



Republic of Namibia
Ministry of Agriculture, Water and Land Reform &
Ministry of Environment, Forestry and Tourism

LIVESTOCK, WILDLIFE AND RESILIENT LIVELIHOODS

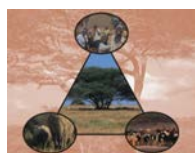
Ways Forward in Namibia's Component of KAZA



Katima Mulilo, Namibia

26-27 September 2022

PROCEEDINGS



College of
Veterinary Medicine





Workshop participants at the Protea Hotel, Katima Mulilo, Namibia, 26-27 September 2022.
Photo: N. Ramsden

About the Report

The Proceedings of the MAWLR-MEFT workshop 'Livestock, Wildlife and Resilient Livelihoods: Ways Forward in Namibia's Component of KAZA' was prepared by the AHEAD programme team who drew on contributed presentations as well as discussions at the workshop.

Cover photos: M. Atkinson

Table of Contents

Abbreviations & Acronyms	ii
Executive Summary	iii
Introduction.....	1
Setting the Scene	2
Securing Animal Health at the Livestock-Wildlife Interface.....	5
Landscape Connectivity as a Foundation for Sectoral Resilience in Namibia’s Component of KAZA	9
Rethinking Fences in the KAZA Context	12
Special Topics Session.....	18
Summary of Key Themes	18
Next Steps & Wrap Up	19
Annexes	21
Annex 1: Agenda.....	21
Annex 2: Special Topics Session Breakout Group Notes	25
Annex 3: List of Participants	28
Annex 4: Summary of Options and Key Requirements for Export of Beef from FMD Endemic Areas	31

Abbreviations & Acronyms

AHEAD	Animal & Human Health for the Environment And Development
BNP	Bwabwata National Park
BVI	Botswana Vaccine Institute
CBPP	Contagious Bovine Pleuropneumonia
CBNRM	Community-Based Natural Resource Management
CBT	Commodity-Based Trade
DVS	Directorate / Department of Veterinary Services
EU	European Union
FMD	Foot and Mouth Disease
GIS	Geographic Information System
GPS	Global Positioning System
H4H	Herding 4 Health
HACCP	Hazard Analysis Critical Control Points
KAZA TFCA	Kavango Zambezi Transfrontier Conservation Area
MAWLR	Ministry of Agriculture, Water and Land Reform
MCF	Malignant Catarrhal Fever
MEFT	Ministry of Environment, Forestry and Tourism
MSU	Mobile Slaughter Unit
NCA	Northern Communal Areas
NGO	Non-Governmental Organisation
SADC	Southern African Development Community
SAT	South African Territories (FMD serotypes)
SPS	Sanitary and Phytosanitary
TAHC	Terrestrial Animal Health Code (of WOAHP)
TFCA	Transfrontier Conservation Area
WDA	Wildlife Dispersal Area (of KAZA)
WOAH (formally OIE)	World Organisation for Animal Health
WTO	World Trade Organization
WWF	World Wildlife Fund

Executive Summary

Livestock agriculture and wildlife conservation are both critical components of Namibia's economy, particularly in the country's component of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) comprising the Kavango East and Zambezi Regions, and a portion of Kavango West. However, the potential economic benefits from livestock production are not being fully realized because cattle farmers in these areas have lacked full access to higher value markets due to the proximity of wildlife, particularly buffalo, that maintain foot and mouth disease (FMD) viruses. This situation has restricted market access and constrained the success of livestock owners who share the land with wildlife. In addition, attempts to meet international FMD standards related to 'freedom from disease' have had significant negative repercussions for free-ranging wildlife, largely related to disease control fencing. Whilst the status of the Kavango West, Kavango East and Zambezi Regions as FMD protection and/or infected zones is unlikely to change anytime soon, this does not mean that these areas cannot produce FMD-free beef. Newly developed commodity-based trade (CBT) approaches are scientifically sound and effective, and accepted by the World Organisation for Animal Health (WOAH, formerly OIE). The further development of this approach, which was first pioneered in the Zambezi Region, would be a 'win-win' for sustainable and diversified land use and livelihoods and go a long way towards realizing our collective, regional vision for KAZA as a mechanism for sustainable poverty alleviation as well as biodiversity conservation.

This Proceedings summarizes the September 2022 meeting hosted by Namibia's Ministry of Agriculture, Water and Land Reform (MAWLR), through the Directorate of Veterinary Services (DVS), and the Ministry of Environment, Forestry and Tourism (MEFT), in collaboration with Cornell University's AHEAD (Animal & Human Health for the Environment And Development) programme and World Wildlife Fund-Namibia. Over 40 stakeholders from both the livestock veterinary and wildlife sectors attended the two-day workshop to: (1) review the history of and current state of CBT in Namibia, (2) develop a shared understanding of how successful CBT can enhance prospects for resilient livelihoods, (3) share thoughts on border fences between Namibia and Botswana in terms of historical vs current livestock disease management and wildlife conservation (connectivity) needs.

The level of enthusiasm for sectoral integration and a 'One Government' approach was notable at the workshop as officials confirmed their support for innovative approaches and demonstrated a genuine willingness to think about meaningful changes in approaches. CBT was recognized as a viable solution for the FMD infected zone, having the potential to: improve market opportunities for local cattle farmers; improve relations between regulatory authorities and farmers; foster human-wildlife coexistence and wildlife-related economic benefits; and enable traditional veterinary fencing policy to be revisited, to facilitate wildlife connectivity across KAZA. However, CBT must be implemented in a manner such that the costs of compliance do not overshadow the benefits, particularly for small-scale producers – failure to do so will have the undesired impact of excluding small-scale farmers from the beef value chain. Participants also recognized that participation from different sectoral role players along the beef value chain is required to unlock the true potential of CBT.

Livestock's proximity to wildlife (buffalo in particular) remains a concern even though phylogenetic analyses demonstrate that most FMD outbreaks are cattle-related – indicating endemic circulation and livestock-to-livestock transmission vs dependence upon new introductions of viruses from wildlife into the cattle population. The emergence of FMD serotype O is another cause for concern (a strain notably not maintained/transmitted by buffalo). Application of the Herding 4 Health (H4H) model as a way of improving herd health, minimizing livestock contact with wildlife and improving rangeland condition was seen as a practical and potentially effective solution for enhancing CBT compliance and mitigating farmer-wildlife conflict. Attention was repeatedly drawn to the high cost of vaccination and the need for

cheaper, more effective vaccines (including in terms of duration of protection). The importance of systems-based, integrated surveillance, particularly for supporting CBT implementation, was also highlighted. Acknowledging that improvements can and should still be made to international trade standards, the challenge was taken on board to gather, collate and analyse data that could be used to motivate for changes at national, regional and international levels, specifically with regards to the 30-day quarantine requirement as part of CBT compliance.

Raising awareness, community outreach and farmer education were identified as imperative actions going forward, but attention was also drawn to the need to empower and entrust communities/farmers with value chain-related responsibilities. In addition, the need to explore further markets for CBT beef, build relationships and trust with buyers, and collaborate with Botswana and other KAZA countries to develop standards and markets for wildlife friendly beef were seen as areas that require ongoing work. The processing plant planned for Katima Mulilo will expand opportunities for small-scale farmers and reduce the need for quarantine.

Without securing wildlife's abilities to move as needed at a landscape scale, the promise of KAZA will be left unfulfilled. In this regard, urgent action is required to secure wildlife corridors before they are completely blocked. Formalizing corridors within the overarching policy and legislative environment is deemed important for their future security. In particular, the importance of resolving the challenges associated with Bwabwata National Park and removing the cattle illegally in the park was acknowledged, as this region represents the 'key' to KAZA in terms of wildlife movements. At a transboundary level, bilateral collaboration and agreements are needed to deal with the fences between Botswana and Namibia, to enable wildlife movement across KAZA's key Wildlife Dispersal Areas. In this regard, a disease risk assessment of fencing scenarios is underway to enable cross-sectoral decision making on both sides of the border. At the local level, work on elephant micro corridors in neighbouring Botswana highlights the need to apply holistic approaches drawing on genuine stakeholder involvement that includes local communities and land authorities, whilst concurrently implementing measures aimed at increasing the benefits from living with wildlife and mitigating human-wildlife conflict. Importantly, benefits need to be felt not only at the level of the community, but at the household level too.

In conclusion, participants recognized that new, interrelated approaches (like CBT and H4H) and tools (such as mobile abattoirs and mobile quarantines) are providing traction to help make multi-use systems like KAZA a successful reality. The new, sectorally integrative model discussed and debated in this working meeting can support diversified livelihoods and enhance resilience to the impacts of climate change at local and regional levels, and enable the removal of portions of fences that have been a barrier to landscape level connectivity, a requirement for the long-term viability of the region's wildlife populations – thus changing the paradigm from 'cattle versus wildlife', to 'cattle and wildlife'.

Introduction

In 2022, Namibia's Ministry of Agriculture, Water and Land Reform (MAWLR), through the Directorate of Veterinary Services (DVS), and the Ministry of Environment, Forestry and Tourism (MEFT), in collaboration with the Animal & Human Health for the Environment And Development (AHEAD) programme (based at Cornell University, USA) and WWF-Namibia, hosted a workshop: 'Livestock, Wildlife and Resilient Livelihoods – Ways Forward in Namibia's Component of KAZA'. It was held from 26-27 September 2022 in Katima Mulilo, Namibia, and brought together over 40 participants. Participants included senior DVS and MEFT officers and veterinarians; the Meat Board of Namibia and Meat Corporation of Namibia (Meatco); the University of Namibia; representatives from the KAZA Secretariat and Botswana Vaccine Institute (BVI); and other researchers and NGO partners.

