
Guidelines for Implementation of a Value Chain Approach to Management of Foot and Mouth Disease Risk for Beef Exporting Enterprises in Southern Africa



Practical guidelines report

Animal & Human Health for the Environment And Development (AHEAD) Program



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Address:

Wildlife Conservation Society
2300, Southern Boulevard
Bronx, NY 10460

www.wcs-ahead.org

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Abbreviations

BSE – bovine spongiform encephalopathy

CBT – commodity-based trade

CCP – critical control point

COMESA – Common Market for Eastern and Southern Africa

EU-FMD – Foot and Mouth Disease Commission of the European Union

FAO – Food & Agriculture Organization of the United Nations

FMD – foot and mouth disease

GAP – good agricultural practice

GMP – good manufacturing practice

HACCP – hazard analysis critical control points

OIE – World Organisation for Animal Health

QRA – quantitative risk assessment

SADC – Southern African Development Community

SAT – South African Territories (serotypes of FMD viruses)

TAHC – Terrestrial Animal Health Code (of the OIE)

WHO - World Health Organization of the United Nations

WTO – World Trade Organization of the United Nations

ZR – Zambezi Region of Namibia

1. Introduction

Foot and mouth disease (FMD) has major effects on trade in cloven-hoofed animals and products derived from them. Although people are not susceptible to FMD, its effects on high producing animals such as dairy cows and intensively farmed pigs can be catastrophic, and this has led to massive investment in eradication of the disease from industrialised countries. These countries are understandably anxious to prevent introduction or re-introduction of FMD. The result is that producers of beef and other meat derived from cloven-hoofed animals in areas that are not recognised as free of FMD are confronted by barriers to trade. Producers in southern and eastern Africa are particularly affected because the SAT (South African Territories) FMD viruses evolved in and are endemic to most African buffalo (*Syncerus caffer*) populations. Nearly all buffalo become sub-clinically infected with SAT viruses without developing obvious disease within the first year of life. Breeding herds, in southern Africa at least, periodically transmit SAT viruses to other species, including domestic livestock. Available evidence suggests that breeding herds containing acutely infected calves are mostly responsible for such transmission. Elsewhere in the world, other FMD serotypes (O, A and Asia 1) are almost exclusively associated with domestic livestock, mainly cattle and pigs. Wildlife are insignificant in maintaining FMD outside Africa. Management of FMD in most parts of the world therefore targets domestic livestock, and eradication of FMD in that situation is a feasible goal. However, that is not the case for the SAT serotypes (SAT1, SAT2 & SAT3) in southern and eastern Africa.

The Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE) have jointly developed a pathway for the progressive control of FMD based on eliminating FMD infection in livestock from countries or parts of countries – usually referred to as zones – in which FMD is endemic (FAO/OIE/EU-FMD, 2011). Implementation of this pathway, as it stands, is problematic in southern and eastern Africa because buffalo, and antelope to some extent as well, maintain and transmit the SAT serotypes.

There is therefore growing recognition that a different approach is needed to facilitate trade, particularly regional trade, in beef derived from places where FMD cannot be eliminated due to the presence of wildlife. Three alternatives are recognised for managing FMD risk associated with beef trade: (1) processing of beef so that any virus possibly present is inactivated (i.e. destroyed), (2) application of ‘compartmentalisation’ and (3) management of FMD risk along value chains where the concepts of commodity-based trade (CBT) and hazard analysis critical control points (HACCP) are applied. These options can also be used in combination.

This guide is intended to assist enterprises in southern Africa interested in the possibility of applying one or more of the above alternatives.

Definitions for technical terms used in this document are given in section 6.

2. International foot and mouth disease standards for beef trade

The OIE is mandated by the World Trade Organization (WTO) to provide international standards for trade in livestock commodities influenced by animal diseases (live animals are considered by OIE to be commodities). For terrestrial animals the standards are published in the Terrestrial Animal Health Code (TAHC), available on the OIE website (www.oie.int). A chapter on each listed disease, including FMD, is provided in the TAHC.

Adoption of OIE standards is voluntary for member countries but the OIE provides an official recognition mechanism for country or zonal freedom from some diseases, including FMD. Food safety guidelines, codes of practice and standards, which constitute the other component of sanitary management, are provided in the Codex Alimentarius (www.codexalimentarius.org/standards/en/) under WHO and FAO auspices.

