication, are used. While many of these methods are effective in preventing or controlling disease, there is increasing concern about the effects on human health, animal health and the environment. The 'one health' concept implies an integrated approach to managing animal and human diseases in a way that minimises the ill effects of disease and benefits both animals and humans. Increasingly it is realised that environmental damage and disruption of ecosystems have negative impacts on human and animal health and therefore interventions for disease control must take into consideration possible effects on the environment and on biodiversity. Fences, in particular those used to separate wildlife from domestic livestock, disrupt ecosystems and conservationists are committed to find alternatives or ameliorate their potentially adverse effects. Pesticides used against internal and external parasites often have detrimental effects on

invertebrates that are essential for ecosystem health, such as dung beetles, as well as on human and animal health. Concerns are raised that antimicrobial residues in meat, milk and eggs may select for bacterial resistance and result in harm to both animal and human health. There are fears that we are running out of options for 'new' chemicals and drugs to replace those for which resistance has become widespread. Raising animals indoors in artificial environments raises health, welfare and food safety concerns, particularly as a number of diseases that have emerged in recent decades have been associated with intensive animal production systems.

The challenge is to modify livestock disease control systems in order to achieve adequate protection for animals and humans, support livestock production and trade to improve livelihoods dependent upon it and increase food security, and at the same time be cost effective, environmentally friendly and support biodiversity conservation. Livestock production in itself is seen as environmentally damaging by many, for example the contribution to greenhouse gas through methane production by ruminants that can contribute to global climate change, the potential adverse effects of nitrous oxide emissions from manure, and the release of carbon dioxide into the atmosphere from commercial farming practices. An innovative and holistic approach is needed that minimises environmental pollution and optimises the use of waste products.

The aim of the OIE Collaborating Centre for training in integrated management of livestock and wildlife health and production is to highlight the challenges and propose solutions. The livestock component provides basic information about important animal diseases, animal production systems, and trade in animals and their derivatives as well as the tools that are available for the fight against animal diseases. The emphasis throughout is on the 'one health' approach and how some of the current approaches to livestock production and disease control need to be adapted to conform to the concept of healthy animals, healthy people and a healthy environment. It also focuses on improving



livelihoods by making it possible for a wider range of role-players to participate in and benefit from safe livestock trade in national, regional and international arenas. In the final analysis, improved livestock health, management and production will benefit the global environment and local economies.



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