Livestock agriculture and wildlife conservation are both critical components of Namibia's economy, particularly in the country's component of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) comprising the Kavango East and Zambezi Regions, and a portion of Kavango West (Figure 1). However, the potential economic benefits from livestock production are not being fully realized because cattle farmers in these areas have lacked full access to higher value markets due to the proximity of wildlife, particularly buffalo, that maintain foot and mouth disease (FMD) viruses. This situation has restricted market access and constrained the success of livestock owners who share the land with wildlife. In addition, attempts to meet international FMD standards related to 'freedom from disease' have had significant negative repercussions for free-ranging wildlife, largely related to disease control fencing.

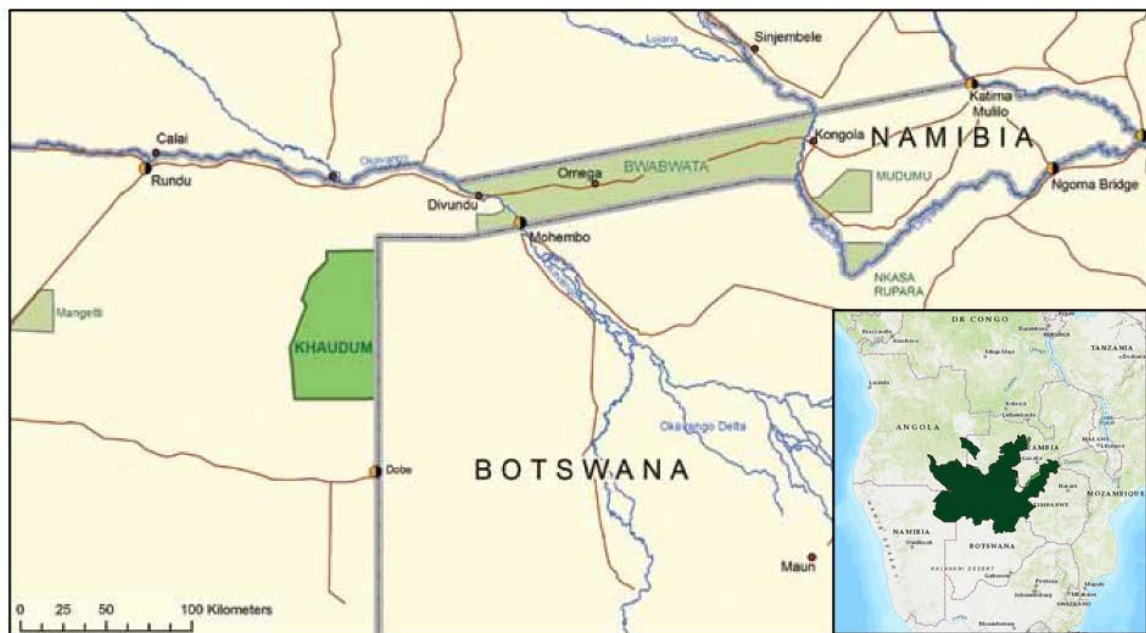


Figure 1. Namibia's Kavango East and Zambezi Regions, and a portion of Kavango West, form part of the five-nation KAZA TFCA (insert).

Wildlife is one of Namibia's greatest assets and, in terms of its portion of KAZA, the status of the Kavango West, Kavango East and Zambezi Regions as FMD protection and/or infected zones is unlikely to change anytime soon. However, this does not mean that these areas cannot produce FMD-free beef. Newly developed commodity-based trade (CBT) approaches are scientifically sound and effective, and accepted by the World Organisation for Animal Health (WOAH, formerly OIE). The further development of this approach would be a 'win-win' for sustainable and diversified land use and livelihoods and go a long

way towards realizing our collective, regional vision for KAZA as a mechanism for sustainable poverty alleviation as well as biodiversity conservation.

The workshop provided an opportunity to:

- review the history of and current state of CBT in Namibia,
- develop a shared understanding of how successful CBT can enhance prospects for resilient livelihoods,
- share thoughts on border fences between Namibia and Botswana in terms of historical vs current livestock disease management and wildlife conservation (connectivity) needs.

Meeting materials, including PDFs of the presentations, are available online at <http://www.wcs-ahead.org/namibia-mawlr-meft-workshop-2022/namibia-mawlr-meft-workshop-2022.html>.

Setting the Scene

Welcome Remarks

Colgar Sikopo (Deputy Executive Director, MEFT) chaired the first session, which set the scene for discussions around diversified economies and for establishing a common understanding of CBT approaches to beef production.

Albertina Shilongo (Chief Veterinary Officer & Director, DVS) welcomed participants, noting that important issues with a bearing on local livelihoods would be addressed over the next two days. She was encouraged to see experts from both veterinary science and wildlife conservation in attendance, and extended a special welcome to Dr Modisa, former DVS Director for Botswana.

Purpose and Objectives of the Workshop

Steve Osofsky (Director, AHEAD Programme, Cornell University) gave a summary of the purpose and objectives of the workshop. He pointed out that across the SADC region both wildlife and livestock represent economic growth opportunities at a time when southern Africa finds itself in competition with other parts of the world. Given the importance of both the livestock and wildlife sectors to the Kavango East, Kavango West and Zambezi Regions, he said that there has never been a more opportune time to reevaluate how to best manage risks from diseases like FMD in ways that are positive for both livestock agriculture and wildlife conservation, while also providing confidence to beef importing countries that the products they might like to buy pose minimal threats to their own agricultural sectors. He went on to note that wildlife and livestock both represent critical components of Namibia's economy, particularly in the Kavango East, Kavango West and Zambezi Regions. He conveyed that the further development of a CBT approach, which was first pioneered in the Zambezi Region and is now accepted by WOA, would be a 'win-win' for sustainable and diversified land use and livelihoods.

The Importance of a Diversified Economy in Namibia's Component of KAZA

Kenneth Uiseb (Deputy Director, Wildlife Research and Monitoring, MEFT) underscored the importance of a diversified economy in Namibia's component of KAZA. He noted the source of the challenge lies with the area being endemic for FMD due to the presence of African buffalo. The Northern Communal

Areas¹ (NCA) host around 1.7 million head of cattle, but markets for beef are lacking. Traditional approaches to controlling FMD and/or managing outbreaks have resulted in erection of fences, prolonged movement bans and closure of the abattoir for extended periods. As a result, the area is characterized by large herds of cattle that contribute little to local livelihoods except for local, informal slaughter. Compounding this, climate change is impacting communities. He emphasized that with the right policy framework and political will, a conservation area's potential can be unlocked. New wildlife policies have, for example, led to rapid expansion of the wildlife economy in Namibia south of the Red Line and in South Africa. Likewise, in the NCA, opportunities exist to integrate iconic but 'problematic' wildlife and optimize the value of the protected area network, which is valuable for photographic tourism. He proposed the following going forward, noting that this will require bold and decisive policy interventions: (1) adopt CBT approaches to disease management, which will raise the value of cattle and their products, leading to higher household incomes, and diverse and resilient rural livelihoods, (2) remove fences to allow free movement of wildlife while tapping into the value of wildlife through sustainable use.

[From the MCC-supported CBT Pilot Project to the State of CBT Today: A Decade of Lessons Learned](#)

Thimoteus Kativa (Livestock Procurement Manager, Meatco NCA) went on to discuss progress on CBT implementation from the MCC-supported CBT pilot project² to the present. He noted that Meatco had operated the abattoirs in the NCA from the early 1990s, but operational losses (N\$300 million), coupled with loss of the South African market in 2014, led to a decision to pull out of the NCA. A mobile slaughter unit (MSU) was introduced in 2016 as an alternative to the three NCA abattoirs (Oshakati, Rundu and Katima Mulilo) but it has remained at one location due to the high cost of site establishment. The lack of onsite chilling for meat maturation is a limiting factor in the utility of the MSU. Following a Cabinet directive, Meatco recently re-entered the NCA market to assist farmers. Today, Meatco's operations in the NCA are guided by CBT, with Circular V7/2019 providing a protocol for marketing beef from the FMD protection and infected zones. Both the Katima abattoir and MSU are operational with a combined slaughter capacity of 13,600 cattle/year; Rundu abattoir will increase capacity by 12,000 when renovation is complete. Quarantine infrastructure is, however, poor with only two of the original five facilities currently functional.

He noted that the costs associated with CBT implementation are high but progress is nevertheless being made. Since April 2021, when Meatco re-entered the Zambezi Region, net payments to producers have doubled, and live mass and dressing percentages have increased. While the Zambezi Region has a small, low-priced market for offal and other low value beef products, CBT has allowed a high value product (deboned beef) to be exported to the FMD free zone, Angola, DRC and Ghana. Ongoing challenges include, for example, vandalism of quarantine camps, lack of trucks and loading facilities, and veld fires in the quarantine camps. Recommended ways forward include (1) renovation of the vandalised quarantine facilities, (2) mentorship and training of farmers to realize the economic value of their livestock, (3) sourcing funding support to address these challenges, (4) recognition that CBT is a feasible way forward for livestock and wildlife to coexist in the KAZA TFCA.

Key points emerging from the plenary discussion included:

- The relationship between Meatco, DVS and farmers is good and information (e.g. when to bring cattle to quarantine camps) is relayed at meetings.

¹ The Northern Communal Areas (NCA) comprise the Zambezi, Kavango East, Kavango West, Oshikoto, Ohangwena, Omusati, Oshana and Kunene regions.

² SATOTO Livestock Projects et al. (2014) [Development of Export Opportunities for Beef Products from the Zambezi Region](#), completed with funding support from the Millennium Challenge Corporation (MCC).

- Meatco sustained huge operational losses in the NCA prior to exiting in 2014; the situation is improving with a potential for profit this year.
- In the past, FMD outbreaks frequently led to blanket movement bans and a cessation of trade across the region. The situation has improved (due to employing CBT principles) and during last year's outbreak only certain areas were closed, allowing Meatco to continue to operate.
- At present, bone-in beef can only be sold for local consumption; however, a protocol for bone-in products could be developed.