2.1 Geographic trade standards for FMD

Historically there were only four options for exporting beef in respect of FMD risk:

- Country free of FMD without vaccination (TAHC Article 8.7.2);
- Country free of FMD with vaccination (TAHC Article 8.7.3);
- Zone free of FMD without vaccination (TAHC Article 8.7.4);
- Zone free of FMD with vaccination (TAHC Article 8.7.5).

Requirements for beef intended for export under any of the 4 options above are uncomplicated, viz. the need for a certificate provided by the exporting country's competent authority (i.e. the official veterinary service) to show that the animals from which the beef was derived had the designated status and that the animals were slaughtered in an approved abattoir (TAHC Articles 8.7.22 & 8.7.23).

A major problem for businesses based at locations within zones recognised by the OIE as free from FMD is that if FMD is detected in clinically ill or healthy animals within that zone, the status of that zone will be suspended for at least 3 - 18 months (Article 8.7.9 of the TAHC). The variation in the period of suspension is determined by the type of FMD freedom (as shown in the bullet points above) and the control measures applied to eliminate the specific FMD occurrence. Interruption of business for such lengthy periods obviously presents a major problem for any commercial enterprise.

2.2 Non-geographic trade standards (see definitions)

Unlike the cases for freedom of countries or zones from FMD (with or without vaccination), the OIE does not provide an official accreditation process for non-geographic approaches to risk management; it simply provides the measures that need to be complied with in order to meet the overall standard. It is therefore incumbent upon the exporter to persuade the importer as well as the competent authority of the importing country that the applicable international standard has been met. Conventionally that takes place by certification provided by the competent authority of the exporting country, i.e. the official veterinary service.

Unfortunately, for most southern African countries, the standards associated with some non-geographic approaches (e.g. compartments & value chains – see below) are problematic. Therefore, adoption of these approaches is not straightforward. On the other hand, they are not insurmountable.

Essentially there are three different non-geographic approaches for management of FMD trade-related risks associated with beef where the country or zone from which the beef is derived is not recognised as free from FMD:

- Processing that inactivates any FMD virus that could potentially be present;
- Establishment of a 'compartment' free from FMD;
- Management of risk of FMD along a particular value chain.

2.2.1 Processes that inactivate FMD virus

Certain processes, namely canning, thorough cooking during which a core temperature of 70°C or higher is maintained for a minimum of 30 minutes, or curing by drying and salting are accepted by OIE to be effective in destroying FMD virus in meat (TAHC Article 8.7.34). Therefore there is no reason why meat and meat products subjected to these treatments cannot be exported regardless of the FMD status of the area of origin.

2.2.2 Compartments (see definitions)

A compartment consists of one or more establishments within which animal health risks are managed using a common, i.e. integrated, biosecurity system. Compartments may consist of a single farm, a group of farms, or one or more farms as well as relevant service providers such as feed and/or animal suppliers. The concept has been most successfully applied to intensive farming systems as found in the pig and poultry industries, where a high level of control over the animals and their environment is possible. In theory at least, extensive livestock production could also be compartmentalised but there are practical difficulties in that respect.

The major obstacle to using compartmentalisation for managing FMD in endemic locations is that vaccination is expressly prohibited (Clause 2.d – Box 1). This extends to the introduction of vaccinated animals into FMD-free compartments, i.e. no cattle vaccinated within the last 12 months may be introduced into such a compartment. To preclude the use of vaccination in compartments for FMD in southern Africa potentially increases rather than decreases the risk. Until this provision is amended by the OIE, compartmentalisation for FMD where both SAT viruses and buffalo are prevalent is unlikely to be effective. Furthermore, if FMD were to be detected in a compartment, that compartment would be precluded from international trade for a period of at least 12 months (Articles 8.7.6 & 8.7.9). Few businesses could survive such lengthy interruption of their operations.

Box 1: Provisions of Article 8.7.6 of the OIE's Terrestrial Animal Health Code dealing with establishment of a FMD-free compartment

A Member Country wishing to establish a FMD free compartment should:

1. have a record of regular and prompt animal disease reporting and if not FMD free, have an official control programme and a surveillance system for FMD in place that allows an accurate knowledge of the prevalence of FMD in the country or zone;
2. declare for the FMD free compartment that:
 - a. there has been no outbreak of FMD during the past 12 months;
 - b. no evidence of FMDV infection has been found during the past 12 months;
 - c. vaccination against FMD is prohibited;
 - d. no animal vaccinated against FMD in the past 12 months is in the compartment;
 - e. animals, semen and embryos should only enter the compartment in accordance with relevant articles in this chapter;
 - f. documented evidence shows that surveillance is in operation for FMD and FMDV infection;
 - g. an animal identification and traceability system is in place;
3. describe in detail the animal subpopulation in the compartment and the biosecurity plan for FMD & FMDV infection.

