SADC TADs PROJECT: SCIENTIFIC SYMPOSIUM ON FOOT AND MOUTH DISEASE IN SADC
&
JOINT SADC/AHEAD WORKSHOP ON RECONCILING LIVESTOCK HEALTH AND WILDLIFE CONSERVATION GOALS IN SOUTHERN AFRICA: STRATEGIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT

Phakalane Golf Estate, Gaborone, Botswana

13-16 November 2012

PROCEEDINGS

Organized by the Southern African Development Community (SADC) FANR Directorate, SADC TADs Project, and the Wildlife Conservation Society's Animal & Human Health for the Environment And Development (*AHEAD*) Program

The Proceedings of the SADC TADs Project Scientific Symposium on "Foot and Mouth Disease in SADC" & the Joint SADC/AHEAD Workshop on "Reconciling Livestock Health and Wildlife Conservation Goals in Southern Africa: Strategies for Sustainable Economic Development" was prepared by the Wildlife Conservation Society's *AHEAD* Program team who drew on contributed presentations and papers as well as discussions at the workshop.

For more information, please contact:
Shirley Atkinson
AHEAD Senior Program Manager
Wildlife Conservation Society
satkinson@wcs.org
www.wcs-ahead.org

Cover Photo: Mark W. Atkinson, WCS *AHEAD*

TABLE OF CONTENTS

ABBREVIATIONS & ACRONYMS

ADB	African Development Bank
AHEAD	Animal & Human Health for the Environment And Development
AU-IBAR	African Union - Interafrican Bureau for Animal Resources
BVI	Botswana Vaccine Institute
CBNRM	Community-Based Natural Resource Management
CBT	Commodity-Based Trade
DVS	Department of Veterinary Services
FAO	Food and Agricultural Organization of the United Nations
FANR	Food, Agriculture and Natural Resources (Directorate of SADC)
FMD	Foot and Mouth Disease
GL	Greater Limpopo (TFCA)
HACCP	Hazard Analysis & Critical Control Points
KAZA	Kavango Zambezi (TFCA)
LLP	Livestock and Livestock Products
LTC	Livestock Technical Committee (of SADC)
OIE	Office International des Epizooties (World Organisation for Animal Health)
PCP-FMD	Progressive Control Pathway for Foot and Mouth Disease
PPR	Peste des Petits Ruminants
RVF	Rift Valley Fever
SADC	Southern African Development Community
SAT	South African Territories (FMD serotypes)
TAD	Transboundary Animal Disease
TAHC	Terrestrial Animal Health Code (OIE)
TFCA	Transfrontier Conservation Area
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society

EXECUTIVE SUMMARY

The southern Africa region currently faces unprecedented animal health and rural development challenges posed by transboundary animal diseases (TADs) such as foot and mouth (FMD). Given the fundamental and growing importance of both the livestock and wildlife sectors in the region, it has become increasingly important for policy-makers to collaboratively reevaluate how to manage risks from diseases like FMD in ways that help Africa's pastoralists and farmers, do not threaten free-ranging wildlife, and still provide confidence to beef importing countries that the products they are buying pose minimal threats to their own agricultural sectors. In November 2012, following presentations and discussions that took place during the SADC TADs Project Scientific Symposium "*Foot and Mouth Disease in SADC*" and the Joint SADC/AHEAD Workshop "*Reconciling Livestock Health and Wildlife Conservation Goals in Southern Africa: Strategies for Sustainable Economic Development*," SADC Member States agreed to adopt additional, environmentally-friendly ways to manage trade-sensitive animal diseases like FMD, with an aim towards easing tensions at the livestock / wildlife interface. SADC experts agreed to actively explore new approaches to the safe trade of beef and beef products based on the meat production process itself (aka-"commodity-based trade"), rather than solely on livestock's geographic origin as delineated by veterinary cordon fencing. In addition, delegates agreed that by applying Hazard Analysis & Critical Control Points (HACCP: a risk management system already widely used around the world to ensure that food is safe for human consumption) and by focusing on straightforward pre-slaughter management principles, meat hygiene, and quality processing, beef and related products free of animal diseases of concern can be produced. The key outcomes of the workshop were succinctly captured in SADC's "*Phakalane Declaration on Adoption of Non-Geographic Approaches for Management of Foot and Mouth Disease*."

As noted in the Phakalane Declaration*, SADC:

> *Recommends* the adoption of commodity-based trade and other non-geographic approaches such as compartmentalization for foot and mouth disease control as additional regional standards for the livestock and wildlife sectors, where applicable;
>
> *Recommends* to Member States that they utilize commodity-based trade and other non-geographic approaches as needed to bolster trade, first and foremost, within the region itself, and with other African partners;
>
> *Recommends* that Member States identify and address their needs to implement non-geographic approaches in terms of institutional, infrastructural, and human capacity;
>
> *Recommends* that SADC work together with the OIE, FAO and other international organisations to formalize the implementation guidance needed for certification, auditing and thus wider international acceptance of appropriately prepared livestock-derived commodities by potential importing countries within the SADC region and around the world. This needs to be done in partnership with the private sector and with national veterinary services, the latter having both official responsibility and expertise critical for safe and successful deployment of any animal disease control strategies;
>
> *Recommends* that SADC Member States and their appropriate government agencies responsible for livestock agriculture, veterinary services, and wildlife conservation and

---

** See http://www.wcs-ahead.org/phakalane_declaration.html for the complete Phakalane Declaration, including a downloadable PDF version.*

production work together and in partnership with the private sector and civil society organisations to promulgate context-appropriate approaches to transboundary animal disease management and wildlife utilisation policies that mitigate conflicts at the wildlife / livestock interface.

Recommends that Member States seize upon the socioeconomic as well as conservation opportunities offered by SADC's collective vision for transfrontier conservation areas as facilitated by strategic alignment and realignment of selected veterinary cordon fences, while simultaneously expanding access to regional and international markets for animals and animal-derived products via adoption of the above-described enlightened and practical disease control policies and practices.

The goals of the Scientific Symposium and Workshop were to convene decision-makers from several key sectors including agriculture and environment, wildlife and tourism, and encourage them to seriously consider opportunities to advance animal health policy in the region in ways that support both conservation and rural development objectives. The Phakalane Declaration (see Annex 3 for the full Phakalane Declaration as well as http://www.wcs-ahead.org/phakalane_declaration.html) clearly demonstrates how the meeting was successful in achieving these goals.

Symposium and Workshop Delegates at the Phakalane Golf Estate, Gaborone, Botswana
November 13-16, 2012

INTRODUCTION

Background to the Meeting

It is now well recognized that across much of Africa both livestock and wildlife represent economic growth opportunities. However, costs associated with current geographic 'zonal' approaches to managing international trade-associated animal disease risks often preclude the livestock sector's access to regional and international markets. In addition, many attempts to meet international standards related to freedom from disease under historically prevailing policy regimes in southern Africa have had significant negative repercussions for free-ranging wildlife, largely related to veterinary cordon fencing. Currently the region faces unprecedented animal health and rural development challenges posed by transboundary animal diseases (TADs) such as foot and mouth (FMD). Given the fundamental and growing importance of both the livestock and wildlife sectors in the region, it is crucial that policy-makers collaboratively reevaluate how best to manage risks from diseases like FMD in ways that help Africa's pastoralists and farmers, do not threaten free-ranging wildlife, and still provide confidence to beef importing countries that the products they are buying pose minimal threats to their own agricultural sectors.

During the past ten years, regional stakeholders have been working to develop viable alternatives to the internationally accepted, zonal approaches to disease control, focusing instead on novel, non-geographic techniques. In 2008, the Southern African Development Community (SADC) FMD Project and regional partners convened a ground-breaking meeting in Kasane, Botswana, entitled "*Achieving Compatibility between the Transfrontier Conservation Area Concept and International Standards for the Management of Transboundary Animal Diseases*" (see http://www.wcs-ahead.org/sadc_forum.html). The meeting furthered the process of examining areas of conflict between biodiversity conservation and trade in products derived from livestock, highlighted the importance of cross-sectoral dialogue and collaboration, and explored potential non-geographic solutions such as commodity-based trade (CBT, see Box 1). More recently, in response to escalating conflict between livestock and wildlife in the region and in recognition of the need to better integrate the agricultural and wildlife conservation sectors in southern Africa, the SADC Livestock Technical Committee endorsed commodity-based approaches to disease management and trade, and adopted the OIE Terrestrial Animal Health Code's Article 8.5.25 (see Box 2) as a regional standard, thereby setting the stage to critically evaluate and rethink regional approaches to FMD management.

Delegates in session at the SADC/AHEAD Scientific Symposium and Workshop, Gaborone, Botswana.

This Proceedings summarizes the November 13-16, 2012 meeting held at the Phakalane Golf Estate, Gaborone, Botswana, hosted by SADC's Food Agriculture and Natural Resources (FANR) Directorate, the SADC TADs Project, and the Wildlife Conservation Society's Animal & Human Health for the Environment And Development (*AHEAD*) Program. Funding was also provided by the African Development Bank (ADB), the United States Agency for International Development (USAID), the Rockefeller Foundation, and the Botswana Vaccine Institute (BVI).

Goals and Objectives

The goal of the symposium and workshop was to thoroughly explore alternative animal health and trade management regimes that do not implicitly pit the livestock and wildlife sectors against each other. Invited delegates (from government, nongovernmental organizations, multilateral institutions, the private sector as well as academia) with expertise in the livestock agriculture, wildlife conservation and other sectors converged at this important forum in order to map out next steps for optimizing cross-sectoral land-use planning in the interest of resilient livelihoods and development success that is economically, socially and ecologically sustainable over the long term.

It is worth noting that at the June 2012 meeting of the SADC Livestock Technical Committee, the Committee had endorsed commodity–based approaches to disease management and trade, adopted OIE Terrestrial Animal Health Code Article 8.5.25 as a regional standard, and delineated the significant challenges posed by FMD currently faced by the region. All of this provided an opportunity to rethink the region's approach to FMD management, in the interest of enhancing opportunities for trade in beef among SADC countries and beyond, while simultaneously facilitating regional wildlife conservation initiatives such as transfrontier conservation areas (TFCAs).

Box 1: Commodity-Based Trade*

Market access for livestock and livestock products (LLP) from Africa is constrained by the prevalence of endemic highly contagious transboundary animal diseases such as foot and mouth disease (FMD). These diseases have been mostly eradicated in the developed world, but the fear of their re-entry from endemic reservoirs in the developing world largely precludes large-scale LLP exports from Africa to lucrative markets in the European Union, United States and Japan.

International trade practices for LLP have historically emphasized geographic or 'zonal' freedom from disease (i.e. miles of cordon fencing separating wildlife and livestock). Recently, however, suitable alternate strategies have become available for managing significant disease hazards, strategies that offer more focused yet equally effective standards for risk management. For example, commodity-based, non-geographic approaches to trade focus on the safety of the process by which products are produced rather than on their regional origin, and in so doing offer the potential for developing countries to export meat products that are scientifically demonstrable as safe for importing countries while also precluding the need for impenetrable veterinary fencing that currently constrains SADC's vision for regional transboundary conservation.

**While there is no single accepted definition of commodity-based trade (CBT), it can be considered to represent an array of alternatives that can be used to ensure the production and processing of a particular commodity or product are managed so that food safety and animal health hazards are reduced to appropriate risk levels. OIE Terrestrial Animal Health Code guidelines (Article 8.5.25) now recognize a disease management scenario under which commodity-based trade could be effectively implemented.*

OPENING SESSION

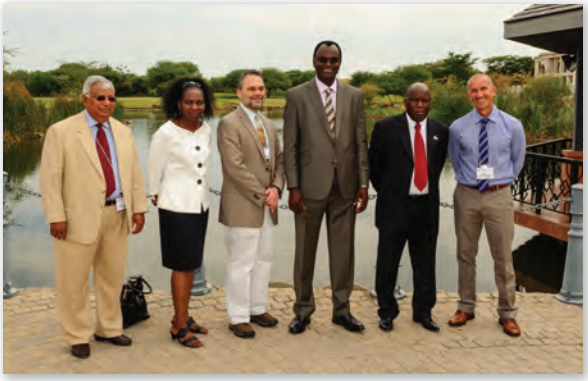
November 13, 2012

Mr. Beedeeanan Hulman, representing the SADC Food, Agriculture and Natural Resources (FANR) Directorate and Livestock Development Programme, welcomed all participants and introduced three dignitaries, each of whom delivered an opening address.

Dr. Steve Osofsky, the Wildlife Conservation Society's Director of Wildlife Health Policy and Coordinator of the Animal & Human Health for the Environment And Development (*AHEAD*) Program, expressed strong support for SADC's commitment to developing multi-sectoral approaches to FMD management and underlined the need for different sectors to work together to minimize the unintended but nevertheless unfortunate cross-sectoral impacts of currently accepted strategies. He urged Member States to seize upon the economic and conservation opportunities offered by SADC's collective vision for TFCAs as facilitated by strategic realignment of selected veterinary cordon fences, while simultaneously expanding livestock farmer's access to international markets through the adoption of enlightened and practical disease control policies and practices.

Ms. Margaret Nyirenda, Director of FANR, SADC, emphasized the need to formulate effective strategies for sustainable economic growth in the region and explained how, in spite of strong demands for livestock products in the region, increases in production have not been sufficient to satisfy demand. She called for innovative and creative ways to sustainably exploit both livestock and wildlife resources, especially in the context of rural development in TFCAs. She described SADC's central role in facilitating regional integration, recognized the recent adoption of Article 8.5.25 of the OIE Terrestrial Animal Health Code (see Box 2) as a regional standard, and called upon meeting participants to assist in the development of a regional strategy for the long-term control of FMD.

Mr. Edison Wotho, Deputy Permanent Secretary for Botswana's Ministry of Agriculture officially opened the meeting. In his opening address he recognized the importance of TADs such as FMD in the region, acknowledged the complicating presence of wild buffalo in protected areas and TFCAs, and pointed out the general ineffectiveness of cordon fencing as a disease management strategy. He urged the group not to blame wildlife, and pointed to the importance of our stewardship over the biosphere and all of its creatures as important to our own survival. Mr. Wotho suggested that the region has both the resources and the talent to find long-lasting solutions and encouraged the veterinary profession to think creatively, calling upon delegates to step up and meet the challenges by working together to develop an innovative, integrated and homegrown approach to the management and control of FMD in southern Africa.



From left: Mr. Beedeeanan Hulman, Ms. Margaret Nyirenda, Dr. Steve Osofsky, Dr. Misheck Mulumba, Mr. Edison Wotho, Dr. Mark Atkinson.

Box 2: Article 8.5.25 of the OIE Terrestrial Animal Health Code

Recommendations for importation from FMD infected countries or zones, where an official control program exists, involving compulsory systematic vaccination of cattle for fresh meat of cattle and buffaloes (*Bubalus bubalis**) (excluding feet, head and viscera). *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 3 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 fulfill the required conditions for export;
   f) have been 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 subjected to ante-mortem and post-mortem inspections for FMD with favorable results within 24 hours before and after slaughter;

2. Comes from deboned carcasses:
   a) from which the major lymphatic 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*.

