

# CROSS BORDER MOVEMENTS OF ANIMALS AND ANIMAL PRODUCTS AND THEIR RELEVANCE TO THE EPIDEMIOLOGY OF ANIMAL DISEASES IN AFRICA

Mohammed Bouslikhane<sup>1</sup>

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## 1. Introduction

At the 82nd General Session of the OIE in May 2014, the OIE Regional Commission for Africa adopted Cross-border movements of animals and animal products and their relevance to the epidemiology of animal diseases in Africa as Technical Item II to be presented at the 21st Conference of the OIE Regional Commission for Africa, to be held in Rabat, Morocco, in February 2015.

This topic, which has been a key concern of the OIE since the beginning of the 2000s, follows on from several conferences dealing with the issue of livestock movements in Africa, their socio-economic and sanitary impacts and the means to control them.

This report reviews the current context with regard to livestock mobility in Africa and the associated constraints. Concrete examples of transboundary animal diseases of relevance to the continent will be used to shed light on the role of cross-border movements in the persistence and spread of these diseases as well as the sanitary and non-sanitary constraints hampering their prevention and control.

## 2. Animal movements in Africa

### Context of livestock mobility

Livestock mobility is an essential part of the way of life in a pastoral environment. It is motivated by the need to access natural resources and livestock trade channels. Current mobility practices are dictated by the geo-climatic and sociocultural conditions on the African continent. There are also other factors that justify the mobility of farmers and their herds, namely the lack of water sources in the dry season or periods of drought, flooding, the need to move from areas affected by disease or inter-ethnic conflict, and banditry.

Nomadism is a vulnerable form of mobility, characterised by constant and irregular movement of herders, their families and their animals in search of watering places and grazing. This often means that they have no fixed base, are permanently on the move and have only limited access to basic resources and social services. Camels are the animals most commonly involved, followed by cattle, sometimes associated with small ruminants. Nomadism is tending to decline in favour of transhumance or a partly sedentary way of life.

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<sup>1</sup> Department of Veterinary Pathology and Public Health, Microbiology Unit, Immunology and Contagious Diseases, Institute of Agronomy and Veterinary Medicine Hassan II, Rabat, Morocco

Transhumance is a system of animal production based on seasonal movements and a strategy of opportunistic and ecologically viable management of pastoral resources. Historically, it has enabled pastoralist communities in Africa to survive major climatic crises. Two types of transhumance can be distinguished according to their scale:

- a) Short distance transhumance lasting 3 to 7 months, within a single country (Morocco, Algeria, Madagascar) or crossing national borders. Its role is to achieve a compromise between agriculture and livestock farming in terms of land use, and it also helps to reduce conflicts and exploit crop residues.
- b) Long-distance cross-border transhumance during the dry season. Some countries often act as transit countries for transhumant animals (Central African Republic) while others serve as host countries (Côte d'Ivoire, Togo, Zambia and Guinea Bissau).

In the Sahel and West Africa, transhumant pastoralism is one of the major livestock production systems, involving an estimated 70-90% of cattle and 30-40% of small ruminants. There is agreement among experts that this method preserves the environment and is viable, competitive and a provider of seasonal work.

#### Trade routes

Numerous trade routes for animals and animal products in Africa have been described. These include the following:

- a) West African routes for the export of live cattle and small ruminants from the Sahel to coastal countries. Animals leave from Mali and Burkina Faso to supply Côte d'Ivoire, Ghana, Togo and Benin ('central corridor'), from Chad, Niger, Sudan, Central African Republic, Mali and Burkina Faso to supply Cameroon, Nigeria, Benin and Togo, and from Mauritania and Mali to Cote d'Ivoire, Senegal, Gambia and Guinea Bissau ('western route');
- b) Central African route (export of live animals from the Sahel to equatorial forest countries);
- c) Horn of Africa route (export of live animals to the Gulf States and Middle East countries);
- d) East Africa route (export of live animals and dairy products between countries in the Great Lakes region);
- e) Indian Ocean route (export of live animals and meat from East Africa to Indian Ocean countries);
- f) Southern Africa route (exports of deboned meat to Europe);
- g) North Africa route (informal trade in live small ruminants and camelids from the Sahel to countries of North Africa).