Beauty and the Beef: Achieving Compatibility Between Wildlife Conservation and Livestock Production (film)

A showing of the film entitled 'Beauty and the Beef: Achieving Compatibility between Wildlife Conservation and Livestock Production' was followed by a panel discussion on 'CBT Then and Now'. Panellists included **Frank Chitate** (Senior Lecturer, University of Namibia), **Thimoteus Kativa**, **Alaster Samkange** (Department Head, University of Namibia) and **Jacques van Rooyen** (Director, Herding 4 Health, Conservation International).

The panellists covered a wide range of topics, including:

- CBT requirements – the WOAHA has a standard (Article 8.8.22) in its Terrestrial Animal Health Code (TAHC) that provides for the international trade in beef produced in FMD infected areas. All requirements must be followed, including a 30-day quarantine period prior to slaughter, ante- and post-mortem inspection, maturation of the beef until it reaches a pH <6, and deboning and lymph node removal. Progress on CBT implementation has been made since the original pilot project in the Zambezi Region, and the region is now exporting beef to Angola, DRC and Ghana.
- Trucking vs trekking cattle – significant improvements have been made since the early days, including trucking animals to quarantine instead of trekking them. While transport is often difficult to arrange and more expensive for farmers, it does enhance overall FMD control.
- Barriers to market participation – care needs to be taken not to create additional barriers (costs) for farmers, as this prevents progress. Data from the Zambezi Region show that when transaction costs rise, the smaller producer (selling fewer than 10 cattle) is left behind. This requires deep consideration in forums like this.
- Operator support to farmers – Meatco involves itself throughout the value chain to ensure information is properly relayed to farmers and that they meet all requirements at the time of booking. However, other role players need to play their part too. As noted, transactional costs are clearly a problem. Cattle also lose condition while adapting to the quarantine, but eventually improve. Support is needed to overcome some of these challenges. The CBT protocol is currently serving stakeholders, but new FMD strains have raised doubts.

A robust discussion in plenary followed. Highlights of the discussion included:

- Mobile abattoirs could help reduce transaction costs, but they need to be coupled with a large stationary processing unit that is CBT compliant, e.g. monitoring pH. Waste management needs to happen at a central facility.
- The quarantine facilities in Kavango East are 'all-in, all-out', are not compartmentalized, and grazing is not managed. This impacts body condition, i.e. by the time the last animal enters, much of the grazing has been used.
- Mobile quarantines could help improve cattle condition and reduce transactional costs to farmers. However, overseeing them requires manpower and could increase the cost to government regulatory authorities.
- In response, it was noted that not all monitoring needs to be done by DVS. Efforts need to be made to train and empower farmers in risk monitoring and mitigation. This approach does,

however, require trust on the side of the authorities. Counter to this, it was noted that farmers have different interests, and some may not be trustworthy.

- Vaccination does not prevent infection but does prevent clinical disease, so serology would be necessary to detect infection. Without serology, detecting infection relies on herding and reporting, and could also rely on on-farm quarantine. It was noted that despite vaccination, an animal may become infected on the way to quarantine, but a viraemic animal should be detected during quarantine.
- During an outbreak, and depending on the level of surveillance, the region may be closed entirely for detecting infection rapidly. Under such a scenario, local slaughter (even far from the outbreak location) may be prohibited.
- There is still resistance to purchasing CBT beef. Ultimately suppliers/exporters need to build trust with potential buyers/importers and negotiate better deals.
- The government is in the process of establishing a processing plant at Katima Mulilo, which will reduce the need for quarantine. There are, however, growing markets for fresh CBT beef, which requires quarantine.
- Rather than focusing solely on higher value markets, reliable markets need to be identified and basic systems set up to ensure reliable trade.
- Training is needed for farmers in communal areas in disease surveillance, as well as related to breeding programmes to enable improved quality and supply.
- International trade standards depend on member countries – the TAHC can be modified, as has happened before. An export market ‘cheat sheet’ (simple summary of different CBT options) was included in workshop packets (see Annex 4).

Securing Animal Health at the Livestock-Wildlife Interface

Challenges to Managing FMD in the Red Zone of Namibia

Albertina Shilongo chaired the second session. She also gave the first presentation on the challenges of managing FMD in the red zone of Namibia. After a brief introduction on DVS’s mandate and the legislation that guides it, she described the zonation system used to control FMD (Figure 2). Namibia is divided into three FMD control zones, namely the infected zone (aka red zone), protection zone (aka green zone) and free zone in line with the Animal Health Act 1 of 2011. The free zone depends on separation from the protection and infected zones by a veterinary cordon fence, commonly known as the Red Line. Dr Shilongo pointed out major challenges, related mainly to logistical, financial and anthropogenic issues, to managing FMD in the infected zone (also see Box 1 below). She reaffirmed that **CBT is the solution for the infected zone**. However, as a way forward, the following are needed: (1) cheaper FMD vaccines with longer lasting immunity, (2) maintenance of quarantine facilities, (3) strengthened regional control of transboundary animal diseases, (4) harmonized strategies for FMD control with neighbouring countries, (5) investment in implementation of animal health from development partners.

Key points that emerged from the ensuing discussion included:

- The last FMD outbreak in the FMD free zone was in the 1960s; however, the dossier for official recognition was only submitted in 1997.
- Not all FMD outbreaks caused by the South African Territories (SAT) viruses come from buffalo. Phylogenetic analyses show that most outbreaks are cattle-related, i.e. indicating endemic circulation and livestock-to-livestock transmission vs new introductions of viruses into the cattle population.

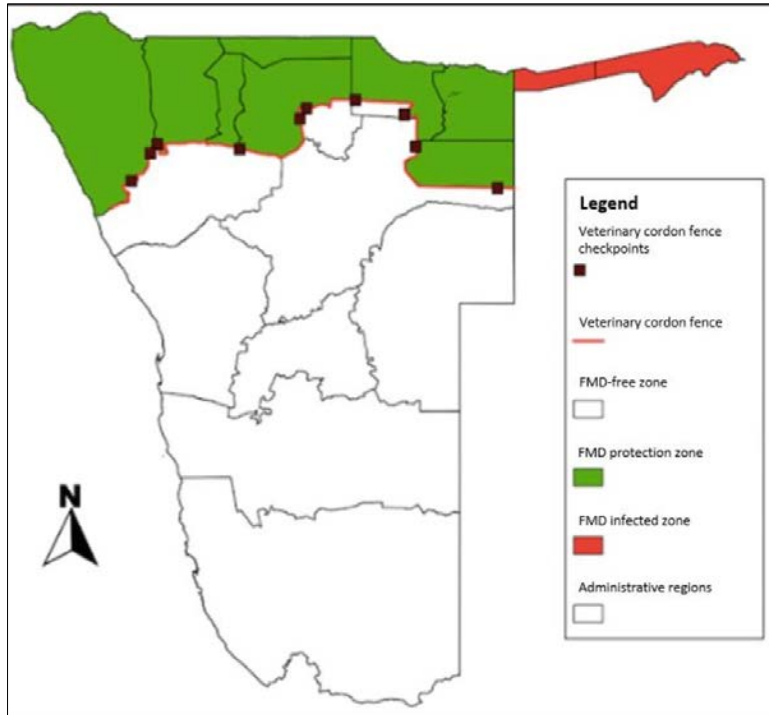


Figure 2. FMD control zones in Namibia.

Importance of Surveillance & Vaccination for Managing FMD

Mokganedi Mokopasetso (Chief Veterinary Officer, Botswana Vaccine Institute - BVI) presented next on the importance of surveillance and vaccination for managing FMD. He noted that the objectives of FMD surveillance are aimed at (1) detecting infection as early as possible, (2) determining the extent of infection, (3) demonstrating absence of infection for countries that wish to trade. To do this effectively countries need to evaluate their surveillance systems because an effective surveillance system requires a systems-based, integrated approach with multiple stakeholders and adequate resourcing. He pointed out that sample movement is a major challenge, with samples often arriving too late to test. As a result, BVI now offers to pick up samples at the border. Vaccination is also an essential component of FMD control, and protective (proactive) vaccination (i.e. targeting high-risk herds before exposure to the live virus) is preferred to suppressive vaccination. Suppressive vaccination needs very high vaccine coverage (usually 80% to 85% of susceptible animals). Thus, it is important to vaccinate before infection arrives.

During plenary discussion the following points were made:

- Following clinical resolution of disease, vaccinated cattle can remain carriers for several months, and there is resistance to buying meat from vaccinated animals (e.g. South Africa).
- In terms of the correlation between field and vaccine isolates, the match must be >0.3 on a scale of 0-1 (VNT r_1 -values). The most recent vaccine is a match. Current isolates are all closely related.
- Natural infection does not induce permanent immunity.
- The role of buffalo is overestimated. In South America there are no buffalo but there was major FMD, which has largely been overcome by achieving very high vaccine coverage [enabling zones free with vaccination]. This might make a good case study, but southern Africa's biggest problem is management of cattle – farmers don't even know where their cattle are.

Overview of CBPP & FMD in Namibia's Component of KAZA & Proposed Ways Forward

Joseph Kapapero (Chief Veterinarian, North-East Regions, DVS) provided an overview of FMD and its control in Namibia's component of KAZA. Vaccination is carried out three times a year in the infected zone and twice in the protection zone. Additional control measures include movement controls through the issuance of permits [and animal identification]. Dr Kapapero noted challenges similar to those cited by other presenters (see Box 1). Recommended ways forward to improve the situation include (1) harmonized legislation between DVS and other stakeholders, e.g. what to do during an outbreak, (2) farmer education and delegation of responsibilities, (3) stakeholder assistance during outbreaks, (4) developing Standard Operating Procedures with specific roles for each role player, (5) increasing availability of high-quality vaccines, (6) timely allocation of resources during outbreaks, (7) investing in research – to shed more light on the role of buffalo in the current circulation and transmission of FMD.