_____

*Asian water buffalo

SADC TADS PROJECT SCIENTIFIC SYMPOSIUM ON FOOT AND MOUTH DISEASE IN SADC

November 13, 2012

SADC TADs Project Research

Dr. Misheck Mulumba, Project Coordinator of the SADC/ADB "Strengthening Institutions for Risk Management of TADs" Project, led and moderated the symposium. Dr. Mulumba introduced the session with a comprehensive overview of FMD virus distribution, disease prevalence, and impacts of FMD on trade in livestock and livestock products in the SADC region. He emphasized the fact that very few countries in the region are exporting beef and that there is virtually no intra-regional trade because of FMD. He emphasized the need to better understand FMD transmission in buffalo and called for greater interaction among veterinarians working with livestock and wildlife, laboratory technicians, wildlife experts and other stakeholders, suggesting that better cooperation among reference laboratories and between laboratories and decision-makers in SADC Member States will be required for progress to be made.

The series of technical presentations which followed examined various aspects of research into FMD ecology currently being undertaken in the region (see http://www.wcs-ahead.org for PDFs of these presentations). In a regional context, molecular and phylogeographic characteristics of the SAT (South African Territories serotype) viruses were described and risk factors for FMD outbreaks were examined. It was clear from the presentations that movement restrictions perceived as unfair by local livestock farmers are frequently not adhered to and unrestricted cattle movement, cross-border theft and unregulated trade all likely play significant roles in FMD spread in the region. In addition, there was general agreement that a holistic approach will be needed to adequately address conflicts at the livestock/wildlife interface and that new policies are needed for successful FMD management.

Dr. Misheck Mulumba, Project Coordinator of the SADC TADs Project, addresses delegates during the scientific symposium on FMD.

New tools for successfully diagnosing and investigating FMD outbreaks were described and the importance of accurately identifying different topotypes of FMD virus circulating in both domestic and wild animal populations in the SADC region was recognized as essential for producing suitably matched vaccines. It was suggested that currently available vaccines may not be fit for purpose and that, while adequate tools for matching viral topotypes and vaccines may be available, questions regarding the efficacy of existing vaccines remain and need to be adequately addressed if meaningful progress in the control and management of FMD is to be made in the SADC region.

An emerging situation in Botswana concerning the recent discovery of SAT2 FMD circulating in goats was also discussed during this session. Botswana Department of Veterinary Services (DVS) described the ongoing investigation of FMD in goats and in sympatric cattle and wildlife in a newly established containment zone in eastern Botswana. At the time of the workshop, the source of the virus remained unknown and under investigation.

Other TADs of Significance in SADC

Chaired by Dr. Letlhogile Modisa (DVS, Botswana), two additional TADs of importance were discussed during the one-day scientific symposium: peste des petits ruminants (PPR) and Rift Valley fever (RVF), both of which are of growing concern in the SADC region. The potential role played by wildlife is not well understood for either disease but it is possible that wild animals may contribute to the epidemiology of these TADs in SADC and additional research appears to be warranted.

Known to be present in Tanzania since 2007, PPR has recently been reported from Angola and has the potential to spread through the region. Disease management strategies in Tanzania, which include mass vaccination, appear to be limiting further spread at present. However, additional diagnostic sampling in high risk areas and the establishment of an appropriate vaccine bank are being recommended as priorities. A regional strategy for the control and management of PPR has been published by SADC and is available at http://www.sadc.int/documents-publications/show/1286.

The cyclical occurrence of RVF in the region is well recognized. However, in light of recently published figures on human fatalities, a better understanding of links to climatic change, and updated patterns of distribution, RVF is considered by the SADC TADs Project to be a TAD that requires more attention by animal and public health authorities. The need for an effective public awareness campaign along with a robust livestock vaccination strategy is being promoted by SADC.

JOINT SADC/AHEAD WORKSHOP ON RECONCILING LIVESTOCK HEALTH AND WILDLIFE CONSERVATION GOALS IN SOUTHERN AFRICA: STRATEGIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT

November 14-15, 2012

Workshop Welcome & Overview

The two-day workshop followed the scientific symposium. Mr. Hulman welcomed delegates and re-emphasized the need to identify new and innovative approaches to disease management that are appropriate for the SADC region. Dr. Mark Atkinson (Wildlife Conservation Society, *AHEAD*) presented the objectives, expectations and anticipated deliverables of the workshop and provided a brief historical overview of the significant efforts already made by SADC to find ways of making livestock production and wildlife conservation more compatible. Much of this is summarized in the earlier "Background to the Meeting" section on page 1 of this Proceedings. Also see http://www.wcs-ahead.org for PDFs of the workshop presentations.

Setting the Scene

Chaired by Dr. Mokganedi Mokopasetso (FAO-ECTAD, Botswana), the opening session of the workshop (November 14) began by addressing the status, challenges and opportunities posed by the establishment of TFCAs in the region and in that context, the relative importance (in both social and economic terms) of agriculture and tourism to rural development and conservation. Presenters reiterated how both livestock agriculture and nature-based tourism contribute significantly to local, national and regional economies and provide a strong incentive for SADC Member States to explore win-win opportunities that combine both systems in the development of TFCA landscapes. Highlighting the critical challenges posed by disease to long term success of TFCAs and other rural development initiatives, a presentation on the status of TADs in the region provided delegates with an up-to-date overview. In view of the recent successful eradication of rinderpest, a presentation concerning the relative difficulty of eradicating other TADs emphasized the impracticality of eradicating FMD from southern Africa (given the role of the African buffalo as a reservoir host) and underscored the need to find other, more suitable ways of managing them instead. This was a point discussed further- permanent veterinary fences, while historically relied upon and still important in specific circumstances, are generally no longer considered a suitable method for the control of TADs in southern Africa. Another key observation related to disease epidemiology - SAT viruses (southern African FMD serotypes) behave differently from other FMD viruses, limiting control options and making FMD eradication at a global level extremely complicated. It was recognized that failure to develop a more holistic, effective and contextually appropriate approach that takes into account southern Africa's unique biodiversity and ecological circumstances will perpetuate the current situation and limit the potential for sustainable rural development that includes both the livestock and wildlife conservation sectors.

The first keynote address of the workshop was delivered by Dr. Alejandro Thiermann who provided the OIE perspective on the potential for application of non-geographic approaches to the control and management of TADs in southern Africa.

Dr. Thiermann indicated that while updated international standards (i.e. those set by the OIE, including Article 8.5.25 of the Terrestrial Animal Health Code, see Box 2) should permit SADC Member States to better integrate livestock and wildlife production systems and manage TADs like FMD using non-geographic approaches, the inability to effectively maintain and guarantee acceptable standards at present remains a pressing concern. He did however, compliment African nations for their willingness to work together and present a united front. He also recognized the increased willingness of SADC Member States and other African countries to engage with and participate more meaningfully in the OIE during the past five years. He suggested these developments stood African nations in good stead for future trade negotiations but strongly reiterated the critical need for efficient and credible veterinary services to be re-established in SADC Member States to guarantee the continued safe trade in livestock and livestock products.

Dr. Alex Thiermann, President of the Standard Setting Committee and Code Commission for the World Organization for Animal Health (OIE) delivers his keynote address during the workshop.

Following a screening of the DVD "*Beauty and the Beef: Achieving Compatibility Between Wildlife Conservation and Livestock Production,*"[2] Dr. Mulumba offered a perspective on regional and international trade in livestock products, highlighting the fact that current standards make it especially challenging for SADC Member States to trade amongst themselves. Rapidly growing economies in Africa mean the potential for national and regional beef production and trade is also expanding, and clearly identifying the various reasons for intra-regional trade challenges currently being experienced will be an essential next step if existing demands for beef are to be met from within the region.

Regional Perspectives

The second workshop session was chaired by Mr. Sedia Modise (SADC TFCA Technical Advisor, Botswana) and included a series of presentations offering both historical and current perspectives on the key challenges faced by wildlife conservation, livestock production and rural development in the SADC region. Assessments of veterinary control fencing and the multi-sectoral impacts of this and other geographic approaches, in the context of the two major southern African TFCAs [the Kavango Zambezi (KAZA) and the Greater Limpopo (GL)] were offered. The critical impact of expanding elephant populations in terms of human / wildlife conflict, fence maintenance, sustainable land use, and natural resource management was recognized, as was the importance of working to increase socioeconomic and ecological resilience in the region. It was suggested that opportunities to increase ecological resilience in TFCAs like KAZA (home to the largest population of elephants on the continent) are available and should be sought out by SADC Member States, with priority being given to applying effective and appropriate community-based natural resource management (CBNRM) approaches, diversifying land uses, increasing the number of local and regional beneficiaries in tourism activities, and enhancing landscape connectivity to facilitate the movement of elephants into areas where they will stimulate local economies.

[2] *Workshop delegates each received a copy of this DVD; a limited number of additional copies are available from AHEAD upon request (contact Shirley Atkinson satkinson@wcs.org). The 22 minute video may also be viewed online at www.wcs-ahead.org.*

An overview of an innovative 'market access' project funded by the Millennium Challenge Account (and in collaboration with the Namibian Directorate of Veterinary Services, the Namibian Meat Board and regional partners) was presented by the Namibian Meat Board. This ground-breaking local initiative, aimed at improving access to beef markets for local livestock farmers through the implementation of a commodity-based management approach, was described and potential benefits of implementing such a system were explored. This presentation was supported by a short video entitled "*Livestock Commodity Trade: The Way Forward*"[3] which was screened during the session.

The session concluded with an examination of wildlife / livestock conflicts in the context of trade-related animal health standards for livestock in Zimbabwe, and an evaluation of the potential to expand options for rural development in the region through the types of non-geographic approaches under discussion at this workshop.

The Progressive Control Pathway (PCP-FMD) and the Global Strategy for the Control of Foot and Mouth Disease in the SADC Regional Context

The opening session on November 15 was chaired by Dr. Chap Masterson (Zimbabwe Wildlife Trust, Zimbabwe) and focused on the key components of the Progressive Control Pathway for the control of FMD (PCP-FMD), the distribution, behavior and ecological characteristics of FMD viruses in the region (i.e. southern Africa, Virus Pool 6)[4] and the multiple challenges and opportunities associated with the management of FMD in southern Africa.

Speakers emphasized the unique epidemiology of FMD in southern Africa, which is characterized by the dominance of buffalo-maintained and transmitted South African Territories (SAT) 1, 2 and 3 serotypes believed to have co-evolved with buffalo. Presentations served to highlight the initial progress that was made in controlling FMD in the SADC region between the late 1970's and 2000, and how the situation rapidly deteriorated between 2001 and 2011. Presenters emphasized the importance of institutional collaboration in achieving regionally successful disease control.

Dr. Gavin Thomson (TAD Scientific and University of Pretoria, South Africa) delivered the second keynote address of the workshop, in which he described a non-geographic disease management solution designed to address the current conflict between livestock production, wildlife conservation and trade. Dr. Thomson described how trade practices for food commodities and products other than those derived from animals, e.g. horticultural produce, have overcome the problem of trade exclusion of localities where trade-influencing diseases and pests occur, by adopting a value chain approach to biological risk management and certification. He explained how the risk of potentially dangerous infectious agents in foodstuffs can be effectively managed along an entire value chain and how such foodstuffs and constituents can be safely traded. He described how food safety standards set by the Codex Alimentarius for foodstuffs are founded on the concept of HACCP (Hazard Analysis & Critical Control Points), a system which is not influenced by geographic distribution of infectious agents. Dr. Thomson explained how SADC Member States can effectively address the key conflicts between livestock and wildlife by applying non-geographic commodity-based

[3] *This short film was produced by the UK Department for International Development (DFID) in 2008. It can be viewed by visiting http://blip.tv/r4d/livestock-commodity-trade-the-way-forward-995561. A link to it can also be found on the AHEAD website at http://www.wcs-ahead.org/kaza/kaza_additional_resources.html.*

[4] *The clustering of FMD viruses into 7 virus pools, with 3 pools covering Europe, the Middle-East and Asia, 3 pools covering Africa and 1 pool covering the Americas, is designed to enable a targeted approach to progressive FMD control through the combined activities of OIE and FAO and the regional authorities.*

approaches to disease management and trade and by identifying and mitigating risk along the entire beef value chain by applying similar HACCP principles.

In the plenary discussion, it was noted that while commodity-based approaches now appear to be well recognized and accepted in the region (as well as being acceptable to the OIE, as per Article 8.5.25 of the TAHC), apart from in the Caprivi, they are not yet being applied in the SADC region. Increased financial and political support from Member States will be needed to make further progress in SADC.

The Global Strategy for the Control of FMD was addressed by Dr. Gideon Brückner, president of the OIE Scientific Commission. He described the draft Global Strategy that was presented and adopted during the second FAO/OIE Global Conference on Foot and Mouth Disease Control held in Bangkok in June 2012. He explained how the Global Strategy specifically recognizes the unique situation faced by agencies tasked with managing FMD in southern Africa, the importance of African buffalo in the epidemiology of FMD in the region, and the fact that some well-established FMD control measures (such as cordon fencing) may have unacceptable impacts on wildlife conservation. He informed the delegates that the TAHC Chapter on FMD was in the process of being rewritten by the Standards Commission with input from Member States, and that southern African concerns would be incorporated into the updated version due to be published in 2013.[5]

Land-use Policy Options in the SADC Region: Optimizing Sustainable Livelihoods

The second session on November 15 was chaired by Dr. Steve Osofsky (Wildlife Conservation Society, *AHEAD*). Presenters reviewed opportunities and limitations associated with the adoption of CBT management practices in the region, evaluated the current status of beef commodity chains, and examined scenarios regarding the socioeconomic impacts of (a) currently prevailing, (b) experimental (e.g. CBT), as well as (c) potential future disease management approaches in Namibia. Speakers highlighted how SADC Member States might advocate for regional- and context-specific beef trade standards, but emphasized the importance of effective regional cooperation if such standards are to be developed and implemented in the near future.

Preliminary results from a comprehensive financial and economic cost-benefit analysis of policy options related to the possible introduction of CBT in Caprivi, Namibia were presented. Comparisons of different disease management scenarios clearly demonstrated the potential offered to local, national and regional economies by a commodity-based approach. Overall, the study found that cordon-fencing and zonation as a management strategy is economically inefficient, while CBT has strong economic merit.

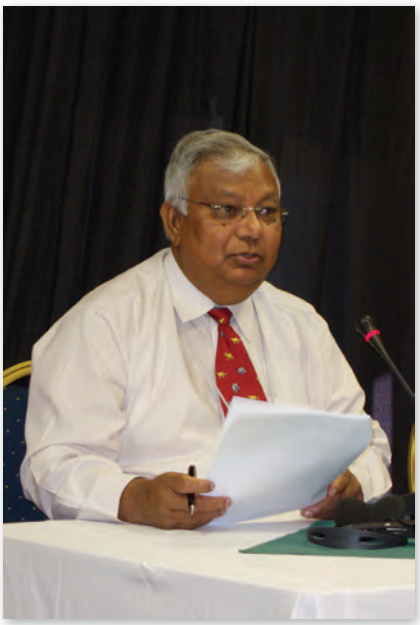
Concluding the session, a Zimbabwean example of how CBT approaches could be incorporated into a national strategy to ensure food and income security and sustainable development for rural communities in semi-arid regions of SADC was presented.