The OIE, as already indicated, does not provide an accreditation mechanism for FMD-free compartments. The rationale is that for FMD-free compartments the competent authority of the country concerned (usually the country's official veterinary service) would need to agree with the enterprise's management on the biosecurity plan for the compartment using the TAHC as a guide. Compliance with the biosecurity plan also needs to be audited and certified by the competent authority. This implies that export of beef derived from the compartment could only take place following bilateral agreement between the competent authorities of the

importing and exporting countries. The implication is that the importing country's competent authority would need to be in agreement with the soundness and implementation of the biosecurity plan of the compartment concerned.

2.2.3 FMD management along value chains (see definitions)

The implementation of this approach is founded on a guide provided by the FAO (2011) and Article 8.7.25 of the OIE's TAHC. However, Article 8.7.25 is not labelled as a value chain-based approach by the OIE but in effect that is what it is. The concept has been expanded in a recent publication (Thomson et al, 2013 - see further reading) which showed that not only can FMD and other animal disease trade risks be managed along value chains but that food safety risk management can also be incorporated into risk management along the value chain. This is possible because it was shown that HACCP and CBT principles are similar and can readily be applied in parallel along a beef value chain (Figure 1). It needs to be borne in mind that food safety risk management of infectious agents is universally non-geographic, i.e. is independent of whether specific infections are present in the locality of production or not.

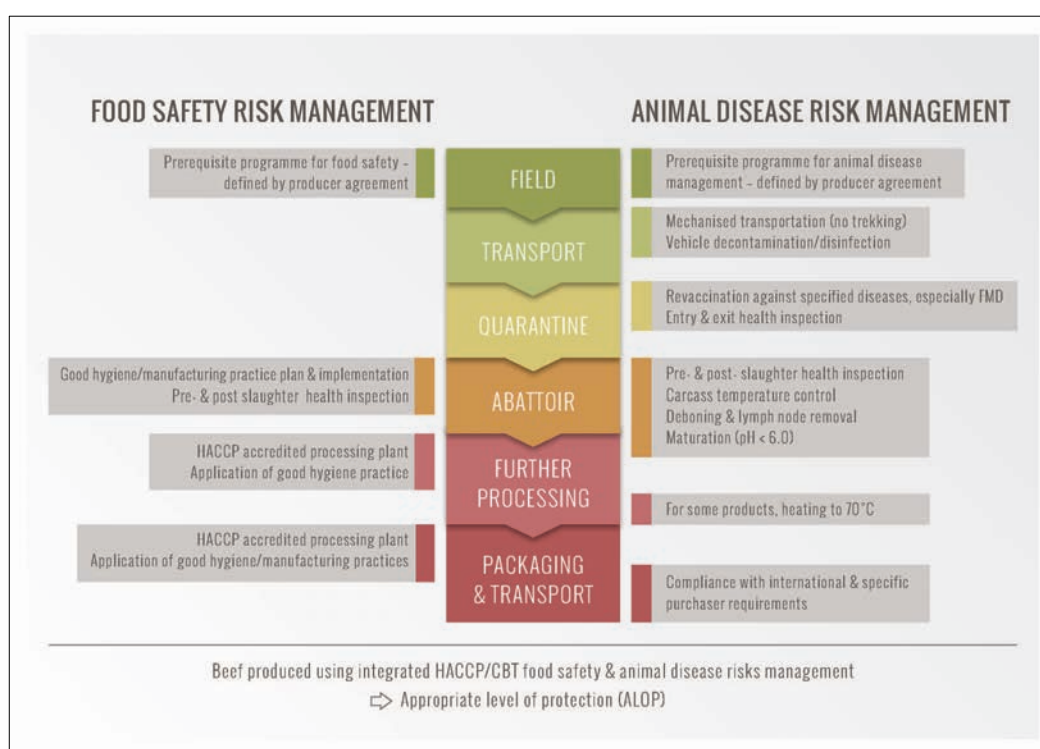


Figure 1. Parallel application of food safety and animal disease risk management measures along a value chain for beef production in a location that is not recognised as free from FMD, namely the Zambezi Region of Namibia. It should be noted that quarantine of the animals prior to slaughter is not an international requirement but is implemented by the national veterinary services in the Zambezi Region, where it includes physical inspection and revaccination of cattle, and is a powerful risk mitigation measure.