Box 1: Commonly Cited Challenges to Managing FMD in the FMD Infected Zone

- Presence of resident African buffalo (causing frequent outbreaks)
- Illegal cross-border cattle movement
- Long distances to move samples to Windhoek
- Insufficient budget (vaccines, vaccination campaigns, etc.)
- High cost of vaccines (230,000 cattle vaccinated 2-3 times/year)
- Shortage of transport and manpower for vaccination campaigns
- Introduction of new serotypes (and concomitant increased workload)
- Reduction in community outreach and awareness campaign activities
- Movement restrictions on livestock resulting in decreased farmer income
- Destruction of quarantine facilities by veldfire and vandalism
- Lack of harmonized strategies with neighbours

Wildlife Health in KAZA: A Perspective from Namibia

Janine Sharpe (Game Capture Wildlife Veterinarian, MEFT) provided an overview of wildlife health issues within Namibia's portion of KAZA. She emphasized that FMD is of particular importance in the region, with incredible economic impact. The implementation of CBT offers a solution, with benefits to both wildlife and livestock. Other diseases of concern include anthrax, brucellosis, rabies, theileriosis (Corridor disease), infectious bovine rhinotracheitis, echinococcosis and other helminth infections, lumpy skin disease and contagious bovine pleuropneumonia (CBPP). Bovine tuberculosis is also of concern although it has yet to be confirmed in Namibia's component of KAZA. However, the only way to know with any certainty which diseases exist in wildlife is to undertake surveillance – and disease surveillance in wildlife comes at a very high cost when factoring in transport (particularly helicopters), wildlife veterinary drugs, post-capture monitoring, laboratory testing and post-mortem sampling time. Innovative solutions such as GPS ear tags may help reduce post-capture monitoring costs by doing away with the helicopter time required for collar removal. In plenary discussion, it was noted that the Herding 4 Health (H4H) programme is piloting GPS ear tags in cattle to monitor compliance and discourage strays.

Herding for Health: Towards Better Integration of the Livestock and Wildlife Sectors

Jacques van Rooyen summarized the H4H model currently being piloted in southern African TFCAs. He identified uncontrolled animal movement as a key challenge facing the livestock sector in communal

rangelands because it leads to increased rangeland degradation, disease transmission through contact with wildlife, and stock losses from theft and predation. This in turn compromises FMD risk management efforts by veterinary authorities. Herd health and production also suffers, impacting household income. H4H pilot projects are demonstrating that the practices of strategic herding and kraaling by skilled herders provide a simple yet practical solution to this challenge. They also play a vital role in enabling communities to comply with and participate in CBT by setting farmers up for what the value chain requires. He noted that if one can get CBT right in the field, then the rest of the value chain is manageable. He advised, however, that compliance with producer protocols must be empowered with incentives, not simply required by law. H4H compliance via skilled herders (including monitoring herd health, low-stress handling, record keeping, strategic herding and kraaling, animal identification and planned grazing) is climate smart, wildlife friendly and sustainable – which in turn leads to CBT compliance, improved markets and enterprise development opportunities.

H4H is testing a community-based mobile quarantine facility (Figure 3a) to increase market access and ensure CBT compliance in Ngamiland, Botswana (an FMD endemic area). Women are also benefiting from employment in boma maintenance as well as by sowing crop seeds in formerly degraded areas, with notable results. In addition, mobile abattoirs are being piloted in South Africa (Figure 3b). Dr van Rooyen concluded by contemplating whether proper control at the village level could replace the need for quarantine, noting that wildlife-livestock coexistence, and CBT for that matter, can only truly transform lives if people are empowered and entrusted with responsibilities.



Figure 3. Trialling (a) a community-based mobile quarantine and (b) mobile abattoir. Photos: J. van Rooyen.

The following points were made during plenary discussion:

- The H4H project has government support where it is being trialled.
- Farmers will pay the salaries of skilled herders in the long run. Initially, donor funding will pay for three years or longer since sustainability is not achieved immediately, although funders would like that to be the case. There are many funding streams that can be explored under the climate change umbrella to support H4H project sites into the future.
- Commercial farmers are not included in the project yet.

[Overview of Updated \(2021\) 'Guidelines on Commodity-Based Trade Approaches for Managing Foot and Mouth Disease Risk in Beef in the SADC Region'](#)

Shirley Atkinson (AHEAD Programme Coordinator, Cornell University) provided an overview of the recently updated CBT [Guidelines](#) developed to assist in evaluating the options available for exporting beef from areas that are not free of FMD. The SADC Council of Ministers of Agriculture, Food Security and Fisheries approved the *Guidelines* for implementation in 2019, hence it is now an official [SADC document](#). She pointed out that not all the available options are based on CBT, but several are. The *Guidelines* outline those that comply with international agreements as well as their respective

advantages, disadvantages and requirements. She noted that of the seven available options, four are practical for the Zambezi Region, namely: (1) exporting to areas with the same or lower FMD status [WTO SPS Agreement³], (2) processing beef to destroy any potential virus present [TAHC Article 8.8.31], (3) managing FMD along the beef value chain [TAHC Article 8.8.22 with quarantine option], (4) risk mitigation using a HACCP-like value chain approach. Option 4 builds on Article 8.8.22 to incorporate other up- and downstream mitigation measures such as herding and kraaling strategies as per the H4H model. However, achieving export quality beef is a process and not an event. Value chain risk mitigation to achieve CBT can help facilitate new opportunities for cattle producers in zones that are not free of FMD, but it is up to all stakeholders to open these doors fully. The 2021 *Guidelines* document was included in hard copy in the workshop packets.

A Perspective from the Meat Board: Expanding Markets & Applied Research to Support CBT

Desmond Cloete (Chief Marketing Officer, Meat Board) introduced a presentation by **Freddy Samuntu** (Research Consultant with the Meat Board and private veterinarian) on applied research sponsored by the Meat Board. Dr Samuntu explained that the objective of the research was to determine whether vaccinating cattle for the first time on entry into quarantine (before slaughter at the abattoir) would provide equivalent protection to the current government FMD vaccination campaign, where animals are vaccinated three times a year. The investigation is based on the serological response of the cattle. If equivalence can be demonstrated, it would significantly decrease government expenditure in terms of vaccine acquisition, given that N\$ 6,000,000 was spent on a new FMD virus serotype O vaccine alone during the first round of vaccination in the Zambezi Region in September 2021. In response to questions about whether the approach would result in more outbreaks, Dr Samuntu explained that the feasibility of the approach would be examined, if equivalence was demonstrated. The laboratory results would be analysed, and a way forward could then be determined. The trial would not include FMD serotype O.

Landscape Connectivity as a Foundation for Sectoral Resilience in Namibia's Component of KAZA

Nyambe Nyambe (Executive Director, KAZA TFCA Secretariat) chaired the session. He reminded participants that the KAZA Treaty of 2011⁴ provides a framework for the type of cross-sectoral engagement this forum represents, and that the treaty is also very specific about the need for collaboration on animal disease issues. It also provides for sharing experiences and pooling resources amongst Partner States, and for developing collaborative approaches to managing shared natural and cultural resources.

KAZA and Connectivity: Why Wildlife Corridors Matter, Challenges in Securing Them

Erdwin Muradzikwa (KAZA Dreamfund Corridors Coordinator, WWF-Namibia) gave the first presentation in the session, focusing on KAZA and connectivity – and why wildlife corridors matter. He noted that KAZA is the largest terrestrial TFCA in the world, spanning an area of approximately 520,000 km². However, only when the people's problems are solved will the KAZA vision be attained. He pointed out that wildlife corridors keep KAZA intact and functional – they facilitate human-wildlife coexistence, enable resources (animals and water) to be shared and allow rangeland restoration to take place.

³ World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). https://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm

⁴ KAZA TFCA Treaty. See Article 6, Objective 1.j. https://tfcaportal.org/system/files/resources/KAZA%20TFCA%20Treaty_SIGNED.pdf

However, due to anthropogenic barriers, including linear infrastructure (such as fencing) and uncontrolled settlements along main roads, KAZA faces increasing fragmentation, loss of connectivity and blocked movement for elephants and other wildlife. The Zambezi Region lies at the heart of KAZA and if corridors are not secured in this area, transit routes for roughly 126,000 elephants moving between Botswana, Namibia and Angola to the north will be blocked. He emphasized that occlusion of corridors is prominent in all the Zambezi Region's conservancies. Moreover, the conservancies that line the southern part of the Zambezi Region are effectively sealing off the seven most critical corridors that pass through the region. As a way forward, he highlighted the need to promote effective human-wildlife coexistence measures and ensure that interventions are aimed at increasing benefits at the household level, not just at the community level.

Enabling Elephant Movements Lessens Conflict: Thinking Through Macro & Micro Corridors

Anna Songhurst (Director, Ecoexist Trust) elaborated on the importance of understanding critical elephant movement corridors to lessen conflict with humans. She noted that the Kwando River Wildlife Dispersal Area (WDA) – stretching across parts of four of the five KAZA countries – is an important macro corridor for elephant movement and connectivity within KAZA. However, to make transboundary-level macro corridors work, an understanding of what is happening at the local level is needed in the micro corridors. A hotspot for human-elephant conflict in the WDA is the eastern Okavango Panhandle in Botswana. Here 16,000 people and 18,000 elephants compete for space and resources. Research has shown that conflict is typically highest between March and May when elephants use distinct pathways to access resources in the Okavango Delta. Agricultural fields located closest to these micro corridors are twice as likely to be raided, although elephant movements are strongly influenced by human activity.

Dr Songhurst explained how data from elephant crop-raiding monitoring and pathway locations were incorporated into a GIS-based mapping and modelling tool. Using the tool, and through a collaborate initiative (between communities, the local land authority, other government stakeholders, Ecoexist and USAID), 13 important elephant corridors in the Panhandle were identified and a land-use plan and map developed to guide land allocations (ones that would reduce future conflict with elephants). This kind of approach involves many stakeholders and allows the corridors to be officially demarcated. The approach has since been scaled-up to areas on the western side of the Okavango Delta. She concluded by noting that holistic strategies are required to reduce human-elephant conflict in the short and long term, including (1) land-use planning that incorporates both micro and transboundary-level movement corridors to ensure elephants can access key resources, (2) deterrent techniques such as relocating individual fields away from corridors, (3) sustainable farming practices to improve food security, (4) increased benefits from living with elephants, e.g. new markets for elephant-aware farmers, (5) provision of access to safe transportation, safe water access etc.

