BACKGROUND TO TRADE IN LIVESTOCK COMMODITIES

Live animals

Live animals pose the greatest risk for transmission of infectious diseases. Cross-border trade in live animals therefore usually involves some formalities that at the least would be a veterinary certificate of health but normally include quarantine requirements as well. However, in many countries moving animals from one area to another also involves formalities. This may be to maintain zones free of particular diseases and to reassure trading partners that this is being done correctly. For example, South Africa requires internal movement controls to ensure that cloven-hoofed animals are not moved from the foot and mouth disease (FMD) protection zone around the Kruger National Park to the rest of the country and that pigs are only moved from the African swine fever (ASF) control zone in the north-eastern part of South Africa (mainly Limpopo province) from accredited farms within the zone to designated abattoirs outside the zone. Even countries without designated free zones may require movement permits in order to keep track of animals and to prevent spread of diseases from one part of the country to another.

Classification and description of livestock marketing systems

- Live animal markets("wet" markets), shows, fairs, auctions
- Agents and speculators
- Sale at point of slaughter (abattoir)
- Retail outlets other than livestock markets
- Private sales – home, roadside
- Internet auctions
- Import and export marketing agents and systems

Challenges for animal health management

With the presumed exception of internet auctions, which offer a sophisticated way to avoid unnecessary transport of animals and contact between animals of different origin, marketing...
animals can pose a health risk. Even animals bought over the internet might pose a risk if they are not transported in the correct way.
Live animal markets or the equivalent (show, fairs, auctions), where large numbers of animals are brought together under unavoidably stressful conditions, clearly pose a level of risk of disease transmission that many regard as unacceptable. The H5N1 avian influenza pandemic has led to at least temporary closure of live poultry markets in some countries, for example China, since it was evident that infected birds were being offered for sale and that such markets could become focal points for spread of infection. In developing countries especially, when animals start to sicken or die and the owner realises that he has a serious disease in his animals the tendency is to sell off animals as quickly as possible to limit damage. This has been cited as a major reason for the spread of ASF in Nigeria and has certainly contributed to the fact that the disease has now become endemic in that country. This tendency is exacerbated by disease control programmes that involve compulsory culling and disposal of animals without adequate compensation. Nevertheless, under conditions where live markets offer the only alternative to even higher risk sale procedures, they present the veterinary authorities with an opportunity to perform inspection of the animals offered for sale and to take the necessary steps should diseases be detected. The key to mitigating the risk of live animal markets is that as much veterinary supervision as possible should be supplied, that the size of the market should be manageable, that the facilities should be such that reasonable separation of lots from different producers is achieved, and that detailed records of animals offered for sale are kept to permit rapid tracing to farms of origin if any outbreaks do occur.

Sale at point of slaughter, i.e. at an abattoir or other area designated for slaughter of animals, should be safe, as such places can and should be regulated by the veterinary public health authorities. However, abattoirs have been incriminated as sources of disease, owing to practices such as the sale of live animals for home slaughter or for purposes other than slaughter. It was suspected that an outbreak of ASF in Nairobi in 1994 may have originated from pigs brought from an area close to the border with Uganda to an abattoir in Nairobi and being sold live to clients instead of being slaughtered. There is also a possibility that animals in the incubatory phase of a disease may show no clinical signs or lesions at inspection but infected product will be released to the market. To prevent this happening in the case of an asymptomatic bovine infected with bovine spongiform encephalopathy (BSE) being slaughtered, there is a requirement for the removal of specified risk materials (SRMs), which include tonsils, distal ileum, brain, eyes, spinal cord, skull and vertebral column. The rest of the carcass is safe, although animals known to pose a high risk (e.g. old dairy cows born before the feed ban) are not passed for human consumption. Lymph node removal is generally considered to reduce risk of disease transmission and may be recommended for other diseases as well, e.g. FMD.