It has been known for many decades that matured, deboned beef from which visible lymph nodes have been removed does not contain transmissible quantities of FMD virus because the low pH (<6) of striated muscle attained during the maturation process inactivates FMD virus. In a qualitative risk assessment carried out on behalf of the OIE in 2010 it was determined that the FMD risk posed by such beef is 'very low'. The risk can

be further reduced to 'negligible' by the implementation of additional risk mitigation measures applied along the value chain. This provided the technical basis for some of the clauses of Article 8.7.25.

However, in areas where free-ranging wildlife (particularly African buffalo) occur, Clause 1.d of Article 8.7.25 (Box 2) is impractical because where free-ranging African buffalo and antelope are present it would be impossible to certify with any credibility that no FMD, whether clinical or subclinical and in any FMD-susceptible animal, had been present within 10 km of the establishment of production in the previous 30 days. Consequently, where movement of cloven-hoofed livestock and/or wildlife cannot be effectively managed, Article 8.7.25 cannot be fully complied with. However as explained below, this problem can be overcome through application of the principle of 'equivalence' (see Section 4.1 below).

Box 2: Provisions of Article 8.7.25 in the OIE's Terrestrial Animal Health Code dealing with recommendations for the importation of fresh meat derived from cattle located in FMD infected countries or zones with an official control programme for FMD, involving compulsory vaccination of cattle

Veterinary Authorities should require the presentation of an international veterinary certificate attesting that the entire consignment of meat:

1. comes from animals which:
 - a. have remained in the exporting country for at least three months prior to slaughter;
 - b. have remained, during this period, in a part of the country where cattle are regularly vaccinated against FMD and where official controls are in operation;
 - c. have been vaccinated at least twice with the last vaccination not more than 12 months and not less than one month prior to slaughter;
 - d. were kept for the past 30 days in an establishment and that FMD has not occurred within a ten-kilometer radius of the establishment during that period;
 - e. have been transported, in a vehicle which was cleansed and disinfected before the cattle were loaded, directly from the establishment of origin to the approved abattoir without coming into contact with other animals which do not fulfil the required conditions for export;
 - f. were slaughtered in an approved abattoir:
 - i. which is officially designated for export;
 - ii. in which no FMD has been detected during the period between the last disinfection carried out before slaughter and the shipment for export has been dispatched;
 - g. have been subject to ante- and post-mortem inspections for FMD with favourable results within 24 hours before and after slaughter;
2. comes from deboned carcasses:
 - a. from which the major lymph nodes have been removed;
 - b. which prior to deboning, have been submitted to maturation at a temperature above +2°C for a minimum period of 24 hours following slaughter and in which the pH value was below 6.0 when tested in the middle of both the *longissimus dorsi*.

3. Regional trade initiatives

The difficulties resulting from FMD experienced by meat producers in Southern African Development Community (SADC) countries in gaining access to international and regional markets for livestock commodities and products are well recognised. A different approach to sanitary risk management is consequently needed to facilitate regional and inter-regional trade. In November 2012 the so-called

Phakalane Declaration was adopted by the SADC Livestock Technical Committee. This called for the adoption of CBT and other non-geographic approaches for FMD management as additional (i.e. alternative) regional standards for trade in animal products (http://www.wcs-ahead.org/phakalane_declaration.html). This followed adoption of the CBT concept by ministers of agriculture of COMESA (Common Market for Eastern and Southern Africa) member states in 2008.

Despite espousal of non-geographic approaches to trade in animal commodities and products by SADC and COMESA, practical application to trade in meat in these regions has made little headway. This guide is intended to help address this problem.

4. Integrated management of sanitary (i.e. food safety & animal disease) risk along beef value chains

Even where FMD risks associated with beef can be effectively mitigated, beef destined for the international market must obviously also be certified as safe for human consumption. This means that risk mitigation measures additional to those directed at managing FMD and other animal disease risks need to be implemented.

Food safety is universally founded on a process known as HACCP (Hazard Analysis Critical Control Points – Box 3), which is particularly applicable to value chain management. Not only is it routinely applied to value chains as a whole but also within individual components of value chains such as abattoirs, food processing plants and retail outlets. In the latter case, independent HACCP certification is usually available via regionally accredited institutions or companies.