During plenary discussion on the two preceding presentations, the following points were raised:

- Fences and other barriers clearly discourage wildlife movement.
- Bilateral collaboration and agreements are needed to deal with the border fences between Botswana and Namibia.
- The Zambezi Region is the 'key' to KAZA, and movement across it must be enabled.
- Consideration is required on how to address human settlements in corridors in the Zambezi Region.

Zambezi Region as a Key to Wildlife Dispersal in KAZA: The Way Forward for Bwabwata National Park

Colgar Sikopo gave a presentation on potential ways forward for Bwabwata National Park (BNP). He noted that the history of this protected area is complex, with various proclamations and policies affecting

the north-east parks. Following independence, in 1999 Cabinet approved a new vision for the north-east parks, which, amongst others, included merging Mahango Game Park and Caprivi Game Park to form the newly renamed BNP, and prohibiting cattle within BNP (or any other game park in the north-east of Namibia).

Most of the Cabinet decisions from 1999 have been implemented except for removing the cattle from the park. The presence of cattle clearly constitutes a threat of spread of CBPP and FMD. Accordingly, a cattle removal strategy has been developed and submitted to Cabinet, and a specific committee formed to consult on it. Another key issue affecting BNP relates to the communities who reside in and neighbour the park, as the decision to remove the cattle has reignited debate over ownership of the land itself. Specific details and statistics are available in the presentation. These reflect a very complex set of dynamics, currently under the Prime Minister's portfolio, and in the past high-level consultations have taken place at both Ministerial and Presidential levels. In addition, structures for community consultations in the management and development of BNP have been created. Mr Sikopo highlighted that BNP is the most visited park in north-east Namibia, and tourism holds major socioeconomic potential for the park. BNP, like the Zambezi Region, also lies in the heart of KAZA and is a major transboundary movement area for wildlife, with the unfenced Kwando Corridor playing a particularly important role in this regard. At the end of the day, Bwabwata will remain a national park.

During plenary, the following points were made:

- All five KAZA Partner States and nine NGOs have pooled their data to analyse elephant movement across KAZA. Namibia's data indicates a potential new wildlife dispersal area between Angola and Namibia.
- The information has been incorporated into a policy brief currently under review by the KAZA Elephant Sub Working Group.
- BNP's multiple use area has seen a tremendous increase in wildlife and Namibia acknowledges the significant role the Zambezi Region plays in KAZA.
- There is a need to formalize corridor status, which can be enabled using new legislation at the national level that makes provision for recognition of wildlife corridors.

Mobile Kraals and Other Management Approaches to Human-Wildlife Conflict Mitigation

Lise Hanssen (Project Coordinator, Kwando Carnivore Project) presented on approaches to human-carnivore conflict mitigation. She noted that the Chobe River floodplains are ecologically important to lion prides, but that conflicting land uses along the international boundary (high value tourism in Botswana vs communal lands with cattle in Namibia) is having an impact on both sides of the border. Botswana lions kill cattle in Namibia and Namibians kill lions in retaliation. A challenge is that traditional kraal structures in the area are often temporary and flimsy, and do not protect cattle from lions. Upgrading kraals with stronger poles and wire (to keep cattle in and predators out) has, however, seen a 95% decrease in lion attacks, with no retaliatory lion killings over the past 19 months. Similar results have been recorded in the Mudumu complex, with both lion dispersal and connectivity having been restored. This has been achieved in large part through ongoing community engagement, and the initiative is now run through conservancies. In addition, mobile kraals have been purchased and are in high demand as communities have now seen how successful they can be in protecting cattle at night and increasing productivity of the crop fields the kraals are temporarily sited on.

Prospects, Challenges & Opportunities for Community Conservation in KAZA: Examples from Namibia

Russell Taylor (KAZA Conservation Advisor, WWF-Namibia) discussed challenges, opportunities and prospects for community conservation in KAZA. KAZA represents a large landscape approach to

integrated conservation and development; the Zambezi Region specifically is pivotal to the promise of KAZA. However, existing sectoral policy constraints and inappropriate land-use options limit the potential of such an approach. For example, geographically based livestock disease control measures limit market opportunities for communal livestock producers and present serious challenges to wildlife connectivity across boundaries. Many large mammals (particularly elephants, buffalo, zebra and wild dogs as well as other carnivores) function at spatial scales greater than national parks, necessitating consideration of connectivity across the landscape. While connecting wildlife populations brings opportunities, it also presents challenges in the form of human-wildlife conflict when wildlife roams outside of protected areas. For long-term coexistence, the benefits of living with wildlife must outweigh its costs.

Dr Taylor noted that community conservation has a large role to play in the success of KAZA, but successful community-based natural resource management (CBNRM) involves moving beyond mere decentralization to actual devolution of rights and decision-making. In this regard, joint venture lodges and community enterprises now exist, and a driving circuit through Botswana and Namibia is being developed – all of which have over the years increased the benefits accruing to host communities. A novel wildlife credit programme (which taps into the intrinsic existence value of iconic and conflict-prone species) is being developed to increase direct benefits to communities based on their conservation performance. In other areas, communities are directly involved in conservation activities (e.g. transboundary game counts), thereby strengthening a sense of ownership. Dr Taylor concluded by noting that policy and practice, whether good or bad across the KAZA landscape, will be driven largely by CBNRM involving local communities. The need to be proactive is both important and urgent.

The session chair noted that much had been covered during the session but underlying it all was a very clear link to coordination, collaboration and cooperation – and that without these attributes, it would not be possible to resolve the conflicts and clashes between KAZA’s different user groups and systems.

Rethinking Fences in the KAZA Context

Day 2’s opening session on 27 September was chaired by Kenneth Uiseb.

[An Historical Perspective on Fencing in Namibia, Botswana & Zimbabwe vs Sustainable Ways Forward for Wildlife & Livestock in KAZA](#)

Russell Taylor provided an historical perspective on fencing in Namibia and Botswana. He noted that, contextually, a lot has changed since the time the EU started providing preferential trade agreements and markets to southern African countries, aimed at promoting economic development. The commercial livestock sector has been a major beneficiary of these agreements, but agropastoralists have not. Compliance with stringent veterinary and public health standards resulted in significant negative consequences for wildlife populations, either directly through shooting (e.g. tsetse control exercises) or indirectly through fences (which restricted seasonal wildlife movements and overall population connectivity regionally). He noted that a cost-benefit analysis of FMD fencing completed several years back shows that it hardly breaks even (and is heavily subsidised). Thus, in an era of CBT, traditional approaches need to be reviewed and re-thought to assess which costs can be removed.

Recent maps of GPS-collared wildlife clearly show the continued impact of fences on wildlife movement across KAZA and point to the importance of Bwabwata in maintaining connectivity (Figure 4). Dr Taylor noted that at the time of the early trade agreements, livestock production, with EU subsidies, was a viable land-use option. Today new opportunities such as nature-based tourism and TFCAs have emerged for wildlife to play a meaningful role in socioeconomic development. However, production systems and

policies need to evolve and embrace a multispecies animal production systems approach to land use – with a focus on “cattle and wildlife” not “cattle versus wildlife”. One innovative contribution to this is CBT.

During plenary, the following points were made:

- The EU imports beef for political reasons as opposed to local supply not being able to satisfy local demand.
- People often get defensive when discussing these issues (i.e. the history of European subsidies to southern Africa’s livestock sector), but it’s important to remember that it was conventional wisdom at the time.

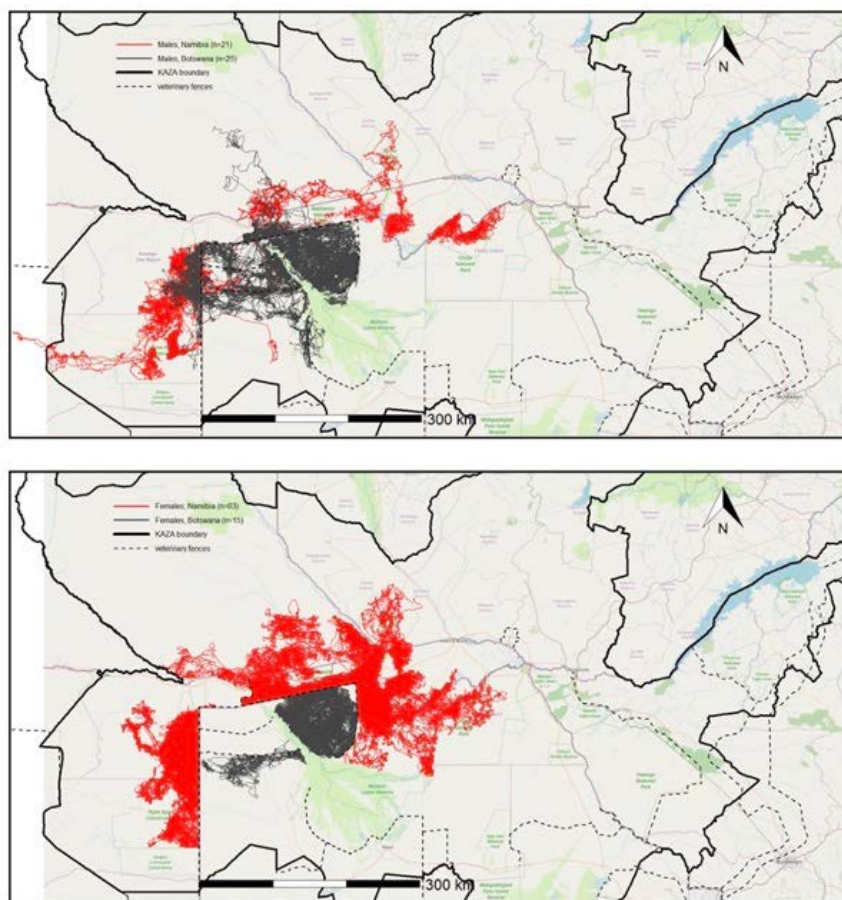


Figure 4. Effects of border fences on movement of male elephants (top) and female elephants (bottom) collared in Namibia (red) and Botswana (grey). Source: Naidoo et al. (2022)⁵

The Role of Subclinical Cattle in Spreading FMD: Is Blaming Buffalo... Bull?