SADC Perspective on Adoption of Non-Geographic Approaches for the Management of FMD

Based on presentations delivered during the preceding sessions and associated discussions, the final session of the workshop, chaired by Mr. Beedeeanan Hulman (SADC FANR Secretariat), was dedicated to the consideration of a draft resolution developed by SADC during the meeting ("Resolution by the Southern African Development Community (SADC) Calling for Adoption of Commodity-Based

[5] *The Terrestrial Animal Health Standards Commission is responsible for ensuring that the Terrestrial Animal Health Code (TAHC) reflects current scientific information. The TAHC contains trade standards for terrestrial animals and their products.*

Trade and Other Non-Geographic Approaches for Foot and Mouth Disease Management as Additional Regional Standards for Trade in Animal Products").



Mr Hulman (SADC) presents The Phakalane Declaration to delegates.

The draft resolution (***The Phakalane Declaration on Adoption of Non-Geographic Approaches for Management of Foot and Mouth Disease***) was discussed in detail during moderated break-out sessions. Following a report-back in plenary, an updated draft was prepared for consideration by the SADC Livestock Technical Committee.[6]

Concluding Session

November 16, 2012

The concluding session on November 16 began with a short address summarizing the presentations on Day One. This was followed by a brief overview of key discussions that took place during the workshop, and invited feedback from meeting participants. There was consensus among delegates that suitable alternative approaches to the production and marketing of beef in the region now exist and need to be thoroughly explored. Utilizing integrated value chain risk management and a non-geographic, commodity-based approach to FMD management, SADC Member States now have the ability to meet international trade standards, access alternative markets and greatly enhance livestock-related livelihood opportunities for rural livestock owners living in close proximity to wildlife, including buffalo - while at the same time facilitating the development of TFCAs in the SADC region. Delegates also observed the significant progress made at the workshop in terms of meaningful cross-sectoral dialogue, especially among those leaders and decision-makers representing livestock agriculture, veterinary medicine, and wildlife conservation who seldom have the opportunity to sit together at the same 'problem-solving' table.

Overall, delegates agreed that significant progress had been made in identifying opportunities to more effectively integrate livestock agriculture and wildlife conservation and that the key messages and points discussed over the course of the meeting were suitably captured in *The Phakalane Declaration* (for Recommendations, see Box 3). The Declaration was subsequently presented to the SADC Livestock Technical Committee for consideration and endorsement.

Next Steps

SADC's role over the next 12 months will be to move *The Phakalane Declaration* forward with key regional and international stakeholders. Once this has been achieved, and with ongoing technical support from the OIE, the SADC Secretariat will be appropriately positioned to assist Member States in identifying, evaluating and implementing new, effective and acceptable non-geographic approaches to the management of FMD in southern Africa - approaches which help rural livestock farmers, do not threaten

[6] *The SADC Livestock Technical Committee met following conclusion of the workshop (November 16, 2012) and endorsed The Phakalane Declaration. The final version of the Declaration is reproduced in full in this Proceedings' Annex, and is also available at http://www.wcs-ahead.org/phakalane_declaration.html.*

free-ranging wildlife, and still provide confidence to regional and international beef importing countries that the products they are buying pose minimal threats to their own agricultural sectors.

Delegates are strongly encouraged to share the *The Phakalane Declaration* with colleagues in their own countries and to begin moving towards integrated systems in which livestock and wildlife both contribute appropriately to sustainable rural development as underpinned by diversified and resilient livelihood opportunities.

Box 3: Recommendations from the Phakalane Declaration* on Adoption of Non-geographic Approaches for Management of Foot and Mouth Disease

The Southern African Development Community hereby:

Recommends the adoption of commodity-based trade and other non-geographic approaches such as compartmentalization for foot and mouth disease control as additional regional standards for the livestock and wildlife sectors, where applicable;

Recommends to Member States that they utilize commodity-based trade and other non-geographic approaches as needed to bolster trade, first and foremost, within the region itself, and with other African partners;

Recommends that Member States identify and address their needs to implement non-geographic approaches in terms of institutional, infrastructural, and human capacity;

Recommends that SADC work together with the OIE, FAO and other international organisations to formalize the implementation guidance needed for certification, auditing and thus wider international acceptance of appropriately prepared livestock-derived commodities by potential importing countries within the SADC region and around the world. This needs to be done in partnership with the private sector and with national veterinary services, the latter having both official responsibility and expertise critical for safe and successful deployment of any animal disease control strategies;

Recommends that SADC Member States and their appropriate government agencies responsible for livestock agriculture, veterinary services, and wildlife conservation and production work together and in partnership with the private sector and civil society organisations to promulgate context-appropriate approaches to transboundary animal disease management and wildlife utilisation policies that mitigate conflicts at the wildlife / livestock interface.

Recommends that Member States seize upon the socioeconomic as well as conservation opportunities offered by SADC's collective vision for transfrontier conservation areas as facilitated by strategic alignment and realignment of selected veterinary cordon fences, while simultaneously expanding access to regional and international markets for animals and animal-derived products via adoption of the above-described enlightened and practical disease control policies and practices.

**See http://www.wcs-ahead.org/phakalane_declaration.html for the complete Phakalane Declaration, including a downloadable PDF version.*

ANNEXES

SADC TADs Project Scientific Symposium on Foot and Mouth Disease in SADC

&

Joint SADC / AHEAD Workshop on Reconciling Livestock Health and Wildlife Conservation Goals in Southern Africa: Strategies for Sustainable Economic Development

13-16, November 2012

ANNEX 1: AGENDA

AGENDA

Day One – Tuesday 13th November		
SADC TADs PROJECT SCIENTIFIC SYMPOSIUM FOOT AND MOUTH DISEASE IN SADC		
TIME	SESSION/ACTIVITY/PRESENTATION TITLE [SESSION CHAIR/MODERATOR]	PRESENTER
07:30	REGISTRATION	N. Gureja S. Atkinson
	OPENING CEREMONY [B. Hulman]	
08:30	Dr. Steve Osofsky - WCS Director Wildlife Health Policy, AHEAD Coordinator	Dignitaries
	Mrs. Margaret Nyirenda - SADC Director Food, Agriculture & Natural Resources	
	Mr. Edison Wotho – Deputy Permanent Secretary, Ministry of Agriculture, Botswana	
09:30	GROUP PHOTO	
10:00	TEA BREAK	
	SADC TADs PROJECT RESEARCH [M. Mulumba]	
10:30	SADC TADs Project – Buffalo Sampling Overview	M. Mulumba
10:40	Molecular Biological Characteristics of FMD Virus in African Buffalo in Southern Africa	C. Kasanga
10:55	Phylogeography of FMD Virus in Tanzania	R. Sallu
11:10	Risk Factors for FMD Outbreaks in Zambia	Y. Sinkala
11:25	Rapid, Sensitive & Effective Diagnostic Tools for Infectious Disease Surveillance	C. Kasanga
11:40	Q&A Group Discussion	
12:00	Typing & Serological Surveillance of FMD Virus in African Buffalo in Zambia	T. Sikombe
12:15	Investigation of FMD Outbreaks in Mbala & Kazungula Districts in Zambia	F. Banda
12:30	Serosurveillance of FMD Virus in Selected Livestock/Wildlife Interface Areas of Tanzania	M. Mkama
12:45	LUNCH	
14:00	A Better Understanding of the Behaviour of Different Topotypes of FMD Viruses Circulating in Domestic Animal & Wildlife Populations in the SADC Region	R. Dwarka
14:15	Vaccine Matching & Development of Appropriate Vaccines	G. Thobokwe
14:30	A Prioritised Research Agenda for the Control & Management of FMD at the Interface of Livestock & Wildlife	C. Kasanga
14:45	Q&A Group Discussion	
15:15	TEA BREAK	
	OTHER TADs OF SIGNIFICANCE IN SADC [L. Modisa]	
15:45	Pestes Des Petits Ruminants (PPR) in the SADC Region	B. Hulman
16:00	Rift Valley Fever: Towards the Development of a Regional Control Strategy in SADC	M. Mulumba
16:15	Q&A Group Discussion	
16:45	Housekeeping	M. Mulumba
17:00	ADJOURN	
18:00	ICEBREAKER Cocktail: All Participants, Phakalane Golf Estate.	

AGENDA

Day Two – Wednesday 14th November		
JOINT SADC/AHEAD WORKSHOP RECONCILING LIVESTOCK HEALTH AND WILDLIFE CONSERVATION GOALS IN SOUTHERN AFRICA: STRATEGIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT		
TIME	SESSION/ACTIVITY/PRESENTATION TITLE [SESSION CHAIR/MODERATOR]	PRESENTER
	WORKSHOP WELCOME & OVERVIEW [B. Hulman, M. Atkinson]	
08:30	Welcome, Purpose of the Workshop	B. Hulman
08:35	Understanding the Objectives, Expectations & Anticipated Deliverables	M. Atkinson
08:45	Introductions around the room	
	SETTING THE SCENE [M. Mokopasetso]	
09.00	TFCAs in the SADC Region: Status, Challenges & Opportunities	S. Modise
09.15	Rural Development & Conservation in TFCAs: Social & Economic Importance of Livestock Agriculture & Nature-Based Tourism to Southern Africa	D. Cumming
09:30	Overview of Transboundary Animal Diseases at the Livestock/Wildlife Interface in Southern Africa: Status, Challenges & Opportunities	M-L. Penrith
09:45	Technical Challenges Associated with Eradication of TADs in Southern Africa	G. Thomson
10.00	Q&A Group Discussion	
10.30	TEA BREAK	
	KEYNOTE 1 [M. Atkinson]	
11:00	Evolving Approaches to TADs Management: OIE Perspectives on Equivalence & Potential for Application of Non-Geographic Approaches to the Control & Management of FMD in Southern Africa	A. Thiermann
11:30	Q&A Group Discussion	
11:40	"Beauty & the Beef" DVD Introduction & Screening	G. Thomson
12:00	Regional & International Trade in Livestock Products: a Candid Assessment of Global Trends	M. Mulumba
12:30	LUNCH	
	REGIONAL PERSPECTIVES [S. Modise]	
14:00	An Historical Perspective on Fencing in Namibia, Botswana & Zimbabwe: The Future of Wildlife, Livestock & TFCAs in SADC	R. Taylor
14:15	An Assessment of the Multi-Sectoral Impacts of FMD & of its Management & Control in Southern Africa, with a Focus on the Kavango Zambezi TFCA	M. Atkinson
14:30	Influence of FMD on Progress & Development in the Greater Limpopo TFCA	M. Hofmeyr & C. Masterson
14:45	Relieving the Bottleneck: System Resilience, Human-Elephant Conflict, Habitat Connectivity & the Importance of TFCAs	D. Parry
15:00	The Caprivi Experience. Enhancing Sustainable Livelihoods through Cross-Sectoral Integration: Wildlife, Livestock & the Promise of KAZA	R. Taylor
15:15	Q&A Group Discussion	
15:40	TEA BREAK	
16:10	"Livestock Commodity Trade: The Way Forward" DVD Screening	S. Osofsky
16:25	The Beef Trade: Potential Benefits Offered by Application of a Commodity-Based Approach in Namibia's Caprivi & Northern Communal Areas (NCA)	C. Khaiseb
16:40	Reconciling Conflicts between Livestock Production & Wildlife Conservation in Zimbabwe: Expanding Options for Rural Development	U. Ushewokunze-Obatolu
16:55	Q&A Group Discussion	
17:15	ADJOURN	

AGENDA

Day Three – Thursday 15th November		
JOINT SADC/AHEAD WORKSHOP (cont'd) RECONCILING LIVESTOCK HEALTH AND WILDLIFE CONSERVATION GOALS IN SOUTHERN AFRICA: STRATEGIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT		
TIME	SESSION/ACTIVITY/PRESENTATION TITLE [SESSION CHAIR/MODERATOR]	PRESENTER
	THE PROGRESSIVE CONTROL PATHWAY (PCP-FMD) AND THE GLOBAL STRATEGY FOR THE CONTROL OF FOOT AND MOUTH DISEASE IN THE SADC REGIONAL CONTEXT [C. Masterson]	
08:30	Overview of the PCP-FMD: Aims, Approaches & Challenges for SADC Member States	M. Mokopasetso
08:45	FMD in Southern Africa: Virus Pool 6	M. Mulumba
09:00	Management of FMD in Southern Africa: Status, Challenges & Opportunities	G. Thomson
09:15	Q&A Group Discussion	
	KEYNOTE 2 [M. Atkinson]	
09:30	Reconciling Livestock Production, Wildlife Conservation & Trade through the Application of Non-Geographic Disease Management Solutions for Southern Africa	G. Thomson
09:50	Q&A Group Discussion	
10:15	TEA BREAK	
	LAND-USE POLICY OPTIONS IN THE SADC REGION: OPTIMIZING SUSTAINABLE LIVELIHOODS [S. Osofsky]	
10:50	Commodity-Based Trade: Technical Considerations & Key Questions	A. Toto
11:05	Standards in Global Agriculture & Food Trade: Studying Botswana, Namibia & South Africa's Beef Commodity Chains	E. Ransom
11:20	Cost-Benefit Analysis of Land-Use & Policy Options for Southern Africa, with Special Reference to Livestock, Wildlife & Disease Management in the Caprivi Region, Namibia	J. Barnes
11:40	Q&A and Reflective Discussion: Common Themes; Opportunities for Development in SADC	
12:00	LUNCH	
13:30	Ensuring Food & Income Security & Sustainable Development for Rural Communities in Semi-Arid Regions of Zimbabwe	C. Masterson
14:00	Global Strategy for the Control of FMD: Outcomes of FAO/OIE Bangkok Conference & the Relevance to SADC Member States	G. Brückner
14:20	Q&A Group Discussion	
	SADC PERSPECTIVE ON ADOPTION OF NON-GEOGRAPHIC APPROACHES FOR MANAGEMENT OF FOOT AND MOUTH DISEASE [B. Hulman]	
14:30	Presentation of Draft Resolution by SADC Calling for Adoption of Commodity-Based Trade & Other Non-Geographic Approaches for FMD Management as Additional Regional Standards for Trade in Animal Products	B. Hulman
	BREAK-OUT GROUPS (5) [S. Osofsky, M. Atkinson, M-L. Penrith, M. Mulumba, B. Hulman]	
14:45	Moderated Break-Out Groups to Discuss Draft Resolution	
16:00	TEA BREAK	
16:15	Break-Out Groups Report Back in Plenary	B. Hulman
17:00	ADJOURN	
19:00	DINNER Braai - All Participants, Phakalane Golf Estate.	