Box 3: Steps and principles of the hazard analysis critical control points (HACCP) system

- Step 1 Assemble the HACCP team
- Step 2 Describe the product
- Step 3 Identify the intended use of the product
- Step 4 Construct the flow diagram
- Step 5 On-site confirmation of the flow diagram
- Principle 1 List all potential hazards associated with each step of the flow diagram, conduct hazard analysis & consider control measures to manage the identified hazards
- Principle 2 Establish critical control points (CCPs)
- Principle 3 Establish critical limits for each CCP
- Principle 4 Establish a monitoring system for each CCP
- Principle 5 Establish corrective actions for each CCP
- Principle 6 Establish verification procedures for each CCP
- Principle 7 Establish overall documentation & recording system

Fundamental to the HACCP system are critical control points (CCPs) that focus risk management and monitoring of food safety risks at defined points along the value chain. The location of CCPs along the value chain will vary with the product as well as the production process. Implementation of risk management at CCPs, furthermore, needs to be supported by ‘prerequisites’ to ensure functionality, e.g. good hygiene practice (GHP) and good manufacturing practice (GMP). It has moreover been shown that CCPs can also be used to

manage animal disease risks, which enables integration of the management of food safety and animal disease hazards.

4.1 Example of integrated sanitary risk management along a beef value chain

The Zambezi Region of Namibia (ZR – formerly known as the Caprivi) is an integral part of the Kavango Zambezi Transfrontier Conservation Area and has large herds of free-ranging buffalo in and around it, as well as other FMD-susceptible wildlife. Separation of cattle and wildlife populations in the ZR is impractical owing to topography (major rivers and wetlands). Therefore the ZR is an FMD-infected zone.

As part of a pilot project conducted on the beef value chain in the ZR (http://www.nammic.com.na/index.php?option=com_content&view=article&id=74&Itemid=52) from 2010-2014 (see Figure 2), it was shown that integration of food safety and animal disease risk management along that value chain is relatively simple through parallel application of HACCP and CBT systems, enabled by the fact that the principles underlying HACCP and CBT are essentially identical. Management of FMD risk along the ZR beef value chain was therefore modified from that prescribed by Article 8.7.25 because, as explained above, clause 1.d of that Article cannot be complied with.

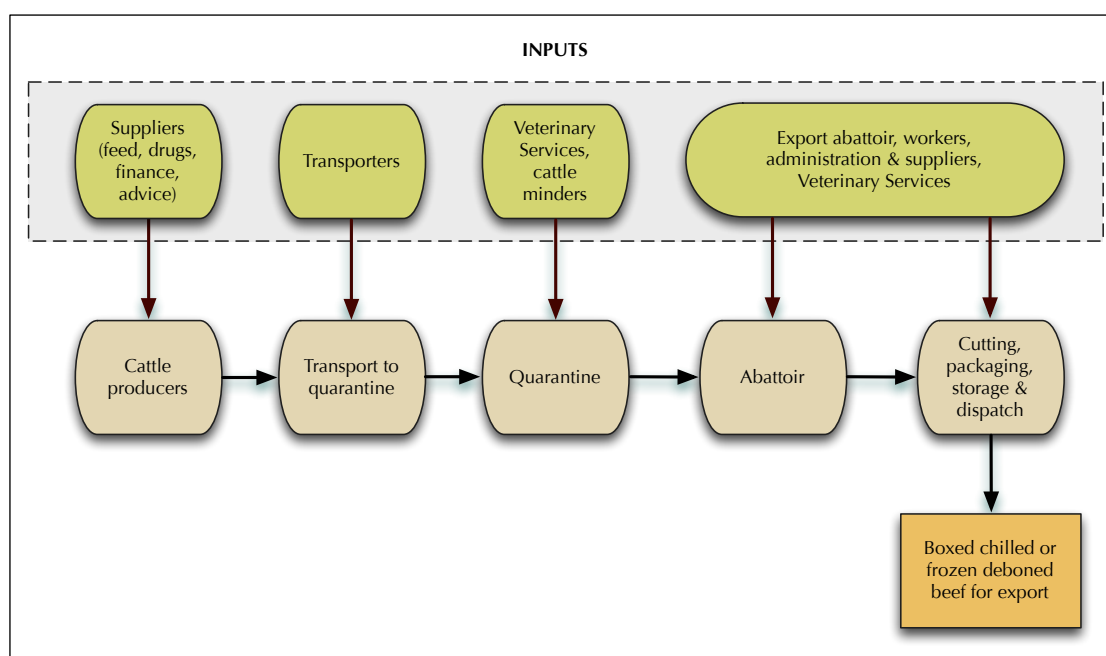


Figure 2. Example of a simple value chain for beef production in the Zambezi Region of Namibia.