Mary-Louise Penrith (Extraordinary Professor, University of Pretoria) followed with a presentation on the role of subclinical cattle in spreading FMD. She noted that the SAT FMD viruses are the only viruses indigenous to the region. They evolved in African buffalo, and historically outbreaks of FMD in cattle

⁵ Naidoo et al. (2022) Challenges to Elephant Connectivity from Border Fences in the World's Largest Transfrontier Conservation Area. <https://doi.org/10.3389/fcosc.2022.788133>

were linked to buffalo contact. In East Africa SAT viruses circulate in cattle independently of buffalo, and there is growing evidence that this is also occurring in the SADC region. SAT viruses cause mild disease and typically in outbreaks few cattle show clinical signs, but virus can circulate in subclinically infected cattle. No carrier state for FMD in cattle has ever been demonstrated, and subclinically infected cattle shed less virus than those with clinical signs, but when a large number of cattle are crowded together transmission can take place. She emphasized that unvaccinated cattle are most susceptible, but there are a number of reasons why vaccinated cattle may also be susceptible, including variable but short duration of immunity or poor immune response. Phylogenetic evidence over 10 years in Ngamiland supports circulation in cattle without buffalo involvement. The implication is that clinical surveillance is inadequate to detect infection, but herding could mitigate risk by earlier detection of subtle signs in cattle and avoiding crowding, as well as improving vaccine coverage, which should be confirmed by post-vaccination monitoring. Research to determine the extent of subclinical infection and identify 'hot spots' would assist in risk mitigation.

During plenary, the following points were made:

- Co-presenter Dr Mokopasetso stated that BVI phylogenetic analysis of Ngamiland outbreaks over 10 years confirmed that all the viruses were closely related, had not been isolated from buffalo, and were highly indicative of independent circulation of FMD in cattle populations.
- 'Carrier' cattle that retain FMD virus in the pharynx for up to two years have never been shown capable of transmitting the virus to in-contact cattle under either natural conditions or laboratory conditions that mimic natural conditions.
- Buffalo are not involved in FMD serotype O and do not sustain type O virus.
- In terms of parallels with COVID, shedding of virus by those without clinical signs is common to a great many infectious diseases.
- New (e.g. H4H model) as opposed to traditional herding has a high potential for improving surveillance.

[Livestock, Wildlife & Diversified Livelihoods: Lessons from Ngamiland, Botswana](#)

Lethlogile Modisa (Chief of Party, Botswana Green Climate Fund Project, Conservation International) shared lessons from Ngamiland District in Botswana and pointed out the benefits of CBT. He emphasized that the management of FMD has traditionally been achieved through a paradigm of geographic separation of livestock and wildlife by fencing. Within Ngamiland, this approach has had negative impacts on wildlife, rangeland health and people. Fences are also prohibitively expensive to maintain, and FMD outbreaks have occurred almost annually in Ngamiland, regardless of fencing. These factors, coupled with changes to the WOA's TAHC in 2015, all played a role in motivating the Government of Botswana to implement CBT in Ngamiland. On top of this, data from global exports has made it clear that FMD-freedom is not a prerequisite for competitiveness in the international beef market. India is the largest exporter of beef by volume in the world, even though it is not free of FMD and has no FMD-free zones. He concluded by describing Botswana's recently launched Green Climate Fund project which, through the implementation of H4H, aims to address climate change and land degradation. In response to questions on the importance of fences for managing malignant catarrhal fever (MCF), it was noted that single fences are not effective against MCF. MCF prevention requires a 1-2 km separation of wildebeest from cattle, which can be easily achieved through application of H4H principles.

[Herding for Health: Lessons from Mozambique \(film\)](#)

Immediately following two short films were shown, one on 'Herding for Health: Lessons from Mozambique' and the other on mobile quarantines being trialled in the Limpopo. **Jacques van Rooyen** introduced the films and led the plenary discussion following them.

Highlights of the discussion included:

- Technically, on its own, CBT may not deliver conservation outcomes. However, through the application of an integrated model, inclusive of H4H, multiple outcomes at the landscape level can be achieved, including those related to coexistence, biodiversity conservation (incl. connectivity), and climate change mitigation.
- Despite the gains made since the first H4H pilot, there is a continuous process of learning taking place.
- Engagement of communities into the programme is complex and, in some instances, they were historically heavily involved in poaching. But over time, and through application of H4H, this dynamic has shifted and their relationship with park management has improved.
- It takes time to build participation in the programme. While 100% participation may never be achieved, as long as there is a majority (80% or over), the result will be felt at the landscape level. Persistent efforts must, however, be made to involve neighbours and traditional authorities and to set grazing plans.
- Concern was raised over the sustainability of plans for professional herder/ecoranger salaries. The question arose as to what sustainability means in a communal system and if it was reasonable to expect communal farmers to bear the costs of farming in a multiple-resource use area with wildlife. Additionally, it was noted that support for ecoranger salaries could be tapped from multiple sources such as safari operators, government job creation programmes and donors (from different angles, e.g. carbon focus, climate change, agriculture, conservation).
- H4H must be community owned and driven. The principles of the programme are based on good practices and informed by science.

[Securing Connectivity Across KAZA: Assessment of Fencing Impacts on Wildlife along the Botswana/Namibia Border](#)

Steve Osofsky and **Shirley Atkinson** provided further insights into fencing impacts on wildlife along the Botswana-Namibia border – based on a recently completed fencing assessment report conducted in collaboration with the KAZA Secretariat and Government of Botswana, and other partners. Maps and animations clearly show the substantial impacts of the border fences on wildlife movement (see Figure 4 above).

While male elephants do cross major fences on occasion, the fences represent a near-absolute barrier to females (since the steel cable that is usually intact keeps calves from being able to cross). Ground survey observations point to similar impacts on other large herbivores. Specifically, along the Zambezi Border fence (east of the Okavango River) altered movement behaviour is evident, with many species ‘patrolling’ the fence on parallel paths in search of crossing locations, and crossing success is low for species like giraffe, sable and zebra. Habitat connectivity and wildlife dispersal across the Kwando River WDA is consequently obstructed. Likewise, the North-South Border fence is substantially restricting cross-border wildlife dispersal, critical to functionality of the Khaudum-Ngamiland WDA. Dr Osofsky noted that the report represents phase 1 of the analysis. It lays out recommendations from the wildlife perspective for removal of key portions of veterinary fences – including portions of both border fences (Figure 5). However, further analysis (phases 2 and 3 – fence scenarios disease risk assessment and community perspectives) is needed to help inform cross-sectoral decision making. For the fence scenarios disease risk assessment phase, the question is really whether there are fences or portions of fences that are actually no longer serving an important disease control purpose, particularly in light of developments around CBT and H4H. It was also emphasized that stakeholder engagement for disease risk assessment of the border fences should ideally be conducted as a collaboration involving the Governments of both Botswana and Namibia (a topic for discussion at this forum), with support from the KAZA epidemiologist and AHEAD as may be helpful.

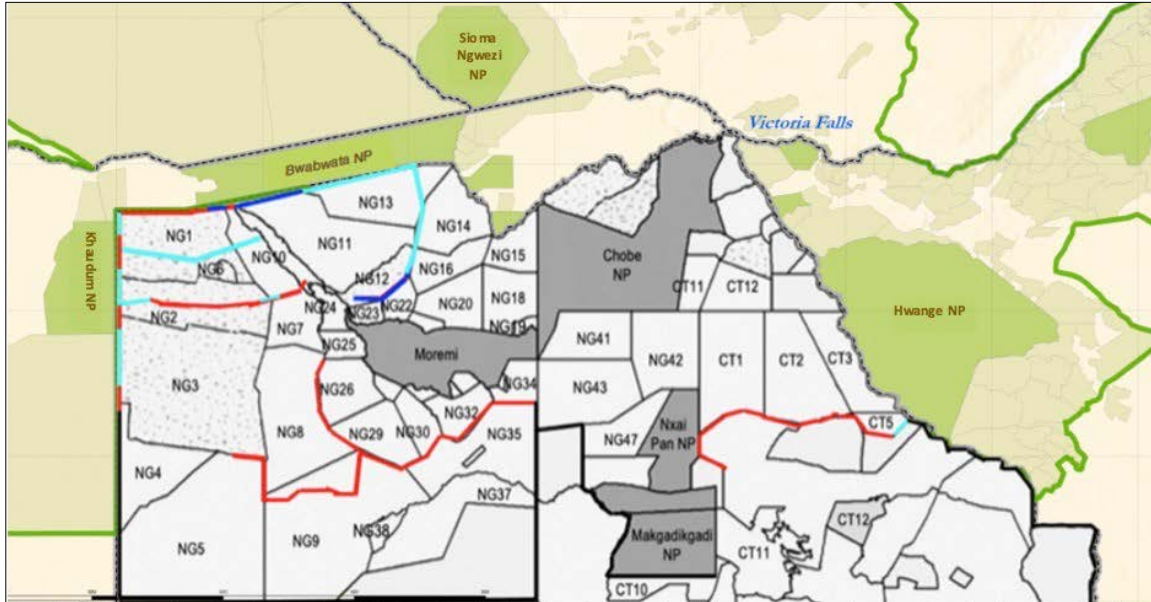


Figure 5. Fence sections recommended for removal from the wildlife perspective (pale blue) or removal pending further evaluation (dark blue). Other fences surveyed (red). Source: Atkinson et al. (2021)⁶

During plenary, the following points were made:

- CBT makes provision for managing FMD in new ways.
- CBPP is important and will be part of the fence scenarios disease risk assessment.
- Analysis of community perspectives on fences should include local land authorities.
- These fence issues need to involve bilateral discussions (Botswana, Namibia).
- Cattle movement would be a key consideration in any decision to remove a fence. For the Zambezi Border fence (east of the Okavango River), in Botswana, cattle presence near the fence is confined to the west portion, which was not recommended for removal in the initial (phase 1) report – only the eastern portion (pale blue in Figure 5) along the NG13 boundary is recommended for removal.
- The North-South Border fence along the Khau dum border is being upgraded. Repaired sections include six strands, with two of them replaced by steel cables – an unusual design.
- The issue of connectivity and how to enhance it across the landscape is being closely followed by various groups within KAZA (e.g. the Carnivore Conservation Coalition, Elephant Sub Working Group) as well as regionally (SADC TFCA Network) as it is considered a matter that could make or break KAZA. Given the partnerships at various levels (among Partners States and within various working groups with NGOs), the issue is being and needs to be pursued at multiple levels.
- Concerns were raised that if CBT is successful, it could further increase cattle numbers and overstocking. However, there was an attendee observation that there is no overstocking per se, just non-optimal distribution of livestock (there is enough biomass), which can be addressed in time. A strong governance system and increased benefits accruing through the wildlife economy, with support from conservancy partners, are important strategies in this regard.