AGENDA

Day Four – Friday 16th November		
CONCLUDING SESSION		
TIME	SESSION/ACTIVITY/PRESENTATION TITLE [SESSION CHAIR/MODERATOR]	PRESENTER
	CONCLUSIONS [B. Hulman]	
09:00	Overview of Sessions	B. Hulman
09:10	Summary of Day 1: FMD Scientific Symposium	M. Mulumba
09:35	Summary of Days 2 & 3: Reconciling Livestock Health & Wildlife Conservation Goals in Southern Africa: Strategies for Sustainable Economic Development	M. Atkinson
10:00	Presentation of Final SADC "Phakalane Declaration on Adoption of Non-Geographic Approaches for Management of Foot and Mouth Disease"	B. Hulman
10:10	Thank You & Potential Next Steps	M. Atkinson
10:20	TEA BREAK	
	SADC LIVESTOCK TECHNICAL COMMITTEE [B. Hulman]	
11:00	AOB	B. Hulman
13:00	LUNCH	
14:00	LTC Closed Session	B. Hulman
16:00	ADJOURN	

ANNEX 2: ABSTRACTS

SADC SCIENTIFIC SESSION ON FOOT AND MOUTH DISEASE

&

JOINT SADC/AHEAD WORKSHOP ON "RECONCILING LIVESTOCK HEALTH AND WILDLIFE CONSERVATION GOALS IN SOUTHERN AFRICA: STRATEGIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT"

ABSTRACTS

NOVEMBER 13-16, 2012

MOLECULAR BIOLOGICAL CHARACTERISTICS OF FOOT AND MOUTH DISEASE VIRUS IN AFRICAN BUFFALO IN SOUTHERN AFRICA

CHRISTOPHER KASANGA[1], RAHANA DWARKA[2], GAOTHLELE THOBOKWE[3], JEMMA WADSWORTH[4], NICK KNOWLES[4], MISHECK MULUMBA[5], EZEKIA RANGA[6], RAPHAEL SALLU[7], MMETA YONGOLO[7], PHILEMON WAMBURA[1], MARK RWEYEMAMU[1] & DONALD KING[4]

[1]Southern African Centre for Infectious diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [2]Onderstepoort Veterinary Institute, Pretoria, South Africa; [3]Botswana Vaccine Institute, Gaborone, Botswana; [4]WRLFMD, Institute for Animal Health, Pirbright, United Kingdom; [5]Southern African Development Community Secretariat, Gaborone, Botswana; [6]Ministry of Livestock Development and Fisheries, Dar-es-Salaam, Tanzania; [7]Tanzania Veterinary Laboratory Agency, Dar-es-Salaam, Tanzania. Email: christopher.kasanga@sacids.org

Foot and mouth disease (FMD) is endemic in most countries in southern Africa. African buffalo (*Syncerus caffer*) are known to play a significant role in the transmission and dynamics of FMD virus (FMDV) in wildlife-livestock interface areas. The aim of this study was to investigate the serotype and determine the genetic relationships of FMDV recovered from animals in Tanzania, Zambia and Mozambique, and compare them with viruses detected from elsewhere in the sub-Saharan region. A total of 150 probang samples collected in 2010 from cattle and buffalo in Marromeu (Mozambique), Katavi (Tanzania) and Lochninvar (Zambia) National Parks were used in this study. The presence of FMDV was determined by laboratory methods such as VI, antigen ELISA and real-time RT-PCR. Phylogenies of VP1 sequences were determined by the Neighbor-joining method. The overall FMDV genome detection rate was 6.7% (n=10), with SAT1 being the most frequent serotype (60%; n=6) isolated in cattle and buffalo in Mozambique, Tanzania and Zambia followed by SAT 3 (30%; n=3) and SAT 2 (10%; n=13). Genotyping showed that type SAT 1 viruses fell into either the TOPOTYPE 1 (NWZ) or UNASSIGNED topotypes, type SAT 2 into the AFRICA topotype I and type SAT 3's into topotype IV (SEZ). This study reveals that serotypes SAT 1-3 are maintained in cattle and buffalo in livestock-wildlife interface areas in Marromeu, Katavi, and Lochinvar National Parks. Phylogenetic analysis of FMDV isolates from Tanzania, Zambia and Mozambique showed that they are genetically related to lineages and topotypes from Africa. This information contributes to the understanding of the epidemiology of FMD in southern Africa. In Mozambique, Tanzania and Zambia lack of consistent surveillance systems and animal movement controls make it difficult to determine the exact source of FMD and transmission dynamics of FMDV. Further studies are needed to elucidate the complex epidemiology of FMD in Africa.

PHYLOGEOGRAPHY OF FOOT AND MOUTH DISEASE VIRUS IN TANZANIA

RAPHAEL SALLU[1], CHRISTOPHER KASANGA[2], MKAMA MATHIAS[2], MMETA YONGOLO[2], CHANASA MPELUMBE-NGELEJA[2], MISHECK MULUMBA[3], EZEKIA RANGA[4], PHILEMON WAMBURA[2], MARK RWEYEMAMU[2] & DONALD KING[5]

[1]Tanzania Veterinary Laboratory Agency, Dar-es-Salaam, Tanzania; [2]Southern African Centre for Infectious diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [3]Southern African Development Community Secretariat, Gaborone, Botswana; [4]Ministry of Livestock Development and Fisheries, Dar-es-Salaam, Tanzania; [5]WRLFMD, Institute for Animal Health, Pirbright, United Kingdom. Email: raphael.sallu@sacids.org

Phylogeography data are of paramount importance in studying the molecular epidemiology dynamics of foot and mouth disease virus (FMDV). In this study epithelial samples and esophageal–pharyngeal (OP) fluids were collected from 329 convalescent animals (cattle and buffalo) in the field throughout Tanzania between 2009 and 2012. The singleplex real-time RT-PCR (qRT-PCR) assay for rapid and accurate diagnosis of FMDV employing the Callahan 3DF-2, 3DF-R primers and Callahan 3DP-1 probe were used. Preparation of the samples was performed according to the OIE Manual with an Ethiopian A serotype obtained from the attenuated vaccine serving as positive control and samples collected from healthy animals serving as true negatives. The results indicated that 53.49% of samples (n = 176) were positive for FMDV genome by qRT-PCR with Ct values ranging from 14 to 32. In addition, molecular typing of the FMDV genome positive samples using serotype specific primers revealed the existence of serotype C (11.42%; n =20), serotype SAT 1 (34.25%; n = 60) and SAT 2 (54.54%; n = 96) in different geographic areas of Tanzania. These findings suggest the presence of multiple FMDV serotypes in Tanzania. In-depth molecular biological studies, including phylogenetic analysis of the VP1 sequences, are required to elucidate the phylodynamics of FMDV field strains in Tanzania and neighbouring countries.

PATTERNS OF AND IMPLICATIONS FOR CONTROL OF FOOT AND MOUTH DISEASE VIRUS INFECTIONS IN ZAMBIA

Y. SINKALA[1, 2], M. SIMUUNZA[2], D. U. PFEIFFER[3], C. KASANGA[4], H. MUNANGANDU[5], M. MULUMBA[6], J. B. MUMA[2] & A. MWEENE[2]

[1]Ministry of Agriculture and Livestock, Lusaka, Zambia; [2]University of Zambia, School of Veterinary Medicine, Lusaka, Zambia; [3]Royal Veterinary College, London, United Kingdom; [4]Sokoine University of Agriculture, Morogoro, Tanzania; [5]Nowergian School of Veterinary Sciences, Ullevålsveien, Oslo, Norway; [6]Southern African Development Community Transboundary Animal Diseases Project, Gaborone, Botswana. Email: yona.sinkala@sacids.org

Foot and mouth disease (FMD) is one of the world's most important livestock diseases for trade, yet little is known about its epidemiology and control challenges in endemic settings, where the disease affects communities wholly dependent on livestock production. Key questions relate to the factors contributing to this endemic situation and the challenges for control that exist. Considering the dynamic nature of FMD infections and variability in risk factors exerting pressure on the epidemiology of FMD, including climate change, there is need to review existing knowledge on FMD control strategies. A review on spatial distribution of the FMD outbreaks, and the effect of the vaccinations and movement control that have been applied in Zambia in the last 30 years was made. Information was collected using peer-reviewed journals, articles, conference proceedings, unpublished scientific reports and personal communication with scientists and personal field experiences. Geographically, three high-risk areas were identified based on repeated outbreaks and includes: Mbala/Isoka area, Kafue, and Zambezi basins. The major serotypes involved in these outbreaks are South African Territories serotypes (SAT) 1, 2 and serotype O in domestic cattle and SAT 1, 2 and 3 isolated from healthy African buffalo (*Syncerus caffer)*. We conclude that FMDV is increasing its area coverage and the current control measures in place seem to be ineffective at controlling the disease. We further propose that more research work be conducted on the epidemiology of the endemicity and strain characterisation that is needed to inform control measures at the livestock-wildlife interface.

RAPID, SENSITIVE AND EFFECTIVE DIAGNOSTIC TOOLS FOR INFECTIOUS DISEASE SURVEILLANCE: A CASE STUDY OF FOOT AND MOUTH DISEASE IN AFRICA

CHRISTOPHER KASANGA[1], WATARU YAMAZAKI[2], VALERIE MIOULET[3], DONALD KING[3], MISHECK MULUMBA[4], PHILEMON WAMBURA[5] & MARK RWEYEMAMU[1]

[1]Southern African Centre for Infectious Diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [2]Department of Microbiology, University of Miyazaki, Miyazaki, Japan; [3]Institute for Animal Health, Pirbright, Surrey, GU24 0NF, United Kingdom; [4]Southern African Development Community Secretariat, Private Bag 0095, Gaborone, Botswana; [5]Faculty of Veterinary Medicine, Sokoine University of Agriculture, Morogoro, Tanzania. Email: christopher.kasanga@sacids.org

Speed is paramount in the diagnosis of highly infectious diseases, such as foot and mouth disease (FMD) as is for emerging diseases. But simplicity is required if a test is to be deployed in the field. The recent development in molecular biology enables specific detection of FMD virus (FMDV) by reverse transcription loop-mediated amplification (RT-LAMP), real time RT-PCR and sequencing. RT-LAMP enables amplification of the FMDV 3D RNA polymerase gene at 63°C (in the presence of a primer mixture and both reverse transcriptase and *Bst* DNA polymerase) for 1 hour, while real time RT-PCR amplifies the same gene at thermocycling temperature for about 2.5 hours. In this study, we compared sensitivity and effectiveness of RT-LAMP with real time RT-PCR in detection of FMDV 3D RNA polymerase gene in 179 oesophageal-pharyngeal (OP) scraping (probang) samples collected from clinically healthy cattle and buffalo in Malawi, Mozambique and Tanzania in 2010. The FMDV detection rate was higher with RT-LAMP (30.2%; n = 54) than real-time RT-PCR (17.3%; n = 31). All positive samples by real time RT-PCR (Ct ≤ 32.0) were also positive for RT-LAMP assay. Both assays were specific to FMDV. In addition, the VP1 sequences of ten viruses isolated from positive samples corresponded to the respective FMDV serotypes and genotypes. Our findings indicate that the performance of RT-LAMP is superior to real time RT-PCR. Accordingly, we consider this test to be of high potential for the specific detection and surveillance of infectious diseases of humans and animals in the resource compromised, developing countries.

TYPING AND SEROLOGICAL SURVEILLANCE OF FMD VIRUS IN AFRICAN BUFFALO IN ZAMBIA

TINGIYA SIKOMBE[1,3], CHRISTOPHER KASANGA[2], YONA SINKALA[3], MARTIN SIMUUNZA[3], JOHN MUMA[3], RAHANA DWARKA[4], MISHECK MULUMBA[5] & AARON MWEENE[3]

[1]Central Veterinary Research Institute, Lusaka, Zambia; [2]Southern African Centre for Infectious diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [3]University of Zambia, School of Veterinary Medicine, Lusaka, Zambia; [4]Onderstepoort Veterinary Institute, Pretoria, South Africa; [5]Southern African Development Community Secretariat, Gaborone, Botswana. Email: christopher.kasanga@sacids.org

Foot and mouth disease (FMD) is endemic in Zambia. Little is known on the epidemiology of FMD virus (FMDV) in the country and this has led to the continuous occurrence of FMD in southern Zambia. FMD severely impacts pastoral and agro-pastoral communities who are most reliant on livestock products for economy and food security. Southern Zambia is densely populated with livestock and wildlife, which are usually in contact almost throughout the year. The control of FMD in Zambia is mainly done strategically through vaccination, but this is complicated by the presence of buffalo and traditional cattle farmer`s practice of transhumance in areas harbouring wild animals. The current research aims at determining the infection status and FMDV serotype(s) circulating in domesticated and wild animals in southern Zambia. A targeted cross sectional study will be employed in this study. Sera and oesophageal–pharyngeal (OP) fluids will be obtained from cattle and buffalo in selected areas of Zambia. Epidemiological data such as age, sex, health, and vaccination status of animals will be taken during sampling. Infection status will be determined by NSP-ELISA targeting the 3ABC region of FMDV genome. FMDV serotypes will be examined by LPB-ELISA and/or antigen ELISA on OP samples. This research has the potential to unravel the infection status and serotype(s) of circulating FMDV strains in Zambia. This information will be useful in designing a rational control strategy for FMD in Zambia and the neighbouring countries.

INVESTIGATION OF FOOT AND MOUTH DISEASE OUTBREAKS IN MBALA AND KAZUNGULA DISTRICTS IN ZAMBIA

FRANK BANDA [1,4], CHRISTOPHER KASANGA[1], RAPHAEL SALLU[2], YONA SINKALA[5], PAUL FANDAMU[4], MISHECK MULUMBA[3], MARK RWEYEMAMU[1] AND PHILEMON WAMBURA[1]

[1]Southern African Centre for Infectious diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [2]Tanzania Veterinary Laboratory Agency, Dar-es-Salaam, Tanzania; [3]Southern African Development Community Secretariat, Gaborone, Botswana; [4]Central Veterinary Research Institute, Lusaka, Zambia; [5]University of Zambia, School of Veterinary Medicine, Lusaka, Zambia. Email: christopher.kasanga@sacids.org

Foot and mouth disease (FMD) is an acute, highly contagious viral infection of domestic and wild cloven-hoofed animals. The South African Territories (SAT) 1-3 serotypes of FMD virus (FMDV) are maintained by large numbers of African buffalo *(Syncerus caffer*), which provide a potential source of infection for domestic livestock and other wild animals. Uncontrolled animal movements across borders can also be responsible for the spread of the disease. The disease is known to be endemic in parts of Zambia with periodic outbreaks occurring in different geographic areas in the country. This study was conducted to investigate FMDV from FMD-suspected cases following disease outbreaks in Kazungula and Mbala Districts in the Southern and Northern Provinces respectively. Sixty epithelial tissues and/or oesophageal–pharyngeal (OP) scrapings from cattle in Mbala (n = 51) and Kazungula (n = 9) were collected and examined for FMDV. The viral RNA and FMDV serotypes were examined by one-step real time reverse transcriptase polymerase chain reaction (qRT-PCR) and antigen ELISA, respectively. A total of 22 samples (36.7 %) were positive for FMDV genome by qRT-PCR with Ct values ranging from 13 to 32. The FMDV genome positive samples from epithelial tissues showed relatively higher Ct values as compared to those obtained from OP scrapings, irrespective of geographic location. Forty percent (40%; n = 4) of epithelial tissues from Mbala District were typed by antigen ELISA into serotype SAT 2. There was no correlation of Ct values in qRT-PCR with antigen detection in samples collected from Kazungula District. These findings indicate that the FMD outbreaks that occurred in Mbala and Kazungula Districts in 2012 were ascribed to at least serotype SAT 2 viruses. Furthermore, regular interaction between buffalo from the Mosi-o-Tunya Park and domestic animals from surrounding areas could be incriminated in the occurrence of regular FMD outbreaks in Kazungula whilst the uncontrolled animal movements across borders between Mbala and Sumbawanga in Tanzania might be responsible for disease outbreaks in Mbala. It is recommended that in-depth molecular biological studies, including sequencing and phylogeny of the viruses, should be conducted to elucidate the complex epidemiology of FMD in Zambia thereby providing valuable information needed for a rational control strategy of FMD in Zambia and the neighbouring countries.