A quantitative risk assessment (QRA) was conducted as part of the ZR study to measure the FMD risks associated with beef derived from the ZR value chain, i.e. incorporating risk management activities summarised in Figure 1 and shown in more detail in Table 1. The QRA estimated the risk of releasing a box of beef cuts (different cuts were assessed independently) infected with FMD virus to be less than 1 in a million (commonly used to define negligible risk). Furthermore, the risk-level associated with this approach was less than that which could be achieved by the theoretical application of Article 8.7.25, i.e. assuming that all the provisions of that standard – including Clause 1.d – could be fully implemented. This demonstrated achievement of equivalence between the value chain approach adopted by the pilot project and Article 8.7.25 (i.e. the applicable international standard).

Table 1. List of actions aimed at ensuring best possible quality deboned beef that is safe for human consumption and presents negligible risk of animal disease transmission (based on an integrated value chain approach). GHP – Good hygiene practice; HACCP – Hazard analysis critical control points. Critical control points are indicated by boldface type. The remaining points are part of the prerequisite programme.

Location	Actions aimed at:		
	Improvement of product quality & quantity	Achievement of appropriate level of protection for food safety	Achievement of appropriate level of protection for animal disease control
Field	<ul style="list-style-type: none"> Animal identification and record keeping Compliance with producer protocol adapted to area (grazing strategy, supplementary feeding practices, herd management/breeding practices and general health management) Provision of essential infrastructure such as loading ramps for cattle 	<ul style="list-style-type: none"> Animal identification, record keeping and effective traceability system Avoidance of undesirable feeding practices (e.g. use of meat/bone meal), observance of treatment recommendations for control of parasites and infectious diseases (including withdrawal periods for drugs used for treatment) 	<ul style="list-style-type: none"> Animal identification, record keeping and movement records/control Grazing and kraaling strategies that avoid contact with buffalo as far as possible Compliance with vaccinations programmes aimed at control of specified diseases including FMD Monitoring of compliance at farm level (animal health/extension services)
Transportation	<ul style="list-style-type: none"> Observance of protocol requirements aimed at avoidance of cruelty and achievement of good quality product Provision of feed and water before/after transportation 	<ul style="list-style-type: none"> Observance of good practice guidelines for animal transport (avoidance of overcrowding, poorly designed vehicles, etc) 	<ul style="list-style-type: none"> Motorized transportation to abattoir (i.e. avoidance of trekking) Decontamination of transport vehicles between batches
Quarantine	<ul style="list-style-type: none"> Sustainable management of grazing resources Provision of adequate water Supplementary feeding if necessary 	<ul style="list-style-type: none"> Avoidance of any prohibited substances Adherence to withdrawal periods for drugs used for treatment Official residue monitoring programme 	<ul style="list-style-type: none"> 21 day isolation of cattle Revaccination against specified diseases, especially FMD Compliance with FMD and biosecurity management plan Entry & exit health inspection
Abattoir	<ul style="list-style-type: none"> Provision of adequate feed and water before slaughter Improvement of animal management practices in the holding area Proper maturation of carcasses 	<ul style="list-style-type: none"> Documented traceability system Washing down of animals on arrival at abattoir Cleanliness of the holding areas Ante-mortem health inspection Carcass/meat inspection HACCP & GHP implementation supported by independent certification Temperature control, including refrigeration Microbiological monitoring Monitoring of residues 	<ul style="list-style-type: none"> Documented traceability system Ante- & post-mortem health inspection Prescribed maturation of carcasses over a 24h period, including pH determination Thorough deboning and removal of lymph nodes 21 day 'quarantine of meat' (post-slaughter)

The ZR project not only developed the foundation for integration of food safety and animal disease risk management along the ZR beef value chain but also introduced measures to improve the quantity and quality of beef produced in the ZR. The three lines of integrated activity are shown in Table 1.

The situation that applies in the ZR is similar to that of many other locations in southern Africa and therefore this approach potentially has wide application in SADC countries.

4.2 Auditing and certifying

Geographically-based control of FMD is traditionally organised, financed and conducted by the national competent authority. The only requirement for producers is compliance with the associated regulations. As already indicated, competent authorities of countries that are members of the OIE may apply formally to the OIE for recognition of a country or one or more zones as free from FMD (with or without vaccination). If the application is accepted, the relevant country or zone(s) is/are 'listed' by the OIE on its website. Such listing needs to be reconfirmed annually.