⁶ Atkinson et al. (2021) unpubl. report. Veterinary Fences in Botswana's Portion of the KAZA TFCA: Assessment of Status and Impacts on Wildlife, prepared for the KAZA TFCA Secretariat and Botswana's National Committee on Cordon Fences.

[Towards a More Holistic Approach to Assessing Costs & Benefits of Veterinary Cordon Fences](#)

Steve Osofsky discussed finding a more holistic approach to assessing costs and benefits of veterinary fences. He noted that reliable, comprehensive global estimates of the direct and indirect costs of many animal diseases to society are currently lacking. However, it is safe to say that the impacts of nonzoonotic as well as zoonotic diseases (of course including transboundary as well as endemic diseases) on livestock and agriculture systems, national economies, public health systems, and society overall are in the billions of dollars every year. The global costs of FMD have been estimated to potentially exceed US\$22.5 billion annually, making this disease of cloven-hoofed mammals arguably the most economically impactful nonzoonotic animal disease in the world, although African Swine Fever remains in the competition. Notably, assessments of such costs have, to date, *not* evaluated the negative impacts of the approaches used to control the disease on other sectors, such as the wildlife sector in southern Africa.

Pre-COVID, nature-based tourism had been contributing as much or more to the gross domestic product of the SADC region as livestock agriculture, fisheries and forestry combined. Dr Osofsky noted that the very real impacts of FMD-related cordon fencing on the free-ranging wildlife resource should give us pause. The history of veterinary cordon fencing in the region is one of significant external subsidies going back to the colonial era: one sector (livestock) has been supported at the expense of another (wildlife). With wildlife having moved into such a prominent position, in terms of its contribution to SADC's economy through nature-based tourism and associated economic activities, now on the rebound, the importance of rethinking a reliance on fencing becomes even clearer. Fortunately, new approaches to managing FMD-related beef trade risks that do not depend on fencing are of course now available. CBT has been officially endorsed by SADC, and farmers in FMD endemic 'red zones' are starting to take advantage of what CBT has to offer after being shut out of markets for generations. Such developments offer genuine traction for the success of TFCAs as multi-use systems with interlinked poverty alleviation and conservation goals. He emphasized that it is now critical for economic analyses of FMD control options to be truly cross-sectoral so that assessments of the benefits and costs of disease control strategies, including fencing, more accurately reflect optimal, sustainable land uses. In conclusion, he noted that only then will we have a chance of yielding results that are socially, ecologically, and economically sustainable for generations to come.

[Exploring Fence Decommissioning: Approaches to Disease Risk Assessment for Science-Based Decision-Making](#)

Laura Rosen (Epidemiologist, KAZA Animal Health Sub Working Group) discussed approaches to disease risk assessment, as related to the next phase of fencing analysis. She summarized the methodologies that could be used (qualitative, semi-quantitative or quantitative), noting that the availability of data would be key to determining the most appropriate approach for a given scenario. Potential data sources could include disease reporting systems, published research or risk assessments, livestock movement records, vaccine campaign records, historical disease occurrence data and expert opinions. She reiterated that fences perceived to be of greatest negative impact to KAZA's landscape connectivity objectives were identified in the recent assessment of fence impacts on wildlife (presented by Osofsky & Atkinson). The purpose of this next phase will be to identify and assess the likelihood of change in risk of FMD and CBPP in Botswana and Namibia, and the likely magnitude of any potential consequences for animal health, for scenarios involving decommissioning of (1) the eastern portion of the Zambezi Border Fence, (2) the northern portion of Botswana's Northern Buffalo Fence, (3) sections of the North-South Border Fence (see Figure 5). A recipe for success includes this being a collaborative undertaking, with a stakeholder-agreed methodology.

Plenary Discussion: Ingredients for a Collaborative Approach to Conducting Disease Risk Assessments Regarding the Border Fences with Botswana

Having established a common understanding of the methodologies that exist, and the types of information required, participants considered a set of questions posed by Dr Rosen to help inform development of the disease risk assessment approach. Rather than dividing into breakout groups, feedback was gathered during a plenary session. Directors of wildlife and veterinary services, deputy directors, chief veterinarians, control wardens and veterinarians responsible for the target areas were all confirmed to be the key personnel with whom Dr Rosen should collaborate during the assessment.

Specifically, participants advised that the following data should factor into the assessment:

- Cattle numbers, distribution and movement around the target fences in Namibia (which is available from DVS), and similar data for Botswana (as this affects surveillance) and Angola due to the CBPP risk along the northern border of BNP
- Similar information for buffalo would prove valuable if it exists
- Vaccination history
- Efficacy of the traceability system in Botswana
- Recent and historic disease incidences on both sides of the border
- Ephemeral water sources, drainage systems and their link with the target fences

Participants also noted that the following considerations would be important in assessing overall disease risk and potential impact of any fence removal:

- The drivers of cattle movement along and across the fence lines including stock theft, family relationships, trade opportunities, search for grazing, barter, etc.
- Impact of the removal of any section of fence on the existing passive surveillance system in the case of an FMD outbreak, and the outbreak response time
- Unforeseen impacts of fence removal on
 - Human-wildlife conflict – identifying existing hotspots and mitigation measures
 - Poaching and the measures to prevent or mitigate against poaching surges
 - Any security or immigration control functions of the fence
 - Ability to secure and maintain wildlife movement corridors within BNP if there was to be a sudden influx of elephants
- Communities should be engaged on the potential benefits and drawbacks of fence removal.

Special Topics Session

Drawing from the meeting's deliberations, and taking advantage of available expertise, three topics were selected by attendees (based on dot-voting) for more in-depth group discussion and debate. The full outputs of the breakout groups are provided in Annex 2.

Topics included:

- Securing Wildlife Corridors
- Commodity-Based Trade: Requirements & Overcoming Market Resistance
- The Future of Bwabwata National Park: Progress on Resolving Issues & Next Steps

Summary of Key Themes

Over the course of the two-day meeting, key themes emerged during discussions and reflections offered by participants. These are summarized below in Box 2.

Box 2: Key Themes Emerging from Workshop Discussions

- The engagement of stakeholders from both the livestock veterinary and wildlife sectors at the workshop was noted, as was the level of integration and unity throughout the workshop; government representatives confirmed their support for innovative approaches and a willingness to think about change.
- CBT represents an opportunity to: improve market opportunities for local cattle farmers; improve relations between regulatory authorities and local farmers; foster human-wildlife coexistence and wildlife-related economic benefits; revisit veterinary fencing policy with the aim of facilitating wildlife connectivity across KAZA. However, CBT should be implemented in a manner such that costs of compliance do not overshadow the benefits, particularly for small-scale producers.
- The ongoing need for raising of awareness and community/farmer outreach was noted, but attention was also drawn to the need to empower and entrust communities/farmers with responsibilities. Initiating H4H pilot sites near the western boundary of Bwabwata could help play a role in this regard.
- Attention was drawn to: the high cost of FMD vaccination and the need for cheaper vaccines that are more effective and provide longer lasting protection; the importance of good surveillance systems; and the need to gather, collate and analyse data to potentially lead to revisions to the WOAHA TAHC (as related to the 30-day quarantine period).
- Urgent action is required on securing wildlife corridors before they are blocked completely; research on mapping micro corridors in neighbouring Botswana provides insights into the necessity for holistic approaches based on broad-level stakeholder involvement that includes local communities and land authorities.
- Bilateral collaboration and agreements are urgently needed to deal with the border fences between Botswana and Namibia, to ensure wildlife movement across KAZA's WDAs is enabled.
- The importance of resolving the challenges associated with BNP was acknowledged (removal of cattle from the park). This requires cross-sectoral collaboration, innovative thinking and holistic approaches founded on community participation to unlock the full potential of the wildlife economy to benefit resident and neighbouring communities. MEFT and MAWLR/DVS made it clear that they are aligned in their vision to see the park cleared of livestock and are supported by the legislative and policy framework at both the national and regional (KAZA) level. The KAZA TFCA Treaty itself calls for the free movement of wildlife across borders.
- The 2011 KAZA TFCA Treaty provides a framework for the type of cross-sectoral engagement this forum represents, and the treaty is also very specific about the need for collaboration on animal disease issues. It also provides for sharing experiences and pooling resources amongst Partner States, and for developing collaborative approaches to managing shared natural and cultural resources.

Next Steps & Wrap Up

Agreed next steps to follow the workshop were outlined. It was noted that MEFT and MAWLR were interested in establishing a Namibian inter-agency committee, similar to Botswana's National Committee

on Cordon Fences, to facilitate cross-sectoral collaboration on matters pertaining to veterinary fencing and wildlife-livestock interface issues. AHEAD offered their support to assist in facilitating such an endeavour, should it be helpful. AHEAD also committed to assisting Namibia and Botswana on the fencing disease risk assessment, in partnership with the KAZA Secretariat; and to continuing to support the KAZA Animal Health Sub Working Group and Dr Shilongo as the working group's incoming chair. Dr Shilongo noted that the region was one epidemiological unit and harmonization is needed. Finally, it was agreed that whilst the meeting proceedings were being prepared, presentations would be made available as PDFs on the AHEAD website.