Sale of live animals through retail outlets other than livestock markets is generally confined to companion animals including birds that are sold through pet shops. Particularly in the case of imported birds and reptiles, it is important that the veterinary authorities ensure that the proper quarantine procedures have been complied with before these animals are disseminated to the public.
Private sales and sales through agents are activities that are often impossible for the veterinary authorities to monitor, and the risk can therefore be high. Professional agents who work under contract to their clients are unlikely to place their livelihoods at risk by breaking the laws pertaining to animal movements and sales. On the other hand, livestock speculators are rife, particularly in the rural areas in the developing livestock sector. They provide a means of selling animals beyond the local market for producers who have no transport to carry animals to the distant urban markets, and therefore make an important contribution to the economy of such areas, even if the prices offered are frequently less than fair. However, their role in the spread of disease is undisputable, since they move from one producer to another and can also move infected and sick animals to new areas, selling them off on the way if they look as if they will not survive the journey.

Sales transactions between private individuals probably pose the lowest risk, provided that both parties are properly informed and that sick animals are not sold or bought. Purchase of animals directly from breeders is recommended as a safe way to acquire animals, provided the breeders are reputable and their facilities are visited by veterinarians (private or state) on a regular basis. In the informal livestock sector breeders may be less reliable. As previously indicated, during disease outbreaks that result in heavy mortality the temptation to sell off animals that appear healthy but may be incubating disease is extremely high, and the danger of this practice must be a prominent part of farmer education as well as public awareness programmes.

Illegal roadside sale of pigs during an African swine fever outbreak, Volta, Ghana
Trade in commodities derived from animals

Trade within countries

At local level, apart from live animals, the usual edible commodities derived from animals that are traded are fresh meat, milk and eggs. Their safety in rural communities is far from assured. In poor communities, dead animals or commodities derived from them may be sold, posing a risk to human health. Most cases of human anthrax in developing countries can be traced to the butchering and consumption of animals that have died of anthrax, a practice that not only often results in human illness but also results in environmental contamination with anthrax spores because the carcasses are not disposed of in the recommended way. Roadside sales of meat and dead animals (e.g. animals that have been hunted), often observed in developing countries, may not only result in the sale of diseased meat but the meat may have spent a long time at high temperatures and have been exposed to flies and other sources of contamination. The trade in bushmeat at both local and international level is globally regarded as a major problem that must be addressed urgently as it threatens biodiversity, food security in communities that for centuries have exploited wildlife for food in a sustainable way, and animal and human health. Informal sales of animal commodities may result in transmission to people of zoonoses like anthrax, pig tapeworm (*Taenia solium*), trichinellosis, bovine tuberculosis, brucellosis, salmonellosis and Rift Valley fever (RVF). These can result not only from butchering animals that have died of disease, but also lack of meat inspection, lack of pasteurisation of milk, and inadequate cooking. Diseases like anthrax, classical and African swine fever and avian influenza may also be transmitted to scavenging animals, in particular pigs, cats and dogs, as well as wild species, by careless disposal of remains. Public education is the only practical way to address the problem, since many rural areas lack animal health officers, but veterinarians are ultimately responsible for ensuring that accurate information about how diseases are spread and acquired is available to extension officers and other workers in rural communities. Skins and hides are non-edible commodities that are also traded, and while generally regarded as safe, an exception has proven to be transmission of anthrax spores in hides; occasional cases of anthrax in humans have been recorded that were traced to skins used in the manufacture of drums.