#### Regulation of livestock movements

Recognising the importance of livestock mobility for the preservation of ecosystems and the sustainable use of pastoral resources in arid regions, West African governments have signed regional and bilateral agreements. These agreements establish the right of pastoralists to move their animals within and across national borders (e.g. Burkina Faso, Guinea, Mali and Mauritania).

The first texts regulating transhumance and the measures to be implemented in the event of disease outbreaks date back to the colonial period. Other texts were subsequently drawn up to help host countries manage the massive influx of animals during transhumance.

Some countries, such as Burkina Faso and Benin, have placed the emphasis on developing national legislation on transhumance. Others, such as Mali Senegal, have focused their efforts on concluding international conventions aimed at to guaranteeing the maintenance of livestock mobility and peaceful cohabitation between populations in border areas.

In Benin, one of the main host countries for transhumant animals from the Sahel, the legislation requires livestock keepers to hold a transhumance certificate bearing the authorisation to leave on transhumance and stating the herd's destination, intended reception areas and the routes to be followed. It also gives details of vaccinations against the major epizootic diseases. In Niger, there are regulations that govern the movement of livestock and grazing rights on cultivated land and define the transhumance corridors.

In Central Africa, legislation enacted in Central African Republic makes provision for the partitioning of areas for extensively grazed livestock and for the management of their movements. However, its practical application remains problematic for reasons that include insecurity, legislation not adapted to the local context and the absence of implementing regulations.

At the 21st Ordinary Session of the Conference of Heads of State and Government of the Economic Community of West African States (ECOWAS) region, a decision was adopted laying down the conditions for the movement and reception of transhumant livestock at regional level. The mechanism for implementation of this decision is the International Transhumance Certificate (ITC), which provides the means to manage transhumance and the sanitary protection of local and transhumant herds.

### 3. Constraints related to livestock movements

The diversity and complexity of the African context as it relates to livestock movements gives rise to many sanitary and non-sanitary constraints, which can have consequences in many different ways. These constraints can have direct and indirect impacts on animal health and food safety and may even modify the epidemiological map.

#### Non-sanitary constraints

Political instability, conflicts, confrontations, social inequality and poverty can undermine the sociocultural and economic stability of communities, especially when these situations are compounded by natural disasters and human and animal diseases, which weaken resilience and increase insecurity.

Mobile and extensive livestock farming practices, a high frequency of uncontrolled cross-border movements and the absence of identification systems hamper any initiative to regulate or ensure the safety of animal movements and the circulation of animal products.

Drought is one of the continent's most devastating natural hazards, depleting pastures, destabilising markets and, at its most extreme, causing widespread human and animal deaths. Drought can also lead to migration to urban areas and cross-border movements or conflicts, which can in turn lead to massive movements of livestock and people.

The non-sanitary obstacles that hinder intra-African trade relate to the poor level of organisation of operators in the livestock sector (formal markets, livestock prices, price of production inputs, etc.) and the inadequacy of the infrastructure (transport networks, livestock markets, abattoirs, etc.). Furthermore, the complex formalities involved in livestock marketing channels, the multiplicity of taxes and duties resulting from inappropriate tariff policies, as well as the "illegal taxes" imposed at numerous road blocks are the kind of constraints that drive livestock producers to engage in illegal trade and resort to informal channels to move their livestock to neighbouring countries.

There are also administrative or regulatory constraints that can hamper the organisation of livestock movements and also trade, namely ill-adapted legislation and a lack of bilateral and sub-regional coordination. Livestock movements between Chad and Central African Republic are a case in point, where transhumance is faced with violence and insecurity largely due to these inadequacies.