SEROSURVEILLANCE OF FOOT AND MOUTH DISEASE VIRUS IN SELECTED LIVESTOCK-WILDLIFE INTERFACE AREAS OF TANZANIA

MATHIAS MKAMA[2], CHRISTOPHER KASANGA[1], RAPHAEL SALLU[2], EZEKIA RANGA[4], JOSEPH MASAMBU[2], MISHECK MULUMBA[3], MARK RWEYEMAMU[1] & PHILEMON WAMBURA[1]

[1]Southern African Centre for Infectious diseases Surveillance, Sokoine University of Agriculture, Morogoro, Tanzania; [2]Tanzania Veterinary Laboratory Agency, Dar-es-Salaam, Tanzania; [3]Southern African Development Community Secretariat, Gaborone, Botswana; [4]Ministry of Livestock Development and Fisheries, Dar-es-Salaam, Tanzania. Email: christopher.kasanga@sacids.org

Foot and mouth disease (FMD) is caused by a virus of the genus *Aphthorvirus* that belongs to the family *Picornaviridae*. There has been much scientific need for determining the transmission dynamics of FMD virus (FMDV) by drawing more attention on the livestock-wildlife interface areas. A good number of literature implicate buffalo as being the reservoir of FMDV in wildlife and cattle. But, many FMDV research studies conducted on experimentally infected cattle as carriers and FMDV highly susceptible animal groups (i.e. bovine calves) have shown lower chances of transmission of the virus between carriers and the susceptible groups. These findings underscore the importance of continued research on the role played by carrier animals on FMDV transmission dynamics under natural conditions. In this study, the sampled areas include Mikumi, Mkomazi and Ruaha National Parks where a total of 85 buffalo and bovine sera samples were collected. Laboratory analysis of the samples was done by NSP ELISA using PrioCHECK® FMDV NS Kit for detection of antibodies directed against 3ABC non-structural proteins and confirming natural infections. Results showed that 80.25% of tested sera samples were positive for FMDV. However, serotyping of NSP ELISA sero-reactors with LPBE is yet to be done. The purpose of the sero-surveillance approach was to determine whether the virus found circulating in the wildlife corresponds/differs to that in the livestock herds in surrounding areas. This information is important for further epidemiological studies towards developing effective FMD control strategies.

A BETTER UNDERSTANDING OF THE BEHAVIOUR OF DIFFERENT TOPOTYPES OF FOOT AND MOUTH DISEASE VIRUSES CIRCULATING IN DOMESTIC AND WILDLIFE POPULATIONS IN THE SADC REGION

R. M. DWARKA[1], F. F. MAREE[1], J. J. ESTERHUYSEN[1], B. BOTHA[1] & N. MTSHALI[1]

[1]ARC, Onderstepoort Veterinary Institute, Transboundary Animal Diseases Programme, Private Bag X5, Onderstepoort, 0110, South Africa. Email: DwarkaR@arc.agric.za

The Transboundary Animal Diseases Programme of the ARC-Onderstepoort Veterinary Institute, is home to the OIE and FAO reference centres for foot and mouth disease (FMD). One of the responsibilities of the reference centre is to maintain an updated sequence database of the SAT type viruses in southern Africa which will assist in tracing the relationships between FMD outbreaks in cattle and those strains circulating in the African buffalo (*Syncerus caffer*). The current database is updated with FMD viruses circulating in African buffalo in the Kruger National Park. The SADC-TADs project is currently addressing the need to add to this database of viruses by sampling buffalo and cattle in some SADC countries.

A comprehensive database of FMD viruses and sequences from SADC countries enables a better understanding on the evolution of the virus. One important aspect is to cluster the viruses according to geographic locations based on genetic information, which is termed a topotype. When a FMD virus database is represented by diverse topotypes, it enables diagnosticians to better understand and trace the possible origins of outbreak strains. Understanding the possible source of an outbreak could play a role in the immediate control strategy for that region. It also enables scientists to assess if a particular topotype is dominant in a district, which could have an impact on vaccine strain selection for that area. If vaccination is applied as a control measure, a topotype rich database of viruses will enable better vaccine matching studies to be performed to evaluate the most appropriate vaccine strain.

Maintaining and addition of viruses and sequences to the SAT type database of southern Africa is essential to enable the study of the genetic relatedness between the buffalo and outbreak strains as well as vaccine matching studies between viruses from different topotypes. Scientists can study the relationships between FMD viruses from different topotypes and perform vaccine matching studies across topotypes, however, for a holistic regional control strategy continued surveillance and vigilance by veterinary services of all SADC countries is required to prevent the spread of this highly contagious, economically devastating viral disease of cloven-hoofed animals, affecting both livestock and game. Concerted collaborative efforts between governments, industry, farmers and research institutions are central to effectively mitigating the risk posed by a disease such as FMD.

RIFT VALLEY FEVER: TOWARD THE DEVELOPMENT OF A REGIONAL CONTROL STRATEGY IN SADC

BAPTISTE DUNGU[1]

[1]GALVmed, Edinburgh, UK.

Since the first description of a Rift Valley fever (RVF)-like disease in Kenya in 1912-1913, and the first isolation of the RVF virus in 1931 in Kenya, RVF continues to be a major zoonotic and economically important disease of livestock in large regions of Africa and the Middle East, where it is endemic. The disease is also considered to be a big threat to different regions of the world, as the virus features on most lists of potential biological warfare agents due to its severe zoonotic nature. In southern Africa, severe outbreaks have been reported since the 1950s, especially in South Africa, Zimbabwe and Madagascar, while serological evidence has been obtained in others such as DRC and Mozambique. Vaccination remains one of the best tools for the control of RVF. However the design of suitable vaccination strategies remains a challenge, essentially due to the cyclical nature of the disease and subsequent long inter-epidemic period, which have resulted in many countries considering the use of vaccination only at first indications of an outbreak. Different forms of vaccination strategies can be considered, including the use of emergency strategic stocks, and strategies that promote the establishment of good herd immunity in the livestock population in endemic regions, thus reducing the devastating impact of severe RVF outbreaks. Regional strategies for the control of RVF are expected to more likely lead to more cohesive policies and mutual support between the different countries. A number of actions are already ongoing in the SADC region. They include the evaluation of RVF risk in each country, through the development of risk maps, based on historic data on the occurrence of the disease, a RVF policy landscaping in order to understand current policies setup in each country around RVF control, and the establishment of a technical RVF interstate working group that would advise policy makers on most appropriate RVF control strategy, which would include aspects such as vaccination strategy and support to the establishment of a common vaccine or vaccine antigen bank.

TFCAS IN SADC: STATUS, CHALLENGES AND OPPORTUNITIES

SEDIA MODISE[1]

[1]*Technical Advisor TFCAs, SADC, Gaborone, Botswana. E-mail: modisesc@yahoo.com*

The establishment of transfrontier conservation areas (TFCAs) in the Southern African Development Community (SADC) region is based on a fundamental underlying philosophy that wildlife resources along international boundaries are a shared asset of the neighbouring states. States participating in TFCAs are therefore jointly responsible for the well-being of these shared resources and should derive equitable benefits from their utilization. TFCAs are intended to enhance the conservation of endangered ecosystems and species, and to provide net social and economic benefits to communities that reside within and around them through development of tourism. TFCAs complement the goals and objectives of several international conservation conventions and their establishment has the support of international conservation organizations and cooperating partners with an interest in nature conservation and associated economic development. The SADC region is at the forefront of TFCA development globally because of the policy and legislative framework in place. As TFCAs transcend international boundaries of partner states, their establishment in the SADC region is ratified by Heads of the State who sign treaties formally establishing them. The development of TFCAs requires the participation of different stakeholders including but not limited to national governments, district and local authorities, non-governmental organizations, international cooperating partners and, where appropriate, the SADC Secretariat.

The benefits range from collaboration on joint law enforcement operations, research and monitoring, marketing and the sharing of experience and expertise to consolidation of the integrity of natural ecosystems that have been severed by man-made laws and the drawing of political boundaries. TFCAs in the SADC region are also faced with immense challenges that range from reconciling differences in land uses, fears of wild animals transmitting diseases of economic importance to domestic stock, disparities in the capacities and capabilities of the TFCA partner countries, and limitations in terms of available technical and financial resources. Despite these challenges, the political will for establishing TFCAs in SADC remains high because of their potential to bring about regional integration and improve living standards of rural communities that routinely pay the opportunity costs of conservation.

RURAL DEVELOPMENT AND CONSERVATION IN TFCAS: SOCIAL AND ECONOMIC IMPORTANCE OF LIVESTOCK AGRICULTURE AND NATURE-BASED TOURISM TO SOUTHERN AFRICA

DAVID H. M. CUMMING[1]

[1]*Percy FitzPatrick Institute, University of Cape Town, South Africa. E-mail: cumming@icon.co.zw*

More than fifteen transfrontier conservation areas are being developed in southern Africa, covering a total area of some 750,000 km^2 - an area nearly the size of Zambia. Some TFCAs comprise only protected areas. Others, such as the Kavango Zambezi and Great Limpopo, include a high proportion of communal land where livestock form an important, if not vital component of peoples' livelihoods. Thus, tensions inevitably arise between conservation and rural development objectives in the development of TFCAs. These tensions are aggravated by disease transmission between wild ungulates and livestock that have potential impacts on livestock and export markets beyond TFCAs.

Central issues are how tensions between livestock agriculture and conservation can be reduced, and how win-win solutions to both conservation and peoples' livelihoods within TFCAs can be achieved. Answers to these questions rest partly on the relative values of livestock and wildlife to household, local, and national economies and how these values may influence national policies influencing rural development. At local levels, and given appropriate policies, returns from land use systems that combine livestock and wildlife may provide greater returns than either system alone.

The contribution of livestock and tourism sectors to national and regional GDP for seven southern African countries (Angola, Botswana, Malawi, Mozambique, Namibia, Zambia and Zimbabwe) amounts to nearly US$ 80 billion, or 13.5% of regional GDP. Of this total US$62 billion is from travel and tourism and $16.5b is from livestock. However, this figure is distorted by the very high contribution (nearly $50b) of travel and tourism to GDP in South Africa. If the data from South Africa are excluded the contribution to regional GDP from livestock and tourism is US$10b and $14b respectively (or 10.3% of GDP). Given the potential values of both livestock and wildlife at local, national and regional levels there is good reason to explore win-win opportunities that combine both livestock and wildlife production systems in the development of TFCA landscapes.

OVERVIEW OF TRANSBOUNDARY ANIMAL DISEASES AT THE LIVESTOCK/WILDLIFE INTERFACE IN SOUTHERN AFRICA: STATUS, CHALLENGES AND OPPORTUNITIES

MARY-LOU PENRITH[1] & GAVIN R. THOMSON[1]

[1]*TAD Scientific, Pretoria, South Africa. E-mail: marylouise@vodamail.co.za*

The establishment of transfrontier conservation areas (TFCAs) in southern Africa poses new challenges in terms of managing animal diseases at the greatly expanded livestock/wildlife interface. Segregating wildlife populations with fences that block migration routes with the aim of preventing infectious contact between livestock and wildlife is contrary to the principles of TFCAs, in which multiple land use is encouraged provided that wildlife can move as freely as possible over a much wider area than before.

A large number of animal diseases are endemic to southern Africa and are important for different reasons. Foot and mouth disease (FMD) has limited impact on extensively-farmed livestock but is a globally feared transboundary disease requiring restrictive control measures that are not compatible with biodiversity conservation and can place economic constraints on livestock producers in areas regarded as infected. Others are pathogenic for livestock, may affect trade and result in lowered production and reproduction as well as increased mortality. Additionally, a high proportion of zoonotic diseases have their origin at the wildlife interface. The management of both epidemic and erosive diseases is essential if the goal of improving livelihoods through trade that allows access to high value markets is to be achieved.

The major challenges are (1) to achieve consensus among policy makers at national and international level that safe trade in livestock commodities can be assured without segregation of infected populations and (2) to assist willing producers to adopt a more commercial and entrepreneurial approach to husbanding their herds. Addressing these challenges provides an unprecedented opportunity to apply approaches to animal disease management that result in safe products without requiring segregation of animal populations of different health status. The opening up of new market opportunities would in turn provide incentives for producers to invest in their animals in order to provide the quantity and quality of product that the market demands.

TECHNICAL CHALLENGES ASSOCIATED WITH THE ERADICATION OF TADS IN SOUTHERN AFRICA

GAVIN R. THOMSON[1,2] , MARY-LOU PENRITH[1,2] & GEOFFREY FOSGATE[2]

[1]TAD Scientific, Pretoria, South Africa; [2]University of Pretoria, Pretoria, South Africa. E-mail: gavin@tadscientific.co.za

Most international sanitary standards developed for the management of TADs as well the TADs risks posed by trade in animal commodities and products are based on the idea that the infectious agents concerned need to be excluded from the locality of production and processing. In other words a common foundation is applied to the management of high impact infectious animal diseases. There are, however, two major problems associated with this approach: (1) there are non-geographically based alternatives to these standards that are potentially equally or even more effective and (2) in situations where free-living wildlife susceptible to these infections are abundant, eradication of TADs that are capable of infecting wildlife, without at the same time adversely affecting the wildlife populations concerned, may be difficult or even impossible with currently available technologies and other resources.

Consequent upon the widespread belief in geographic standards a number of TADs are periodically assumed by organisations and individuals to be either globally or regionally eradicable (foot and mouth disease is frequently mentioned in this context) without any attempt to objectively investigate the feasibility of such objectives. This attitude is often justified on the basis that rinderpest has been eradicated and therefore the same must be possible with other TADs. That ignores the obvious fact that the epidemiology of different TADs and the control options available for use against them are often highly variable.

In this presentation we examine the potential for eradicating selected TADs in the southern African region by comparing them with rinderpest in respect of key features that render TADs potentially eradicable or not.

EVOLVING APPROACHES TO TADS MANAGEMENT: OIE PERSPECTIVES ON EQUIVALENCE AND POTENTIAL FOR APPLICATION OF NON-GEOGRAPHIC APPROACHES TO THE CONTROL AND MANAGEMENT OF FMD IN SOUTHERN AFRICA

ALEJANDRO B. THIERMANN[1]

[1]*President Terrestrial Animal Health Code Commission, World Organisation for Animal Health – OIE. Paris, France. E-mail: a.thiermann@oie.int*

Animal disease control programs in livestock must take an integrated approach in order to manage the risks in all species of epidemiologic significance. When controlling foot and mouth disease (FMD), particularly in the African continent, measures must consider the application of the most recent developments and will require a close collaboration by the livestock producers as well as those responsible for wildlife. An efficient and credible Veterinary Service is one of the most critical factors for a successful and long lasting FMD free status of the livestock population. These authorities will have to demonstrate that all pertinent OIE recommendation are applied according to the Code, and that the national strategy has the support and active involvement of all stakeholders representing all sectors, including wildlife. The OIE continues to review scientific developments and propose improvements in its recommendations in order for Members to be able to guarantee a safe trade and minimize negative impact on all sectors. Without an integrated livestock-wildlife approach the improved health status and the safety of the trade cannot be sustainable.