In the formal sector, where commodities derived from farmed animals are eventually sold through retail outlets like butchers, dairies and supermarkets, the concept that there must be reassurance of safety of the product from ‘farm to fork’ or ‘stable to table’ is widely accepted. Animal health managers are responsible for the part of the value chain that extends from the farm to the abattoir, milk or egg collection point, i.e. the point at which they cease to be closely associated with the animal. Once the commodities enter the retail chain they usually become the responsibility of the municipal health authorities, although this may vary between countries. However, the chain is seen is an unbroken entity and to ensure this there are increasing requirements for traceability that would enable the final product to be traced back with certainty to the farm and even the animal of origin. Sometimes the entire value chain takes place on the farm, or meat products are sold directly from the abattoir and in these cases the veterinary authorities
might need to oversee the entire process. Abattoirs have served as a source of disease through the sale of offal not designated for human consumption as well as meat and organs condemned for various reasons, and the improper disposal of waste from the slaughter process. Most countries have legislation regulating these practices, and the difficulty lies in ensuring that the legislation is implemented. Sale at abattoirs should be restricted to the sale of edible products from animals that have undergone ante- and post-mortem inspection. The products should be handled and packaged hygienically and records kept of the transactions in the form of receipt copies or other sales records.

**International trade in livestock commodities**

When livestock commodities are exported or imported, regulatory mechanisms come into play determined by the importing countries guided by international norms and standards. These are discussed in much more detail in modules on marketing and trade, but the situation is briefly summarised here.

**Rules and structures**

Animal production is regulated by national legislation, which varies according to the country. It may determine where and under what conditions animals may be kept and what may legally be fed to animals. Animal health legislation has an impact on production, as it provides for the registration and use of veterinary medicines, which is vital for international trade. Livestock and livestock commodity trade is subject to regulation at both national and international levels.

At the international level, the World Trade Organisation (WTO) provides member states, through the Sanitary and Phytosanitary (SPS) Agreement, guidelines for fair trade in animal and plant commodities. The World Animal Health Organisation or Office International des Épizooties (OIE) is the body designated by the WTO to develop guidelines and standards for trade in animals and animal commodities. These guidelines are available through the Terrestrial Animal Health Code (TAHC) and the Aquatic Animal Health Code available on the OIE website, www.oie.int. The food safety standards for products destined for human consumption are set by a joint committee of the World Health Organization (WHO) and the Food & Agriculture Organization of United Nations (FAO), the Codex Alimentarius Committee. Some countries or trading blocs, in spite of WTO and OIE membership, impose their own standards that are generally higher than those of the OIE and make access to their high value markets very difficult for developing countries, especially in regions like sub-Saharan Africa where many major transboundary animal diseases are endemic. Many countries tend to follow the EU standards. This has various reasons. Firstly the OIE standards differ for different diseases and therefore a number of chapters in the codes have to be consulted in order to export meat, whereas the EU standards are simpler to follow. Secondly, some veterinary authorities would not like to be seen as imposing a ‘lower’ standard. Thirdly, countries that export to the EU are virtually forced to apply similar standards as importing meat under less rigorous provisions could jeopardise their status. In addition to standards set by
trading blocs and individual countries, international companies and alliances are increasingly setting private industry standards. This situation provides challenges to the official international standard-setting bodies, which need to harmonise their standards as far as possible with market requirements reflected in the private standards without compromising their role in facilitating trade for all their member countries.

There are initiatives among regional bodies in sub-Saharan Africa to support intra-regional trade and to find ways to overcome the differences in animal health status that exist between member countries. COMESA (Common Market for Eastern and Southern Africa) has 19 members in southern and eastern Africa, from Egypt to Swaziland; SADC consists of 15 member countries in southern Africa, several of which are also members of COMESA, and EAC (East African Community) is a community consisting of Uganda, Kenya and Tanzania, the first two of which are members of COMESA and the last of SADC. There is also a West African bloc, ECOWAS (Economic Community of West African States). COMESA, SADC and EAC are exploring the establishment of a tripartite body with a focus on trade policies that will permit free movement of agricultural products among member states subject to some form of certification.

At national level, livestock trade is regulated by laws covering the movement and transport of animals, the slaughter of animals, and all aspects of veterinary public health and food safety.

Animal welfare is increasingly becoming important for trade in animal commodities as well as live animals, particularly in the higher priced markets. At national level, guidelines for the welfare of animals may be provided through Welfare Codes as well as legislation. The OIE is actively involved in developing standards for animal welfare and has so far developed seven standards relating to terrestrial animals, six of which provide for aspects of trade and disease control (transport of animals by land, sea and air, slaughter of animals for human consumption, killing of animals for disease control purposes and control of stray dog populations). Animal welfare is the subject of a dedicated module.