Unfortunately, it must be admitted that freedom from FMD of some of the countries and zones recognised by the OIE is often not accepted by powerful trading nations and trade blocks. Various reasons are adopted for such a stance. That lack of acceptance, of course, could be contested via dispute resolution mechanisms provided by the WTO. The problem is that few developing countries are in a position to follow that option because of the expense, expertise and time such a course necessitates. Both compartmentalisation and the value chain approaches shift the onus, as well as most of the cost, of risk management to the enterprise concerned. However, because FMD is a controlled disease throughout the SADC region, government agencies are always vital actors, especially when it comes to certification.

Table 1 provides details of the general prerequisites that need to be in place to enable reliable certification of the safety of beef sourced from an area that is not free of FMD. There may be additional risk mitigation measures deemed mandatory by the competent authority of the country where the beef is produced. For example, in a number of SADC countries, including in the ZR of Namibia, there is a requirement for cattle to be quarantined under the supervision of the official veterinary service for 21 days prior to slaughter. During that period cattle are isolated and regularly inspected for signs of FMD.

4.3 Deciding upon an appropriate approach to management of FMD that will facilitate trade

Figure 3 provides a Decision Tree to guide beef business enterprises in fulfilling sanitary requirements for export of beef from areas that are not recognised as free of FMD. To date no countries or zones free of FMD 'with vaccination' have been recognised in the SADC region or indeed in Africa but the option nevertheless exists. For the present it is likely that beef producing enterprises will need to consider whether compartmentalization, compliance with Article 8.7.25, another value chain approach (such as described in section 4.1) or processing of beef to inactivate any FMD virus present, is the best option.

4.4 Risk analysis to support risk management along the value chain

In the absence of official OIE recognition of freedom from FMD based on geographic standards, trade between countries that is based on any other approach needs to be negotiated between the exporter and the importer and, particularly important, include their respective competent authorities in the negotiation. To prove to the competent authority of the importing country that the proposed sanitary system is safe and reliable, a risk assessment (i.e. the technical elements of a risk analysis), which may be either qualitative or quantitative, is essential. This should ideally be performed by a specialist or group of suitably trained and experienced specialists that have a good track record in this respect.