AN HISTORICAL PERSPECTIVE ON FENCING IN NAMIBIA, BOTSWANA AND ZIMBABWE: THE FUTURE OF WILDLIFE, LIVESTOCK AND TFCAS IN SADC

RUSSELL TAYLOR[1]

[1]*World Wildlife Fund in Namibia, Windhoek, Namibia. E-mail: rtaylor@wwf.na*

Over 40 years ago the European Union engaged southern African countries in a number of development treaties such as Lome and Cotonou, aimed at promoting economic and rural development through preferred market trade agreements. The livestock sector, in particular, was a major benefactor of these agreements with participating countries receiving lucrative returns for livestock products exported to the recipient EU markets. Engagement of these trade agreements required participating countries to comply with stringent veterinary and health standards that resulted in significant negative consequences for wildlife populations and their associated migration or movement routes. The eradication of targeted wildlife species was followed by the establishment of disease-free livestock export zones and adjacent disease surveillance areas through the construction of thousands of kilometres of wildlife-proof fencing aimed at separating wildlife from livestock.

Given the arid and semi-arid environments of the region and the need for large numbers of wildlife to move seasonally in response to rainfall and food production, the introduction of veterinary fences had devastating effects on wildlife populations. More importantly these impacts either foreclosed or severely limited other economically competitive wildlife-based land use options, and mark a signal failure to recognize southern Africa's comparative advantage.

At the time of these initial trade agreements, livestock production, promoted by EU agricultural subsidies was a viable land use option- at least in the short-term. Increasing evidence to the contrary however, includes greater climatic variability, declining livestock productivity, market failures and social disruptions amongst the rural poor. Consequently, the emergence of wildlife production systems as a competitive land use is now challenging the rangelands-livestock model. Wildlife as a land-use choice has been unable to achieve its full potential though, due to lack of investment in research and development, the limitations of disease-related constraints under prevailing animal health policies, and because of of conventional wisdom that continues to focus on older, livestock-centric models. Over the past 40 years, the advent of globalization has produced massive shifts in market demands. New opportunities such as nature-based tourism and TFCAs have emerged for wildlife to play a meaningful role. The wildlife sector now seeks to overcome these constraints but its future will remain limited until policies are unshackled from the past and are able to embrace a multispecies animal production systems approach to the use of land.

AN ASSESSMENT OF THE MULTI-SECTORAL IMPACTS OF FOOT AND MOUTH DISEASE AND OF ITS MANAGEMENT AND CONTROL IN SOUTHERN AFRICA, WITH A FOCUS ON THE KAVANGO ZAMBEZI TRANSFRONTIER CONSERVATION AREA

MARK W. ATKINSON[1], CHRISTOPHER M. FOGGIN[2], CYPRIAN ZISHIRI[3], CHAP MASTERSON[4], MARK JAGO[5], GAVIN R. THOMSON[6], VICTOR SIAMUDAALA[7] , SHIRLEY J. ATKINSON[8] & STEVEN A. OSOFSKY[8]

[1]Animal & Human Health for the Environment And Development (AHEAD), Wildlife Conservation Society, Gaborone, Botswana; [2]Wild Horizons Wildlife Trust, Victoria Falls, Zimbabwe; [3]Division of Veterinary Field Services, Ministry of Agriculture, Mechanisation and Irrigation Development, Hwange, Zimbabwe; [4]Zimbabwe Wildlife Veterinary Trust, Harare, Zimbabwe; [5]Ministry of Environment and Tourism, Windhoek, Namibia; [6]TAD Scientific, Pretoria, South Africa; [7]Kavango Zambezi Transfrontier Conservation Area Secretariat, Kasane, Botswana; [8]AHEAD, Wildlife Conservation Society, Bronx, USA. Email: matkinson@wcs.org

With wildlife and associated industries playing an increasingly prominent role in SADC countries, the region faces critical resource allocation and land-use decisions that must prove themselves to be socially, ecologically and economically sustainable for generations to come. At the same time, foot and mouth disease (FMD) in southern Africa presents three fundamental challenges to policy makers: (1) the SAT viruses predominantly involved are maintained by free-living wildlife populations, especially African buffalo and are not eradicable without wildlife depopulation and enhancement of prohibitively expensive and environmentally destructive fencing systems; (2) current approaches to FMD management constrain rural economic development in the region; and (3) for both demographic and technical reasons, current approaches are failing to adequately control the disease. Successfully addressing these challenges has become particularly important with the establishment of transfrontier conservation areas (TFCAs) throughout the region and as the OIE/FAO Progressive Control Pathway for FMD (PCP-FMD) is being implemented in support of a comprehensive Global Strategy for the Control of FMD. In the past decade, there has been a resurgence of FMD outbreaks, most of which have occurred in and around the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) where more than 1.5 million people and their livestock are resident. Failure to develop a more holistic, effective and contextually appropriate approach that takes into account southern Africa's unique circumstances will perpetuate the current situation and limit the potential for sustainable rural development that includes both the livestock and wildlife conservation sectors.

INFLUENCE OF FMD ON PROGRESS AND DEVELOPMENT IN THE GLTFCA

MARKUS HOFMEYR[1], CHRISTOPHER FOGGIN[2], ROY BENGIS[3], AGOSTINHO DE NAZARÉ MANGUEZE[4] & CHAP MASTERSON[5]

[1]Veterinary Wildlife Services, SANParks, South Africa; [2]Wild Horizons Wildlife Trust, Victoria Falls, Zimbabwe; [3]OIE African Wildlife Representative, South Africa; [4]Wildlife Unit, Ministry of Agriculture, Mozambique; [5]Zimbabwe Wildlife Veterinary Trust, Harare, Zimbabwe. E-mail: markus.hofmeyr@sanparks.org

Foot and mouth disease (FMD) has been the major focus of animal disease control efforts in southern Africa in the last century. Dramatic regulatory controls have been put in place in areas where buffalo populations naturally occur, which includes destroying buffalo, erecting fences and restricting the movement of cloven-hoofed animals. These regulatory controls have fundamentally altered ecosystem processes by removing keystone species including buffalo, and replacing them with ecologically unsustainable cattle numbers. Fences have also profoundly changed movement patterns of large wild herbivores, which has had unintended consequences, i.e.- major changes to ecological process and a collapse of populations of various species.

In the last decade, the notion of "peace parks" has taken hold and transfrontier conservation areas (TFCAs) have been created to link protected areas within landscapes to improve ecosystem function and resilience. The Greater Limpopo TFCA (GLTFCA), shared by Mozambique, South Africa and Zimbabwe, is an example of an area where FMD regulations (as well as fences put in place for other reasons) have historically curtailed free animal movement. TFCAs are also expected to give rise to alternative rural livelihood opportunities beyond subsistence farming. In this context, regulatory requirements focused primarily on keeping cattle and buffalo physically separated will need to be re-assessed as both species provide economic opportunities to local communities. Regulatory controls should be adapted to optimize resident communities' economic opportunities from both the agriculture and wildlife sectors. Hunting of buffalo and the sale of livestock and livestock products in an equitable market through processes such as commodity based trade (CBT) will likely improve livelihoods in TFCAs. Such livelihood diversification will, however, require progressive approaches from regulatory authorities with regards to FMD controls, and a move away from reliance on geographic separation of 'infected' and 'uninfected' zones in some areas.

Managing the risks of diseases, particularly FMD, at a local level and considering trade issues from the perspective of the local communities concerned will help move the economic development of SADC forward as well as assist in focusing animal health-related expenditures on issues of highest priority.

RELIEVING THE BOTTLENECK: SYSTEM RESILIENCE, HUMAN ELEPHANT CONFLICT, HABITAT CONNECTIVITY AND THE IMPORTANCE OF TFCAS

DAVID PARRY[1]

[1]*Ecosurv Environmental Consultants, Gaborone, Botswana. E-mail: david@ecosurv.com*

This presentation is based around interpreting the elephant issues in the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) within a resilience framework. Resilience theory requires us to understand the past, be aware of the different scales at which components of the system operate, understand the drivers and impacts, identify the big issues, clarify the dynamics by outlining the thresholds and then manage to avoid crossing thresholds and entering different and potentially undesirable states.

A collapse of the Kalahari ungulate populations in the 1980s provided valuable insights as to how large open systems respond to changes such as veterinary control fencing or alterations in land use. The resulting impacts may be severe but not immediately felt; frequently, a combination of events takes place before the full extent of these impacts becomes apparent. During the first half of the 20th century elephant populations in northern Botswana were very low largely due to hunting pressure. In 1968 Child estimated the elephant populations of northern Botswana to be approximately 8,000. These numbers have increased rapidly to the estimated 128,340 we have today. These levels appear to be peaking.. This near exponential increase was probably the result of a combination of wildlife protection, skewed age structure, high fecundity and immigration from contiguous populations in the region. The present elephant population of northern Botswana/KAZA is a result of both conservation efforts and the (historic) open systems.

In terms of resilience, we need to better understand thresholds of the elephant population and the underlying causes, such as closure of the range, loss of dry season forage and expansion of human populations, that might lead to elephant exceeding these thresholds. We are currently heading towards both increasing Human Wildlife Conflict (HWC) and crossing a threshold. How can we avoid this or at least manage for increasing the resilience in the system thus reducing the likelihood of the KAZA area shifting to a different state?

Opportunities to increase the resilience of the system and significantly reduce the likelihood of crossing the threshold in the KAZA TFCA include broadening socioeconomic resilience through effective and appropriate CBNRM, diversifying land uses, and increasing the number of local and regional beneficiaries in tourism activities. Opportunities also exist to strengthen the resilience of the wildlife system by increasing heterogeneity (maintaining wet and dry season ranges, forcing clumping) or by facilitating movement of elephant so that they expand into areas where they will stimulate the local economies (where they are wanted). There are very few such areas and thus we must make the most of these. By populating the wider range and improving linkages we are reducing the likelihood of crossing the threshold.

ENHANCING SUSTAINABLE LIVELIHOODS THROUGH CROSS-SECTORAL INTEGRATION: WILDLIFE, LIVESTOCK AND THE PROMISE OF KAZA - THE CAPRIVI EXPERIENCE

CHRIS WEAVER[1], RICHARD DIGGLE[1] & **RUSSELL TAYLOR**[1]

[1]*World Wildlife Fund in Namibia, Windhoek, Namibia. E-mail: cweaver@wwf.na*

A transboundary or transfrontier conservation area straddles international boundaries and is managed collaboratively for conservation purposes. Economies of scale can generate more efficient protection and better use of scarce resources for biodiversity conservation and ecosystem functioning. Importantly, transboundary conservation can lead to and provide a wide range of political, social and economic benefits, including at the highest level, restoration of peace, dignity and prosperity. The Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) ~440,000 km^2 in size and including the five countries of Angola, Botswana, Namibia, Zambia and Zimbabwe, is currently the largest transboundary area in southern Africa. Formally recognized by Treaty in August 2011, it envisions a world-class conservation area in the Zambezi-Okavango river basins with socio-economic development premised on nature-based tourism.

The Caprivi region of <20,000 km^2 in NE Namibia is bounded by or closely adjacent to the other 4 partner countries and consequently pivotal to the promise of KAZA in terms of biodiversity connectivity, ecological functionality and environmental support systems for sustaining livelihoods. In Caprivi, these attributes are characterised by a mosaic of tenurial arrangements and natural resource management regimes, ranging across core protected areas, community conservancies, forest lands and communal subsistence agro-pastoralism. Spatial integration of these land units at different scales and linked institutional arrangements provide exciting opportunities for wildlife-based land use and multispecies animal production systems. A key feature of Caprivi, as elsewhere in Namibia is CBNRM (Community Based Natural Resource Management) whereby devolved management responsibility, accountability and beneficiation at community level underpins good natural resource stewardship and governance. This has led to the adoption of collaborative co-management principles and practice amongst the different management regimes described above.

However existing sectoral policy constraints limit the potential of such approaches. In particular, geographic-based disease control measures at the wildlife-livestock interface presents serious challenges to greater wildlife connectivity across boundaries within and between countries. This approach also limits opportunities for communal livestock producers to access meat markets more efficiently and effectively through non-geographic disease management strategies. Policy needs to recognize the comparative economic advantage of wildlife and its ability to complement, and not supplant, but add value to, agro-pastoralism across the KAZA landscape. Ultimately it is those rural citizens who occupy the land that will determine the outcome and impact of KAZA.

THE BEEF TRADE: POTENTIAL BENEFITS OFFERED BY APPLICATION OF A COMMODITY-BASED APPROACH IN NAMIBIA'S CAPRIVI AND NORTHERN COMMUNAL AREAS

SUSANNE THALWITZER[1], **CYPRIANUS KHAISEB[2]**, MARY-LOU PENRITH[3] & PAUL STRYDOM[1]

[1]Namibia Meat Board, Windhoek, Namibia; [2]MeatCo, Windhoek, Namibia; [3]TAD Scientific, Pretoria, South Africa. E-mail: Susanne@nammic.com.na

In respect of animal health status and meat marketing opportunities, Namibia is divided into a Foot and Mouth Disease (FMD) Free Zone south of the veterinary cordon fence and FMD Protection Zone in the Northern Communal Areas (NCAs), and the Caprivi region, which is an FMD Infected Zone. A recently developed strategy to achieve officially recognized FMD freedom for most of the NCAs is currently being implemented. That goal is not an option for the Caprivi region, which forms part of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) and has abundant wildlife populations, including buffaloes, which are maintenance hosts of the SAT serotypes of foot and mouth disease (FMD) viruses. Widely adopted international standards based on geographic freedom from diseases such as FMD exclude livestock producers in predominantly poor rural areas, such as the Caprivi, from access to lucrative markets. An alternative commodity-based trade approach (CBT) provides for the production of safe meat from FMD endemic areas by mitigating the risks of FMDV being present in the final product through the application of strict controls along the production chain in order to achieve an acceptable level of protection (ALOP). The successful implementation of CBT and acceptance of meat and meat products produced according to this system has potential to open access to new markets for cattle producers from the Caprivi, while allowing for an integration of the two major income generating land use-options in the Caprivi, livestock production and wildlife based tourism.

RECONCILING CONFLICTS BETWEEN LIVESTOCK PRODUCTION AND WILDLIFE CONSERVATION IN ZIMBABWE: EXPANDING OPTIONS FOR RURAL DEVELOPMENT

UNESU USHEWOKUNZE-OBATOLU[1]

[1]*Division of Veterinary Field Services, Harare, Zimbabwe. E-mail: newazvo@hotmail.com*

The value of livestock production within both subsistence and commercial agriculture sectors in the context of game conservation has been under the spotlight at various points in the history of Zimbabwe. One of the central issues has been animal diseases communicable with wildlife namely tsetse-borne trypanosomosis, theileriosis, malignant catarrhal fever, foot and mouth disease (FMD), anthrax and lately, bovine tuberculosis. This emanated out of sentiments about the central role of livestock production within an agricultural economy. A second, but even more emotive issue revolves around policies which, while recognising the economic importance of a commons like wildlife, apportion the associated opportunities on a sectarian basis, along land tenure lines. This is aggravated by slow recognition of the value and importance of age-old indigenous knowledge systems in the conservation of wildlife resources. Other issues relate to the physical security of livestock and their owners, dangers of zoonotic diseases, unsustainable overhunting and acute competition for grazing and maintenance of natural habitat for wildlife.

A combination of these factors has at various points in time led to emotive debates around balancing livestock production and wildlife conservation and has been rekindled with transfrontier conservation area development. This presentation examines these conflicts in the context of trade-related animal health standards for livestock, which complement rather than contradict conservation of wildlife, while providing commercial stimulus for the benefit of rural development.