In terms of trade with countries outside the continent, the market share of imports of animals and animal products is continuing to grow and the value of these imports is very high for some countries such as Algeria and Côte d'Ivoire. Others are self-sufficient or are supplied from within the continent. At the current time, the main countries producing animals and animal products are unable to conquer markets outside Africa because of the requirements of the WTO SPS

Agreement. Nevertheless, all African countries have much to gain by embracing the prospect of compliance with international standards and seeking to achieve a compromise between the need for livestock mobility and the need to improve animal health and the sanitary safety of animal products. In this respect, the technical support of organisations (OIE, FAO) can target disease-free status at regional level for a given disease within the framework of joint programmes or else begin by developing zoning as an intermediate measure.

#### Sanitary constraints to livestock movements

Sanitary constraints are a constant hindrance to the development of livestock production in Africa. They relate both to animal health and to food safety. Various factors influence the spread, persistence and epidemiological profile of animal diseases and zoonoses, and the risks of pathogen circulation or introduction are increased by cross-border movements of animals and trade channels, legal or otherwise, for animals and animal products.

The risk of epizootic diseases is strongly related to the increase in the frequency of cross-border movements of livestock, the inadequacy of border controls and health surveillance systems and the various conflict situations. The level of risk is also related to the epidemiological status of a country or an entire region of Africa. The mobility of herders exposes their animals to new pathogens, while their animals may in turn be carrying other pathogens, thus creating a vicious circle. The risk of diseases therefore operates in both directions, for the country of origin and for the host country.

Transboundary animal diseases are defined as highly contagious epidemic diseases that can spread extremely rapidly, irrespective of national borders, and may have serious socio-economic repercussions and even public health consequences. They can also have serious economic repercussions in terms of losses due to morbidity and mortality and the cost of individual or collective control measures. Some of these diseases are particularly feared in the case of animal movements. For large livestock, these include foot and mouth disease (FMD), contagious bovine pleuropneumonia (CBPP), peste des petits ruminants (PPR) and Rift Valley fever (RVF). One could also mention rinderpest, because of its historical significance, and African swine fever because of the cross-border risk posed by trade in pig meat products.

**Foot and mouth disease (FMD)** is highly contagious and its transmission is facilitated by movements of infected animals and animal products and contaminated fomites. Cattle are highly susceptible to the disease. Small ruminants often present a subclinical form but can act as a source of infection for cattle.

In view of the epidemiological situation of this disease, especially in sub-Saharan Africa, eradication can only be seen as a long-term objective requiring a progressive, regional approach, as was the case for rinderpest.

Through phylogenetic analysis, it is now possible to trace the source of the infection and the route of introduction and analyse the epidemiological dynamics of FMD, as long as reliable information is available on animal movements and international trade.

Studies have demonstrated the role of animal movements in spreading the virus in Africa. Routes of introduction of FMD from West Africa to the northern countries have been illustrated by the FMD type O outbreaks recorded in 1999 in the Maghreb region (Algeria, Morocco and Tunisia). The viral strains in the three countries were closely related to each other and to those isolated from countries on the west coast of Africa (Ghana, Côte d'Ivoire and Guinea). Although the introduction into Morocco was ascribed to beef cattle illegally imported from Algeria, the spread of serotype O originated from a movement of zebus into Algeria in 1999. Nevertheless, a possible involvement of movements of small ruminants from Mali and Mauritania to Algeria cannot be ruled out.

Another example of the spread of FMD to the north of the continent is the introduction of an FMD virus type A strain into Egypt from East Africa in 2006. Clinical cases of FMD were recorded in eight governorates of north-eastern Egypt. Phylogenetic analysis confirmed the close relationship of the Egyptian strain with a strain already reported in Kenya and Ethiopia. The same strain was again reported in 2009 in Egypt, suggesting that the virus had become endemic in the country.