**Risk mitigation for livestock commodities**

The OIE provides guidelines for risk assessment for import and export in Chapter 2.1 of the TAHC. This is discussed in more detail in modules covering tools for animal health management including risk assessment. The concept supports the requirement of the SPS Agreement that prohibition of the importation of agricultural commodities must be scientifically defensible. It can also be used in support of Article 4 of the SPS Agreement that provides for countries to achieve freedom from infection for commodities by different pathways (principle of equivalence). Risk assessment can be used to evaluate whether these pathways result in commodities posing only an acceptable level of risk.

Classification of commodities and products (i.e. commodities that have undergone further processing) derived from animals, ranked in the order of the level of risk they may pose for transmission of pathogens that threaten animal or human health:
Livestock Health, Management and Production › Animal Health Management › Managing animal health for trade

- Live animals
- Semen, ova, embryos
- Fresh or frozen products (meat, raw milk, eggs, offal/carcass meal, manure, raw hides, hair and fibre, serum and tissues used for biological products)
- Processed products (processed meat, milk and dairy products, rendered carcass meal, tanned hides)

Within these categories there are variations in the level of risk posed. For example, hides in general pose a lower level of risk than fresh meat. The simplest way to mitigate the risk posed by a commodity for a particular disease is to derive it from an area that is demonstrably free of that disease, and this is the criterion on which most of the OIE standards are based. However, it is recognized that countries with few resources may find it difficult if not impossible to create and maintain zones that are free of diseases that are endemic in the region. A particular problem facing the SADC countries in this respect is the fact that the most trade-sensitive disease, FMD, is endemic in African buffalo. Achieving separation between buffalo and cattle involves the use of game-proof fences, which are contrary to principles of biodiversity conservation and are not an option in the vast transfrontier conservation areas that have been established in the region. The problem experienced by livestock farmers in such areas is highlighted in a DVD entitled ‘Beauty and the Beef’.

Increasingly, in order to overcome the problem of trade embargoes on livestock products from developing countries owing to the endemic presence of serious transboundary diseases within their borders, attention is turning to commodity-based trade. It has been demonstrated that certain commodities are unable to sustain or transmit infection, even if they originated from an animal that was actually infected, owing to the properties of the pathogen itself or to its distribution in the animal. For example, deboned beef from which the lymph nodes have been removed is unable to transmit FMD, because the post slaughter conversion of muscle glycogen to lactic acid provides an unfavourable environment in which the FMD virus is unable to survive, and standards could be developed to ensure the safety of the commodity. Article 8.5.25 in the chapter on FMD in the TAHC (2011) provides standards for export of beef from vaccinated animals in an infected area that, if adopted by importing countries, would largely address this requirement. The tissues in which the prions that cause bovine spongiform encephalopathy (BSE) are likely to be present have been identified. Provided that these specified risk materials (SRMs) have been removed from slaughtered cattle, the meat is safe for consumption. The prions are also not present in milk. Various pork products subjected to a lengthy curing process have been found to be unable to harbour the ASF and classical swine fever (CSF) viruses in spite of their ability to persist in meat for long periods. There are many other commodities for which standards could be developed. Animal health managers need to be aware of this and to be able to evaluate, at least within broad limits, whether the level of risk posed by particular commodities that traders wish to
import is acceptable, and also to provide science-based arguments for the safety of products destined for export. It is important to emphasise that commodity-based trade does not open the door to sourcing products from sick animals. Animals that do not pass the usual ante- and post-mortem inspection will not enter the food chain. It does, however, invalidate the argument that because animals incubating a disease but showing no signs might accidentally enter the food chain, animals cannot be sourced from an infected area, thus excluding large numbers of livestock producers in Africa from international and sometimes even regional markets. This viewpoint is strengthened by recent research that indicated that shedding of FMD virus prior to development of clinical signs may occur only briefly.