OVERVIEW OF THE FMD-PCP: AIMS, APPROACHES AND CHALLENGES FOR SADC MEMBER STATES

MOKGANEDI MOKOPASETSO[1], NEO MAPITSE[2], PATRICK BASTIAENSEN[2]; BEEDEEANAN HULMAN[3] & MISHEK MULUMBA[3]

[1]FAO-ECTAD for Southern Africa, Gaborone, Botswana; [2]OIE Sub-Regional Representation for Southern Africa, Gaborone, Botswana; [3]SADC Secretariat, Gaborone, Botswana. E-mail: Mokganedi.Mokopasetso@fao.org

Foot and mouth disease (FMD) is widely regarded as an economically important disease in the SADC region. Through heavy investments in establishment of disease control infrastructure, consistent vaccination programmes, livestock traceability systems and efficient livestock movement protocols, several countries in the SADC region have been able to acquire official FMD status recognition for a country or zone from the World Organisation for Animal Health (OIE). This OIE status has facilitated these countries' ability to access lucrative regional and international markets for their livestock and livestock products. However, due to the presence of African buffalo (*Syncerus caffer*) which are maintenance hosts of the three FMD SAT-type viruses, the management of FMD in many parts of the region still remains a big challenge. This is even more so where the livestock and wildlife interact closely. In line with the FAO/OIE Global Framework for the control of Transboundary Animal Diseases (GF-TADs), countries within the SADC region have embarked on the Progressive Control Pathway for FMD (FMD-PCP). The FMD-PCP proposes a stagewise approach, allowing for a regional or ecosystem based synchronisation of FMD control actions between countries. By following agreed regional roadmaps countries progressively improve their FMD status from stage zero, where there is continuous FMDV circulation with no reporting or control actions to stage five where a country is ready to be officially recognised by the OIE as FMD free without vaccination. Since 2007, FAO and OIE (through the Regional Animal Health Centre for southern Africa), in collaboration with the Livestock Development Unit of the SADC Secretariat and other regional institutions/projects have supported various regional and national actions geared towards progressive control of FMD in SADC. These actions include, but are not limited to: technical capacity building for field and laboratory diagnosis of FMD; training seminars/workshops to assist countries in the development of their strategic FMD control plans; determination of FMD viral strains within buffalo populations in the region and finally overall coordination and technical support to SADC Member Countries on the FMD-PCP process.

FMD IN SOUTHERN AFRICA: VIRUS POOL 6

MISHECK MULUMBA[1], PATRICK BASTIAENSEN[2], BEEDEEANAN HULMAN[1], GEORGE MATLHO[3] & GAVIN R. THOMSON[4]

[1]SADC Secretariat, Gaborone, Botswana; [2]OIE Sub-Regional Representation for Southern Africa, Gaborone, Botswana; [3]Botswana Vaccine Institute, Gaborone, Botswana; [4]TAD Scientific, Pretoria, South Africa. Email: mmulumba@sadc.int

The epidemiology of foot and mouth disease (FMD) in southern Africa is complicated by the dominance of buffalo-maintained and transmitted South African Territories (SAT) 1, 2 and 3 serotypes. The SAT serotypes are believed to have co-evolved with buffaloes, with most healthy buffalo populations maintaining SAT viruses in a commensal relationship. Type A and O also occur in the region even though their impact is not as widespread as the SAT viruses. Tremendous progress was made in controlling FMD in the SADC region between the late 1970's and 2000, however, from 2001 to 2011 the situation rapidly deteriorated with intervals between outbreaks becoming shorter while individual outbreaks lasted longer and were more difficult to control. Roughly 50% of the outbreaks during this latter period are attributed to SAT2 while the remaining 50% are due to SAT 1 and 3 combined. Serotype O occurs sporadically in the northern parts of the region (Tanzania and Zambia) while type A has been recorded in Tanzania on several occasions. FMD control in the SADC region is based on various combinations of methods that depend on the current export status of a country: separation of livestock from infected wildlife populations (fencing the primary tool); routine vaccination of cattle in high-risk areas (in & adjacent to infected buffalo populations); movement control of susceptible animals & their products; and high levels of surveillance. Countries in the region that export beef to high value markets must employ all four of the measures listed above while non exporting countries rely on the last three in the event of an outbreak. Regional FMD control should be designed such that it operates in tandem with national disease control programmes to be effective.

MANAGEMENT OF FMD IN SOUTHERN AFRICA: STATUS, CHALLENGES AND OPPORTUNITIES

GAVIN R. THOMSON[1]

[1] *TAD Scientific, South Africa and University of Pretoria, South Africa. E-mail: gavin@tadscientific.co.za*

In the last decade or so the frequency and duration of foot and mouth disease (FMD) outbreaks in livestock in southern Africa has increased significantly. At the same time, there has been little attempt to establish the reasons for this situation, although logical suppositions related to technical and policy issues have been made. The management practices used against FMD in the region have not changed significantly in the last 40 years and the question arises: Is the negative trend in FMD occurrence in livestock due to deficiencies in the application of appropriate control measures, or is it possibly due to pursuit of inappropriate policy and practices? A subsidiary question concerns which technical developments may be necessary to improve management of FMD in these parts of sub-Saharan Africa, potentially via alternative strategies. The unique epidemiological situation, i.e. maintenance of viral serotypes by wildlife (the SATs) in the sub-region requires an innovative, home-grown approach to management of FMD that will enable resolution of the conflict between livestock production and trade on the one hand and wildlife conservation on the other, conflict that has arisen as a result of the current geographically-based FMD control measures. Today's reality is that both the livestock and wildlife sectors are critical elements of balanced rural development in southern and East Africa which is not catered for by current policies.

RECONCILING LIVESTOCK PRODUCTION WITH CONSERVATION AND TRADE THROUGH APPLICATION OF NON-GEOGRAPHIC DISEASE MANAGEMENT SOLUTIONS

GAVIN R. THOMSON[1]

[1]*TAD Scientific, Pretoria, South Africa & University of Pretoria, South Africa. E-mail: gavin@tadscientific.co.za*

The unfortunate clash occasioned by geographic standards applied to international trade in commodities and products derived from animals on the one hand and the principles of biodiversity conservation on the other have been identified and a potential solution proposed. That solution has come to be referred to as commodity-based trade (CBT). The appropriateness of CBT as an approach is now recognised by the OIE – the international standard-setting body (ISSB) on such matters for the World Trade Organisation – although few purely non-geographic trade standards are currently available. Consequently, international trade continues to be dominated by the requirement for absence of TADs from the locality of production.

Trade practices in food commodities and products other than those derived derived from animals, e.g. horticultural produce, have to some extent overcome the problem of trade exclusion of localities where trade-influencing diseases and pests occur by adopting a value chain approach to biological risk management and certification. The idea is that if the risk of potentially dangerous infectious agents in foodstuffs is effectively managed along the entire value-chain such foodstuffs and constituents can be safely traded (i.e. achieve an acceptable/appropriate level of protection (ALOP). Furthermore, food safety standards set by the Codex Alimentarius (ISSB for food safety) for all foodstuffs are founded on HACCP (hazard analysis, critical control points) which pays little or no heed to the geographic distribution of infectious agents that potentially cause human foodborne disease. These trends have lead to the recognition that biological risks of all kinds – essentially hazards to human health and to the environment posed by foodstuffs – need to be managed right across the value chain, exemplified by catch-phrases like 'farm to fork'.

These developments and trends offer a potential solution for ameliorating the current conflict between biodiversity conservation and livestock production and trade imperatives that is essential to future rural development in southern Africa.

COST-BENEFIT ANALYSIS OF LAND USE AND POLICY OPTIONS FOR SOUTHERN AFRICA, WITH SPECIAL REFERENCE TO LIVESTOCK, WILDLIFE AND DISEASE MANAGEMENT IN THE CAPRIVI REGION, NAMIBIA

JONATHAN I. BARNES[1]

[1]*Design and Development Services, Windhoek, Namibia. Email: jibarnes@iafrica.com.na*

A comprehensive financial and economic cost-benefit analysis of options related to the future development of land use, in particular livestock, tourism and conservation in the Caprivi Region, Namibia is underway. This includes analysis of approaches to animal disease management, including possible introduction of commodity-based trade (CBT).

The Caprivi region in northeastern Namibia is surrounded by Botswana, Zimbabwe Zambia and Angola and forms the centre of the five-nation Kavango Zambezi (KAZA) Transfrontier Conservation Area (TFCA). It contains a mosaic of protected areas, where conservation and tourism are practiced, interspersed with extensive communal lands in which small-scale pastoral and agro-pastoral land use are practiced. The semi-arid setting means that natural rangeland use with livestock and wildlife is dominant. The prevalent livestock and wildlife land uses tend to have comparative advantage and tend to be complementary.

To value the status quo and planned future developments, a multi-disciplinary team conducted desk analyses, undertook empirical data collection, examined selected key alternative scenarios, and then developed standard financial and economic cost-benefit analytical models, to measure their worth. The aim was to find ways to optimize land-use choices and market access in the KAZA region, in the interest of improved local livelihoods and national economic welfare. The cost/benefit model was developed as a tool, and as a basis for more comprehensive future analysis of livestock and wildlife development options in Caprivi and also the wider KAZA TFCA. The interim results of the study are presented here. Recommendations are being formulated regarding the most technically, socially and economically beneficial strategies for land use allocation, animal disease control, and overall development for the Caprivi as part of KAZA and in the context of the wider region.

THE GLOBAL STRATEGY FOR THE CONTROL OF FMD: OUTCOMES OF THE OIE/FAO BANGKOK CONFERENCE AND THE RELEVANCE TO SADC MEMBER STATES

GIDEON BRŰCKNER[1]

[1]*OIE Scientific Commission for Animal Diseases, Somerset West, South Africa. Email: gkbruckner@gmail.com*

Following a recommendation in a Resolution adopted during the first OIE/FAO Global Conference on Foot and Mouth Disease (FMD) in Asunción, Paraguay in 2009 that the OIE and FAO should initiate a plan for the global control of FMD, a Resolution was subsequently adopted during the 79th OIE General Session in May 2011 agreeing in principle on the global control of FMD. Further, it was resolved that the OIE and FAO proceed to establish a joint FMD Working Group to develop a draft Global Strategy for further consultation. During the second FAO/OIE Global FMD Conference held in Bangkok in June 2012, this draft Global Strategy was presented and adopted with the request that both organisations continue to oversee its implementation.

The Resolution that was adopted during the conference in Bangkok emphasises several aspects that are not only relevant to Africa but also acknowledge the unique situation of FMD in Africa relevant to other regions of the globe. The most important being that global control of FMD would remain a dream if not supported by a well governed and sustainable national veterinary service; countries should agree to work in a regional context to harmonise their approaches for the control of FMD and that control programs for FMD should integrate other control programs for livestock diseases of economic importance within a region. An important acknowledgement relevant to southern Africa adopted at the conference was that although scientific evidence indicates that in most regions of the world wild ungulates are susceptible to FMD but do not serve to maintain the virus in the absence of on-going infections in domestic livestock, in Sub-Saharan Africa, the African buffalo (*Syncerus caffer*) can serve as a source of FMD infection for domestic animals - yet not all FMD outbreaks in livestock over the last ten years have been associated with buffalo. In some regions, especially in southern Africa, the persistence of the FMD virus in certain wild animals represents an ongoing threat to the domestic ruminant population and the impact of some FMD control measures on wildlife conservation has become an important consideration.

The presentation will outline the importance of the adopted Resolution relevant to SADC member states and the challenges posed to the SADC region for the future control of FMD.

ANNEX 3: THE PHAKALANE DECLARATION

Resolution by the Southern African Development Community (SADC) Calling for Adoption of Commodity-Based Trade and Other Non-Geographic Approaches for Foot and Mouth Disease Management as Additional Regional Standards for Trade in Animal Products

The Phakalane Declaration
On Adoption of Non-Geographic Approaches for Management of Foot and Mouth Disease

Preamble

Across much of Africa, both wildlife and livestock represent economic growth opportunities in an increasingly globalised world. However, costs associated with current geographic zonation-based approaches to managing international trade-associated animal disease risks often preclude access to international markets. In addition, many attempts to meet international standards related to freedom from disease under historically prevailing policies have had significant negative repercussions for free-ranging wildlife, largely related to veterinary cordon fencing. Given the importance of both sectors to many countries across Africa, it is time to reevaluate how best to manage risks from diseases like foot and mouth in ways that help Africa's pastoralists and farmers, do not threaten free-ranging wildlife, and also provide confidence to beef importing countries that the products they are buying pose minimal threats to their own agricultural sector. The Southern African Development Community (SADC) thus believes that any sound foot and mouth disease (FMD) management initiatives must be genuinely multi-sectoral in nature.

Experience over time has shown that other activities, such as wildlife conservation, that are undertaken on the same land base as livestock rearing, are perhaps just as likely to be impacted, positively or negatively, by policies designed for the livestock sector. Recommendations from the international community for progressive control of a disease like FMD, with its inherent epidemiological complexity (different from rinderpest in many important respects), should be accompanied by cross-sectoral economic impact analysis for those countries in SADC for which livestock *and* wildlife are *both* vital contributors to GDP. In short, especially where wildlife and associated industries play an increasingly prominent role in national and regional economies, an emphasis on zonal freedom from disease not only appears to be increasingly fragile as an FMD management strategy (as evidenced by recent outbreak trends), but also potentially limits countries from seriously considering other, more holistic approaches to managing FMD and the concomitant potential for more diversified land-use options likely to enhance resilience in an uncertain world. It is recognised that, under a range of conditions, fencing remains a useful multi-purpose tool for managing conflicts at the wildlife / livestock / human interface. The critical resource allocation and land-use decisions currently faced by SADC countries must prove themselves to be socially, ecologically and economically sustainable for generations to come.

Understanding both positive and negative impacts of FMD control methods is essential if we hope to optimise the potential for the rural poor to benefit from trade in products derived from livestock as well as from tourism, trophy hunting and other activities derived from wildlife conservation. We suggest that, in order to minimise unintended but nevertheless unfortunate cross-sectoral impacts, it is necessary to more fully articulate and recognise a wider range of management options for FMD so that practical progress can be achieved under the unique circumstances related to the wildlife / livestock interface in many SADC as well as other countries.