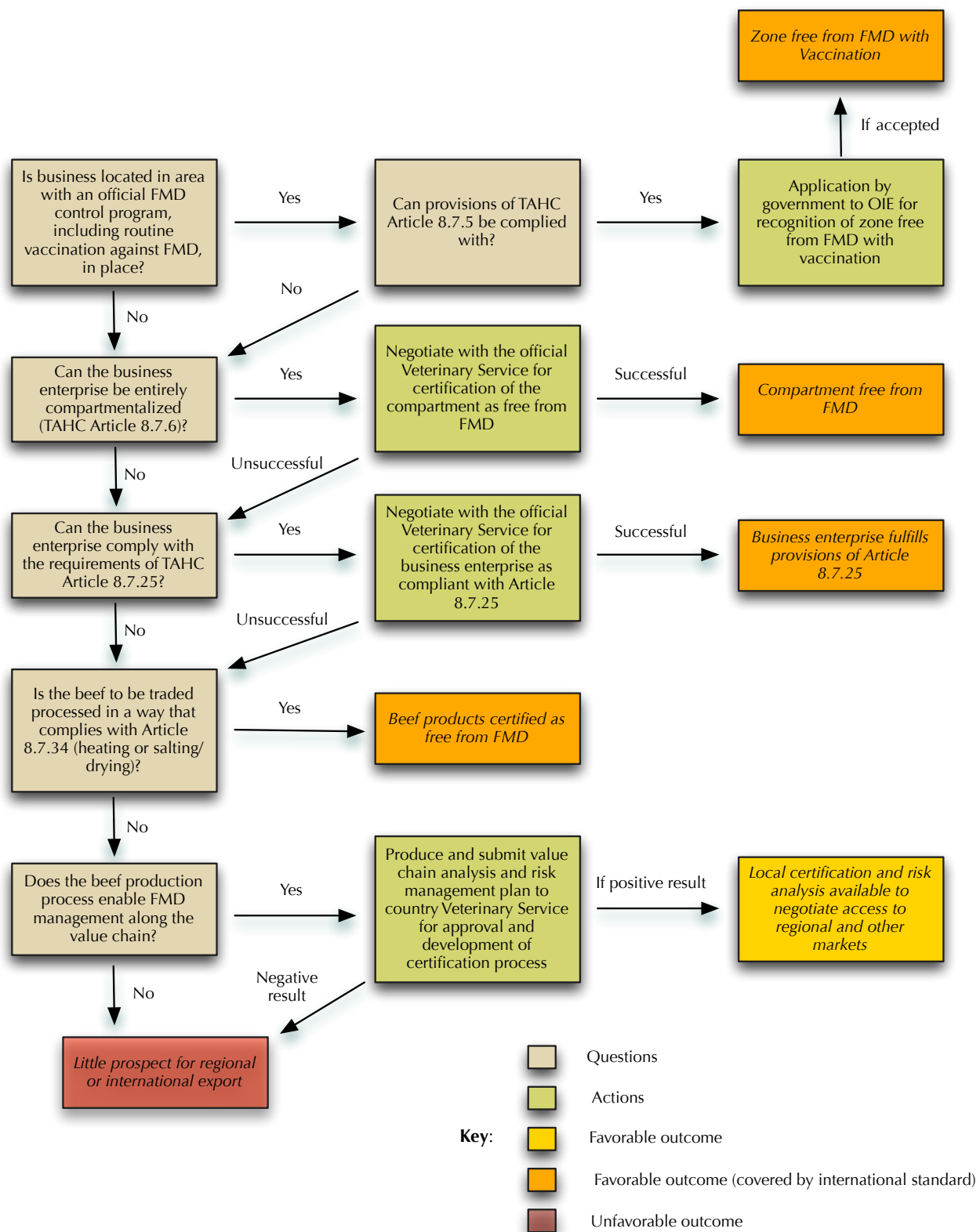


Figure 3. Decision flow diagram for beef business enterprises located in areas not recognized internationally as free from FMD without vaccination.

4.5 Animal identification & traceability

Sanitary assurance as a basis for trade in foodstuffs in the modern world is increasingly dependent on demonstration of adequate traceability for the product in question. When it comes to beef, identification of individual cattle is often required as an element of traceability systems. Many developed countries have national systems but in the SADC region few countries have reliable national systems (Botswana, Namibia and Swaziland are current exceptions). For enterprises based in SADC countries other than Botswana and Namibia this issue is likely to present a complication but, as for localities not recognised as free from FMD, the problem can be overcome by development of a value chain-specific system. Assistance in this respect is available from specialists in this field.

5. Conclusion

This document attempts to demonstrate that export of beef from SADC countries and zones not recognised as free from FMD is possible, especially within Africa's regional markets. There are several approaches potentially available and this guide outlines the possibilities, their respective advantages and disadvantages, and requirements. In this connection management of sanitary risks (i.e. both food safety and animal disease – FMD particularly) along value chains offers an approach that until recently has been unrecognised. To implement such a value chain approach, however, requires a number of considerations and actions, which are outlined in this guide.

6. Definitions

Compartment: An animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct animal health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade.

Competent authority: The veterinary authority or other government authority of a member country having the responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations of the Terrestrial Code and of the Aquatic Health Code in the whole country (OIE, 2014).

Commodity-based trade: An array of alternatives that can be used individually or in combination to ensure that the production and processing of a particular commodity or product are managed so that potential food safety and animal health hazards are reduced to appropriate risk levels (Thomson et al, 2013).

Equivalence: The state wherein the sanitary measure(s) proposed by the exporting country as an alternative to those of the importing country achieve(s) the same level of protection (OIE, 2014).

Establishment: The premises in which animals are kept (OIE, 2014).

Non-geographic approach to managing sanitary trade risk: The application of measures for sanitary risk management that are not based on the geographic occurrence of the infection in question (i.e. as opposed to risk management based primarily on the occurrence/non-occurrence of the infection in question in a defined locality (definition used in this document).

Hazard analysis critical control points (HACCP): A system comprised of five preliminary steps and seven basic principles that defines, evaluates and controls hazards significant for food safety (Box 3).

Risk analysis: The process composed of hazard identification, risk assessment, risk management and risk communication (OIE, 2014).

Value chain: There are many definitions for a value chain. That adopted in this document is: The composite of the people and organisations involved in turning raw material into a ready-for-sale product; each step along the chain contributes value to the product.

Further Reading

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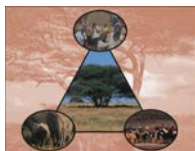
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The Wildlife Conservation Society's Animal & Human Health for the Environment And Development (AHEAD) Program is a convening, facilitative mechanism, working to create enabling environments that allow different and often competing sectors to literally come to the same table and find collaborative ways forward to address challenges at the interface of wildlife health, livestock health, and human health and livelihoods.



We convene stakeholders, help delineate conceptual frameworks to underpin planning, management and research, and provide technical support and resources for projects stakeholders identify as priorities. AHEAD recognizes the need to look at health and disease not in isolation but within a given region's socioeconomic and environmental context.