**Contagious bovine pleuropneumonia (CBPP)** is usually an insidious disease with low mortality in endemic zones but can spread dramatically with high morbidity and mortality in a previously free zone. New outbreaks of CBPP have been registered since 2012 in West Africa, in particular in Gambia and Senegal after an absence of 30 years. In Central Africa, Congo and Gabon recently reported it for the first time. Recurrent outbreaks are recorded in almost all the countries of East Africa and nearly all of sub-Saharan Africa is considered to be infected. Botswana is the only country recognised as free from CBPP in accordance with OIE standards. Since the eradication of rinderpest, CBPP is now considered one of the main infectious transboundary diseases posing a threat to cattle production. Regional collaboration and strict border controls are seen as essential measures to combat cross-border spread of the disease.

**Rinderpest** was one of the most feared viral diseases of cattle in the world. Historically, it caused substantial economic damage and was a major sanitary obstacle to international trade in animals and animal products. It long remained endemic in the vast pastoral lands of sub-Saharan Africa, especially along the main routes of cross-border movements of livestock. Its worldwide eradication was made possible through the sustained efforts of the international community. The eradication of this disease is a model of successful concerted international action, and one that is worth keeping in mind.

**Peste des petits ruminants (PPR)**, a highly contagious viral disease of sheep and goats that did not receive special attention in terms of surveillance and control while the focus was more specifically on rinderpest. PPR is a typical example of a disease where the virus is spread through transhumance and cross-border trade in small ruminants. In view of the effectiveness of vaccination, there is every reason to believe that PPR can be eradicated worldwide, in the same way as rinderpest.

**Rift Valley fever (RVF)** is an arboviral disease of ruminants and camelids. It is also a major zoonosis and in humans the disease is sometimes fatal. RVF was first identified in Kenya, in the Rift Valley, in 1930, and has remained confined to East Africa and Central sub-Saharan Africa since the 1950s.

Subsequently, enzootic outbreaks and outbreaks in humans demonstrated the capacity of RVF to spread within Africa, for example in Egypt (1977), Senegal and Mauritania (1987) and the Horn of Africa (1997-98).

The disease became established along the Senegal River valley and the string of lakes in the pastoral regions, where the disease spread due to the mobility of animals, the presence of vectors and favourable climatic conditions.

The epizootic that occurred in the north of Mauritania in 2010 in a particularly arid zone is further evidence of the virus' great capacity to spread.

In 2000, RVF was confirmed for the first time outside the African continent, in the Arabian Peninsula (Yemen and Saudi Arabia), where it affected large numbers of animals and humans, causing more than 120 human deaths. Saudi Arabia's importation of millions of sheep and goats from the Horn of Africa, where RVF is enzootic, for the feast of *Eid ul-Adha* was directly linked to the occurrence of RVF in the Arabian Peninsula.

RVF is a typical example of a disease placing major constraints on trade in animals and animal products. In the Horn of Africa region, ruminants are traditionally traded through informal channels. The bans on exports to Gulf States have led to a resurgence of illegal trade of livestock in this region.

The role of livestock movements and trade in the spread of vector-borne diseases other than RVF is an issue that would appear difficult to clearly elucidate, since various factors related to changes in habitats and vector-host interfaces need to be taken into account. However, while it is possible for a pathogen to be introduced through infected animals, animal products or arthropod vectors, it would be an exceptional occurrence for a vectorial system to become established in a new zone.

*African swine fever* is a deadly viral disease of pigs that is apt to occur suddenly and unexpectedly, remote from the source of infection. It is also a transboundary disease with a significant effect on food security. Outbreaks are often linked to pig meat products from contaminated zones being transported to other continents by travellers or in food waste from ships or aircraft. The disease is currently enzootic in Eastern and Southern Africa, where its eradication is not yet feasible due to its complex epidemiology and its transmission cycle in wildlife (warthogs, wild boar and tick vectors).