Findings

Whereas, the prevailing approach to managing FMD has, in some countries, been designed on a geographic basis, i.e., the creation of areas (disease-free countries or zones) with the objective of progressive FMD management and control;

Whereas, this approach is supported by the assumption that imports of livestock commodities and products can be safely sourced from such disease-free areas, regardless of circumstances;

Whereas, while this is true in some rural settings, in others, especially where large numbers of free-living cloven-hoofed wildlife (some of which maintain the infection) are dispersed over vast geographic areas, achieving freedom from FMD is often not feasible in practical terms;

Whereas, geographically-based attempts at FMD control have resulted in the use of extensive fencing systems (sometimes accompanied by lethal wildlife removal exercises) to try to separate animal populations of differing FMD status so that zones free from FMD can be established;

Whereas, the past half century has illustrated the damaging effects of such barriers on wildlife and their movement needs, effects that have been profound and increasingly obvious;

Whereas, livestock-based and wildlife-based activities are undertaken separately as well as jointly as primary modes of sustenance, economic betterment and support of rural livelihoods, with the sustainability thereof inextricably linked to ecologically appropriate land-use choices;

Whereas, the increasing frequency of FMD outbreaks across the southern African region in the last 10 years demonstrates that the current zonation-based strategy has limitations in some areas;

Whereas, those major bilateral and multilateral donors that have invested in such geographically-based approaches owe their developing country clients a more thorough approach to environmental and social impact assessments than has historically been the case;

Whereas, the poorest of the poor tend to live closest to wildlife, and thus simply cannot access broader markets for their livestock products under the prevailing disease control paradigm;

Whereas, the rural poor expect tangible benefits from wildlife as a result of the creation of TFCAs;

Whereas, commodity-based trade[*], an alternative to zonation-based freedom from disease in terms of the prevention of the spread of transboundary animal diseases of trade concern such as foot and mouth and other diseases, requires process standards that are generically similar to those on which the HACCP (Hazard Analysis & Critical Control Points) management system is based, HACCP being universally adopted for the management of human food safety;

Whereas, HACCP satisfies the requirements of the World Trade Organisation (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and 'Equivalence' (i.e., the accepted application of alternative measures to achieve the same result) is a founding principle of the SPS Agreement and provides considerable latitude for application of regionally appropriate trade standards that simultaneously accommodate the

[*] *Commodity-based trade represents an array of alternatives that can be used to ensure the production and processing of a particular commodity or product are managed so that identified food safety and animal health hazards are reduced to appropriate risk levels. OIE Terrestrial Animal Health Code guidelines (Article 8.5.25) now recognize a disease management scenario under which commodity-based trade could be effectively implemented.*

diversity of imperatives associated with rural development and land-use planning, including the safety of traded commodities and products as well as the conservation of wildlife;

Whereas, the management of animal disease hazards as they affect international trade also falls under the umbrella of the SPS Agreement, although standards for food safety and those for animal diseases have separate international standard-setting bodies (i.e., the Codex Alimentarius Commission and World Organisation for Animal Health [OIE], respectively);

And

Recognizing the fact that alternative animal disease management and sanitary trade standards are already available, if not yet widely applied, that could potentially increase the effectiveness of current FMD control, promote more effective access to markets, and lessen the unfortunate environmental consequences that accompany the present geographic approach;

Recognizing that the adoption of such standards would also facilitate more balanced rural development portfolios, vital for alleviation of pervasive rural poverty and environmental degradation- both widespread in sub-Saharan Africa;

Recognizing that additional capacity will be needed by many Member States to implement non-geographical approaches;

Recognizing that there is growing acceptance that the management of biological hazards associated with food safety and hazards associated with animal disease spread would be most effectively implemented as an integrated continuum across production (value) chains- from animals in the field to the consumer;

Recognizing that attempts to ensure biological safety of livestock-derived products based simply on the presumed geographic distribution of infectious agents that cause dangerous infections of people and animals can lead to potential security gaps along the production continuum;

Recognizing that for countries aspiring to improve their rural economies in order to uplift large impoverished communities through trade in agricultural products, streamlining and integration of hazard management processes could be transformational from an economic development perspective;

Recognizing that the OIE's Terrestrial Animal Health Code already provides guidance in terms of the acceptability of commodity-based trade of beef from FMD-infected countries or zones in Article 8.5.25;

Recognizing that commodity-based trade, involving safe and stringent processing of animal-derived products, increases biological safety and options for value addition, while alleviating the need for some of the fencing that has been required to separate livestock from wildlife, often with significant negative environmental impacts;

Recognizing that, especially where wildlife and associated industries play an increasingly prominent role in national and regional economies as is the case for much of SADC, an emphasis on zonal freedom from disease is not only proving to be increasingly fragile in some countries as a foot and mouth disease management strategy, but it also limits some countries from employing other, more holistic and efficient approaches for managing diseases of trade concern and diseases related to food safety;

Recognizing that, whether countries in SADC rely on geographic or non-geographic approaches to FMD management over time, there is a clear need to enhance the efficacy, availability, deployment and monitoring of FMD vaccines;

Recognizing that current climate models point to a general drying trend and unpredictable climatic events for much of the SADC region, emphasising the importance of land-use diversification in the face of uncertainty;

Now, therefore, be it resolved that the Southern African Development Community hereby:

Recommends the adoption of commodity-based trade and other non-geographic approaches such as compartmentalization for foot and mouth disease control as additional regional standards for the livestock and wildlife sectors, where applicable;

Recommends to Member States that they utilize commodity-based trade and other non-geographic approaches as needed to bolster trade, first and foremost, within the region itself, and with other African partners;

Recommends that Member States identify and address their needs to implement non-geographic approaches in terms of institutional, infrastructural, and human capacity;

Recommends that SADC work together with the OIE, FAO and other international organisations to formalize the implementation guidance needed for certification, auditing and thus wider international acceptance of appropriately prepared livestock-derived commodities by potential importing countries within the SADC region and around the world. This needs to be done in partnership with the private sector and with national veterinary services, the latter having both official responsibility and expertise critical for safe and successful deployment of any animal disease control strategies;

Recommends that SADC Member States and their appropriate government agencies responsible for livestock agriculture, veterinary services, and wildlife conservation and production work together and in partnership with the private sector and civil society organisations to promulgate context-appropriate approaches to transboundary animal disease management and wildlife utilisation policies that mitigate conflicts at the wildlife / livestock interface.

Recommends that Member States seize upon the socioeconomic as well as conservation opportunities offered by SADC's collective vision for transfrontier conservation areas as facilitated by strategic alignment and realignment of selected veterinary cordon fences, while simultaneously expanding access to regional and international markets for animals and animal-derived products via adoption of the above-described enlightened and practical disease control policies and practices.

ANNEX 4: LIST OF PARTICIPANTS

SURNAME	FIRST NAME	COUNTRY	AFFILIATION	EMAIL
Abernethy	Darrell	South Africa	University of Pretoria	darrell.abernethy@up.ac.za
Atkinson	Mark	Botswana	WCS-AHEAD	matkinson@wcs.org
Atkinson	Shirley	USA	WCS-AHEAD	satkinson@wcs.org
Badaroos	Lionel	Botswana	Botswana Vaccine Institute (BVI)	lbadaroos@bvi.co.bw
Bahta	Sirak	Botswana	International Livestock Research Institute	s.bahta@cgiar.org
Banda	Frank	Tanzania	SACIDS	frankbanda2001@yahoo.co.uk
Barnes	Jon	Namibia	Design & Development Services	jibarnes@iafrica.com.na
Bashiruddin	John	UK	The Pirbright Institute	john.bashiruddin@pirbright.ac.uk
Bastiaensen	Patrick	Botswana	OIE	p.bastiaensen@oie.int
Bocchino	Clara	South Africa	University of Pretoria	clara.bocchino@gmail.com; clara.bocchino@up.ac.za
Brooks	Chris	Botswana	SAREP	cbrooks@sarepmaun.com
Bruckner	Gideon	South Africa	OIE	gkbruckner@gmail.com
Caron	Alexandre	Zimbabwe	CIRAD	alexandre.caron@cirad.fr
Chiduwa	George	Botswana	SADC	gchiduwa@sadc.int
Chikungwa	Patrick	Malawi	SADC-TADs	pchikungwa@yahoo.com
Chimera	Bernard	Malawi	Dept of Vet Services	bernard.chimera@yahoo.com
Coetzer	Koos	South Africa	University of Pretoria	koos.coetzer@up.ac.za
Cumming	David	Zimbabwe	Consultant, WCS-AHEAD	cummingdhm@gmail.com
Dawson	Jessica	Zimbabwe	Wild Horizons Wildlife Trust	jessica@wildhorizons.co.zw
Deve	Jimis	Mozambique	SADC-TADs	jfdeve@yahoo.com.br
Dlamini	Roland	Swaziland	Dept of Vet Services	dlaminirol@gov.sz
Dlamini	Wisdom	Swaziland	Dept of National Parks	mwdlamini@gmail.com
Duncan	Russell	South Africa	USDA APHIS	russell.a.duncan@aphis.usda.gov
Dwarka	Rahana	South Africa	ARC-OVI TADs	dwarkar@arc.agric.za
Fellet-Smith	Sally-Anne	Botswana	HATAB	sally-annef@wilderness-holdings.com
Foggin	Chris	Zimbabwe	Wild Horizons Wildlife Trust	cfoggin@zol.co.zw
Fyumagwa	Robert	Tanzania	Serengeti Wildlife Res. Centre, Serengeti NP	rfyumagwa@yahoo.com; swrc@tawiri.or.tz
Gotosa	Tawanda	Zimbabwe	ZIMPARKS	nyamazana@zol.co.zw
Guilherme	Deodato	Angola		22set61@gmail.com
Gureja	Nidhi	Botswana	Seanama Conservation Consultancy	nidhigureja@yahoo.com
Hayghaimo	Abdu	Tanzania	Veterinary Public Health Dept	haygh.aa@gmail.com
Hofmeyr	Markus	South Africa	SANParks	markus.hofmeyr@sanparks.org
Horn	Steve	Botswana	USAID	HornS@state.gov
Hoy	Darrian	Botswana		dhoy@iafrica.com
Hulman	Beedeeanan	Botswana	SADC - FANR	bdhulman@gmail.com; bhulman@sadc.int
Jere	Felix	Malawi		jerefelix@gmail.com
Jiah	Ramosh	Malawi	National Parks & Wildlife	jiahutonga@gmail.com
Joao	Laureta	Angola	SADC-TADs	joo.laureta@yahoo.com
Jori	Ferran	South Africa	CIRAD	jori@cirad.fr
Kalayamore	Keoagile Ditiro	Botswana	Dept of Wildlife & National Parks	kalayamorek@yahoo.com
Kamboyi	Harvey	Zambia	ZAWA	docharveykk@yahoo.com
Kasanga	Christopher	Tanzania	SACIDS, Tanzania	chrisskasa@gmail.com; christopher.kasanga@sacids.org
Kgomotso	Phemo	Botswana	UNDP	phemo.kgomotso@undp.org
Khaiseb	Cyprianus	Namibia	MeatCo	ckhaiseb@meatco.com.na
Mabela	N'Lemba	DRC	Dept of Vet Services	dr_nlemba@yahoo.fr

SURNAME	FIRST NAME	COUNTRY	AFFILIATION	EMAIL
Makaya	Pious	Zimbabwe	Dept of Vet Services	piousmakaya@gmail.com
Mapitse	Neo	Botswana	OIE	n.mapitse@oie.int
Maseka	Charles	Zambia	Dept of Vet Services	masekacharles@yahoo.com
Massicame	Zacarias	Mozambique	SADC-TADs	zmassicame@yahoo.co.uk
Masterson	Chap	Zimbabwe	Zimbabwe Wildllife Veterinary Trust	chap.masterson@gmail.com
Mkama	Mathias	Tanzania	Tanzania Veterinary Laboratory	matsonics2000@yahoo.co.uk; mkamamm@gmail.com
Matlho	George	Botswana	Botswana Vaccine Institute (BVI)	gmatlho@bvi.co.bw
Mazwiduma	Mbaakanyi	Botswana	Botswana Vaccine Institute (BVI)	marketing@bvi.co.bw
Mbulu	Rosa-Stella	Namibia	KfW	rosa-stella.mbulu@kfw.de
Mdluli	Sihle	Swaziland		mdlulisihle8@gmail.com
Melanie	Jimmy	Seychelles	Dept of Vet Services	seyvet@seychelles.net
Modisa	Letlhogile	Botswana	Dept of Vet Services	lmodisa@gov.bw
Modise	Sedia	Botswana	SADC	modisesc@yahoo.com
Mokganedi	Ernest	South Africa	TFCA Unit, Dept of Environmental Affairs	emokganedi@environment.gov.za
Mokopasetso	Mokganedi	Botswana	FAO-ECTAD	mokganedi.mokopasetso@fao.org
Molomo	Marosi	Lesotho	Dept of Vet Services	marosi_molomo@yahoo.com
Moyo	Sibonoso	Mozambique	ILRI	s.moyo@cgiar.org
Mubanga	Joseph	Zambia	Dept of Vet Services	mumujos@yahoo.com
Mulumba	Misheck	Botswana	SADC-TADs	m_mulumba@yahoo.com; mmulumba@sadc.int
Mundia	Cornelius	Zambia	SADC-TADs	corneliusm@hotmail.com
Neo-Mahupeleng	Gosiame	Botswana	UNDP/Dept of Environmental Affairs	gosiame.neo-mahupelent@undp.org
Njau	Peter	Tanzania	Ministry of Livestock & Fisheries Develop.	pznjau@hotmail.com
Nyirenda	Margaret	Botswana	FANR Directorate, SADC Secretariat	mnyirenda@sadc.int; nyirenda@sadc.int
Osofsky	Steve	USA	WCS-AHEAD	sosofsky@wcs.org
Palime	Mosiuoa	South Africa	USDA APHIS	mosiuoa.z.palime@aphis.usda.gov
Parry	David	Botswana	Ecosurv	david@ecosurv.com
Penrith	Mary-Lou	South Africa	TAD Scientific	marylouise@vodamail.co.za
Perkins	Jeremy	Botswana	University of Botswana	perkinsjs@mopipi.ub.bw
Pinto	Norberto	Angola	Dept of Vet Services	tingiyasikombe@yahoo.com
Podisi	Baitsi	Botswana	MoA	bpodisi@gov.bw
Ranga	Ezekia	Tanzania	Ministry of Livestock & Fisheries Develop.	ezekia.ranga@gmail.com
Ransom	Elizabeth	USA	University of Richmond	eransom@richmond.edu
Reuben	Mmadi	Botswana	Dept of Wildlife & National Parks	mreuben@gov.bw
Rutina	Lucas	Botswana	ORI	lprutina@ori.ub.bw
Sallu	Raphael	Tanzania	Veterinary Laboratory Agency	raphaelsallu@yahoo.com
Santana	Bernadete	Angola	Dept of Vet Services	neydesantana@hotmail.com
Schneichel	Martin	Botswana	GIZ	martin.schneichel@giz.de
Shereni	William	Zimbabwe	Dept of Vet. Services	shereni2005@yahoo.com
Sikombe	Tingiya	Zambia	Central Veterinary Research Institute	tingiyasikombe@yahoo.com
Simela	Langelihle	South Africa	National Emerging Red Meat Producers Org	langa@nerpo.org.za
Sinkala	Yona	Zambia	Ministry of Agriculture and Livestock	ysinkala@gmail.com
Tano	Lazare	Botswana	Botswana Vaccine Institute (BVI)	lazare.tano@bvi.co.bw
Taylor	Russell	Namibia	WWF	rtaylor@wwf.na
Tembo	Nasson	Zambia	AWF	ntembo@awfafrica.org
Thiermann	Alex	France	OIE/USDA	a.thiermann@oie.int

SURNAME	FIRST NAME	COUNTRY	AFFILIATION	EMAIL
Thobokwe	Gaolathe	Botswana	Botswana Vaccine Institute (BVI)	gthobokwe@bvi.co.bw
Thomson	Gavin	South Africa	TAD Scientific	gavin@tadscientific.co.za
Toto	Alexander	Namibia	SATOTO Livestock Projects	xanda@satotoprojects.com
Ushewokunze-Obatolu	Unesu	Zimbabwe	Dept of Vet Field Services	newazvo@hotmail.com
Wotho	Edison	Botswana	Ministry of Agriculture	ewotho@gov.bw