Both COMESA and SADC have adopted commodity-based trade in principle and are busy with various initiatives related to feasibility and cost-effectiveness, recognizing that it is likely to be the only approach that will permit free trade in livestock commodities among countries ranging from those whose animal disease status is unknown but likely to be poor to countries like Namibia that are able to meet the EU conditions for export to their markets. At the same time, countries that have invested considerable resources in establishing export zones are seeking equitable solutions for large numbers of poor livestock owners who are excluded from the export market because they are not within the export zones, and this is also likely to involve commodity-based trade. The concept is also likely to support trade in products derived from the sustainable exploitation of wildlife, which will be necessary in order to ensure that biodiversity conservation provides benefits for communities living in or adjacent to conservation areas (the DVD referred to above provides a good insight into the situation).

**Animal identification and traceability**

High value markets for livestock commodities have stringent requirements for animal identification and traceability, especially for cattle. Identifying their animals has obvious advantages for the producers. It enables good record-keeping to monitor production and it also increases the possibility of recovering stolen livestock. Identification and traceability support animal health management by enabling better follow-up during outbreaks as well as proper registration of animals during interventions such as vaccination campaigns and surveillance for diseases, and may be a national requirement. However, the demand for traceability throughout the marketing chain by trading partners in industrialised countries may require resources that are simply not available in poorer countries. It is usually the responsibility of the animal health authorities to decide which systems are appropriate to their situation (for example individual animal identification vs herd or batch identification) and whether a large investment in identification will be justified in terms of the expected financial gains through trade. Further information about animal identification and traceability is available in a module on that subject as well as in relevant chapters of the TAHC (2011).
One of the most important issues for international trade is the provision of certification for animals and products destined for export. The OIE provides standards and guidelines for the importation of live animals, semen, ova and embryos, and some of their derivatives such as fresh and frozen meat, hides, and fibres. According to these guidelines the competent veterinary authority of a country is responsible for certification that the traded goods pose no more than an acceptable risk for the transmission of pathogens that are harmful to animal or human health. Guidelines for certification are provided in Chapters 5.1 and 5.1 and model certificates in Chapters 5.10-12 of the TAHC. The Codex Alimentarius provides food safety standards for a very large variety of processed products including products derived from animals, but these standards refer only to safety in terms of human pathogens. In assessing the risk to animal health posed by certain commodities, veterinarians need to use their own technical knowledge of the way important animal pathogens behave to decide whether those commodities are likely to harbour them or not.

In order to provide credible certification of the health status of the animals and of the area from which they originated, countries must have surveillance plans and systems in place that provide assurance that as much information as possible about the health status of the country is available to the veterinary authority. The surveillance system should be backed up by a reliable laboratory diagnostic service. The OIE Terrestrial Manual for Diagnostic Tests and Vaccines available online at the OIE website provides an overview of laboratory tests for all the important animal diseases. Increasingly there is insistence that laboratories should provide quality assurance through a quality management system that complies with the international standard for analytic and testing laboratories, ISO/IEC 17025, developed by the International Standards Organisation (ISO) based in Geneva. There is also increasing pressure for laboratories to be accredited for compliance with this standard by an internationally recognised body.
The act of processing livestock products often destroys any pathogens that may be present and renders the products safe. Thus, the heat process used in canning meat will inactivate most pathogens, excluding prions. Some but not all methods of curing pork inactivate the viruses that cause ASF and CSF. However, the actual safety of such products depends upon the processing having been carried out correctly. Thus, carcass meal rendered at the temperatures and duration required to destroy the BSE agent is safe regardless of whether it inadvertently contains SRMs from an infected animal, but this will only hold true if the processing was entirely reliable as certified. Process certification may not be within the scope of the competent veterinary authority owing to lack of specialised knowledge. This is a problem that will need to be addressed for the unreserved adoption of commodity-based trade. Certification is the subject of a dedicated module.