#### Role of wildlife

Numerous diseases are common to both domestic and wild animals and may be transmitted in either direction. Transmission of this kind has been demonstrated for a group of cross-border diseases, especially since the majority of wildlife protected areas are located in close proximity to grazing areas and transhumance or trade routes.

African buffalo are recognised as a reservoir for diseases transmissible to livestock (FMD) and to humans (bovine tuberculosis, brucellosis). Research on epidemiological interactions between species in various cross-border parks and reserves in Africa has shown that contacts between domestic species and wildlife increase in the dry season, suggesting that risks at the domestic animal-wildlife interface are higher during this period.

Poaching and trade, through legal or illegal channels, of wildlife and their products (e.g. bushmeat and decorative or handicraft items) are widely practised in Africa. In addition to the effect on conservation of endangered species, such trade carries a potential risk of spreading pathogens with serious implications for humans and domestic animals.

Consumption of bushmeat is an ancient practice among indigenous populations in Africa. However, commercial hunting with firearms is now taking place. There is an illicit trade in game products to supply restaurants and markets in their country of origin or for export to other countries. The most prized species are antelope, colobus monkeys, river hogs and chimpanzees. These are in fact the very conditions that led to the emergence of Ebola virus, SIV/HIV and SARS (in Asia).

#### Constraints on disease control

In 2005, a survey of Members of the OIE Regional Commission for Africa looked at the safety of trade in Africa. The permeability of borders to legal or illegal movements of livestock, the situation with regard to transboundary animal diseases and the limited capacity of the Veterinary Services to conduct controls are clearly major obstacles. Few countries indicated that they had introduced incentive measures to encourage legal movements, but most countries agreed on the crucial role of livestock identification as a tool for health management and for intra- and international movements for trade or transhumance. Moreover, several countries acknowledged that the failure of some surveillance programmes for enzootic or epizootic diseases were largely due to the lack of a national identification system.

The Veterinary Services often have to contend with insufficient human, financial and material resources and an inappropriate regulatory framework. This has a negative impact on:

- a) surveillance, diagnosis and notification performance;
- b) vaccination coverage of at-risk populations;
- c) border controls of animals and animal products and control of quarantine procedure implementation.

This situation is compounded by a lack of private sector involvement, despite reforms aimed at improving the situation, and the lack of livestock owner participation in disease control efforts by sharing the cost of disease prevention activities.

At a regional level, there are cases of insufficient regional collaboration and a lack of joint, harmonised control strategies for animal diseases. For instance, vaccination against CBPP is free of charge in Kenya and Tanzania, whereas costs are shared in Uganda. Conversely, vaccination

against FMD is free of charge in Uganda, whereas costs are shared in Kenya and paid in full by the livestock owner in Tanzania.

Lastly, it should be noted that during animal movements, the remoteness, scarcity or even total lack of animal health facilities (pharmacies, veterinary clinics, etc.) may drive pastoralists to turn to traditional medicine practices or use counterfeit veterinary products or products of dubious quality, thereby worsening the sanitary consequences.

#### 4. Conclusion

At the current time, it is not surprising that the mobility of livestock keepers and their animals must be considered a complex activity, firmly anchored in the economic and sociocultural reality of many African countries. While cross-border movements are in many ways justified, they are a source of various sanitary and non-sanitary constraints. The impact of these movements on the epidemiology of animal diseases, especially transboundary diseases, and on the safety of animal products is obvious and deserves the full attention of African governments and the relevant international bodies.

The process of preventing or controlling transboundary diseases is inseparable from lifting the constraints surrounding mobility. Any solution proposed must adopt a global approach to the problem in all its complexity, and must preserve the sociocultural balance and ensure sustainable development by improving the epidemiological situation and reducing the risks associated with animal diseases and animal products. With the support of international organisations such as the OIE this approach is feasible, provided that collaboration can be initiated between the countries of a given region, based on the complementarity, harmonisation and adaptation of tools for animal disease control, especially vaccination, and the control of livestock movements.

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