In her closing remarks, Dr Shilongo thanked everyone for sharing information, and said that Namibia is positioned to face transboundary issues and anticipate impacts, positive as well as negative, on KAZA communities. She underscored the need to address the issues collaboratively and unlock wildlife's benefits without compromising other activities. She expressed her thanks to MEFT, AHEAD, WWF and all the other institutions represented at the workshop.

Annex 1: Agenda



REPUBLIC OF NAMIBIA
 MINISTRY OF AGRICULTURE, WATER AND LAND REFORM
 MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM

**LIVESTOCK, WILDLIFE & RESILIENT LIVELIHOODS:
 WAYS FORWARD IN NAMIBIA'S COMPONENT OF KAZA**

Katima Mulilo, Namibia – 26-27 September 2022

PROGRAMME AGENDA

<i>Arrival Day – 25 September 2022</i>		
17:30	Registration	
<i>Day One – 26 September 2022</i>		
TIME	SESSION/ACTIVITY/PRESENTATION TITLE [SESSION CHAIR]	PRESENTER
07:30	Morning registration opens; tea & coffee available	
	SETTING THE SCENE [Chair: Colgar Sikopo]	
08:00	Welcome Remarks	Albertina Shilongo
08:10	Around the Room Introductions	All
08:20	Purpose and Objectives of the Workshop	Steve Osofsky
08:30	The Importance of a Diversified Economy in Namibia's Component of KAZA	Kenneth Uiseb
08:45	From the MCC-supported CBT Pilot Project to the State of CBT Today: A Decade of Lessons Learned	Thimoteus Kativa
09:10	Beauty and the Beef: Achieving Compatibility Between Wildlife Conservation and Livestock Production (short film)	Steve Osofsky
09:30	CBT Then and Now: Reflections and Moderated Discussion, including audience Q & A	Alaster Samkange, Thimoteus Kativa, Frank Chitate, Jacques van Rooyen
10:00	TEA / COFFEE BREAK	
	SECURING ANIMAL HEALTH AT THE LIVESTOCK / WILDLIFE INTERFACE [Chair: Albertina Shilongo]	
10:30	Challenges to Managing FMD in the Red Zone of Namibia	Albertina Shilongo
10:45	Importance of Surveillance & Vaccination for Managing FMD	Mokganedi Mokopasetso, Siegfried Khaiseb
11:00	Overview of CBPP & FMD in Namibia's Component of KAZA & Proposed Ways Forward	Joseph Kapapero, Frank Chitate
11:15	Wildlife Health in KAZA: A Perspective from Namibia	Janine Sharpe



College of ²²
Veterinary Medicine





11:30	Herding for Health: Towards Better Integration of the Livestock and Wildlife Sectors	Jacques van Rooyen
11:45	Overview of Updated (2021) “Guidelines on Commodity-Based Trade Approaches for Managing Foot and Mouth Disease Risk in Beef in the SADC Region”	Shirley Atkinson, Mary-Louise Penrith
12:00	A Perspective from the Meat Board: Expanding Markets & Applied Research to Support CBT	Desmond Cloete, Freddy Samuntu
12:15	Q & A, Facilitated Discussion	
12:45	LUNCH	
	LANDSCAPE CONNECTIVITY AS A FOUNDATION FOR SECTORAL RESILIENCE IN NAMIBIA’S COMPONENT OF KAZA [Chair: Nyambe Nyambe]	
14:00	KAZA and Connectivity: Why Wildlife Corridors Matter, Challenges in Securing Them	Erdwin Muradzikwa
14:15	Enabling Elephant Movements Lessens Conflict: Thinking Through Macro & Micro Corridors	Anna Songhurst
14:30	Zambezi Region as a Key to Wildlife Dispersal in KAZA: The Way Forward for Bwabwata National Park	Colgar Sikopo
14:50	Q & A, Facilitated Discussion	
15:05	TEA / COFFEE BREAK	
15:20	Mobile Kraals and Other Management Approaches to Human-Wildlife Conflict Mitigation	Lise Hanssen
15:35	Prospects, Challenges & Opportunities for Community Conservation in KAZA: Examples from Namibia	Russell Taylor
15:50	Q & A, Facilitated Discussion	
16:00	ADJOURN & GROUP PHOTO	
18:30	GROUP DRINKS & DINNER – All Participants, Protea Hotel	

Day Two – 27 September 2022

	RETHINKING FENCES IN THE KAZA CONTEXT [Chair: Kenneth Useib]	PRESENTER
8:00	Recap of Day 1	Steve Osofsky
8:15	An Historical Perspective on Fencing in Namibia, Botswana & Zimbabwe vs. Sustainable Ways Forward for Wildlife & Livestock in KAZA	Russell Taylor
8:30	The Role of Subclinical Cattle in Spreading FMD: Is Blaming Buffalo... Bull?	Mary-Louise Penrith, Mokganeedi Mokopasetso
8:45	Livestock, Wildlife & Diversified Livelihoods: Lessons from Ngamiland, Botswana	Lethogile Modisa
9:00	Herding for Health: Lessons from Mozambique (short film)	Jacques van Rooyen
9:15	Securing Connectivity Across KAZA: Assessment of Fencing Impacts on Wildlife along the Botswana / Namibia Border	Steve Osofsky, Shirley Atkinson
9:30	Q & A, Discussion	
10:00	TEA / COFFEE BREAK	
	COLLABORATIVE DISEASE RISK ASSESSMENT [Chair: Siegfried Khaiseb]	
10:30	Towards a More Holistic Approach to Assessing Costs & Benefits of Veterinary Cordon Fences	Steve Osofsky
10:40	Exploring Fence Decommissioning: Approaches to Disease Risk Assessment for Science-Based Decision-Making	Laura Rosen



College of ²³
Veterinary Medicine





11:00	Plenary Discussion: Ingredients for a Collaborative Approach to Conducting Disease Risk Assessments Regarding the Border Fences with Botswana (instructions to be provided)	Nidhi Ramsden, Laura Rosen (facilitators)
13:00	LUNCH	
	SPECIAL TOPICS SESSION [Facilitator: Nidhi Ramsden] Drawing from the meeting's deliberations, and taking advantage of available expertise, three topics will be selected by attendees (based on dot-voting) for more in-depth group discussion and debate. Attendees will select which of the three concurrent group sessions to join, and groups will present their findings in plenary. Meeting next steps will also be discussed.	
14:00	Breakout Groups Session, Selected Topics: <ul style="list-style-type: none"> • Securing Wildlife Corridors • CBT Requirements and Overcoming Market Resistance • The Future of Bwabwata National Park 	Nidhi Ramsden (facilitator)
15:30	TEA / COFFEE BREAK	
15:45	Breakout Groups Present Findings, with Q&A, Discussion	Nidhi Ramsden (facilitator)
16:30	Summary of Key Next Steps	Steve Osofsky
16:45	Closing Remarks	Albertina Shilongo, Colgar Sikopo
17:00	ADJOURN	



Annex 2: Special Topics Session Breakout Group Notes

Below are the notes from breakout groups on the three topics selected by workshop participants for in-depth discussion.

Securing Wildlife Corridors

A number of micro and macro corridors exist within Namibia's component of KAZA. The importance of these to maintaining wildlife populations and ecosystem services at a landscape level needs to be made clearer and elevated, the latter through their inclusion in land-use plans and legislation. As a first step, the group recognized the need to develop an inventory of projects currently working to re-establish some of these corridors. The group went on to discuss how best to secure wildlife corridors, drawing on experiences from Ngamiland, Botswana with the Tawana Land Board and Ecoexist.

Key points that emerged during discussion included:

- Community participation is needed throughout the process.
- Participatory mapping and scenario planning tools are helpful – to tap into stakeholders (including affected communities) collective knowledge and experience to better understand and identify problems and solutions.
- Working with Traditional Authorities and Land Authorities allows for applied land-use planning and allocations to be made (in Ngamiland this included relocating individual fields away from corridors and formal designation of corridors).
- Additional measures aimed at increasing the benefits from living with wildlife and mitigating human-wildlife conflict are needed when working to secure corridors.

The group also considered the corridors within the Zambezi Region and the process of land allocation as a practical example of the issues being discussed. To date, 15 corridors that have been identified in the Zambezi Region Land Use Plan, with a total area of 4,032km². Some run through state forest – without legal, formal status of the latter as a protected area, it is unknown what will happen if settlements establish in these forests. Learning from the work of Ecoexist in Botswana, opportunities and incentives for communities living in corridors to secure the same for wildlife movement could include:

- Tourism related activities such as building game-viewing platforms
- Application of H4H to improve herd health and reduce conflict with wildlife
- Safe transport for children living near corridors to and from school

Commodity-Based Trade: Requirements & Overcoming Market Resistance

Whilst CBT enables a continuation of trade even during an FMD outbreak, there are implementation challenges related to market resistance, ensuring a quality product that matches market demand, and compliance costs borne by the farmer. The EU is the primary market for Namibian beef and there was considerable discussion on how to convince the EU to accept CBT beef. However, part of the EU's (and other markets') resistance to CBT beef is that they do not want beef produced from vaccinated animals. Their consumers also prefer beef from younger animals, but farmers are reluctant to sell younger animals due traditional farming practices. Incentives offered by government (e.g. better breeds) and other role players (e.g. Meatco) could motivate a shift in traditional farming practices. Farmer education with regards to livestock value and market forces would also enable such a shift. Ultimately, as farmers become convinced that such changes would improve their financial bottom line, whilst also improving herd health, these changes can be internalized.

There was recognition that there may be other markets in addition to those currently accessible for fresh chilled CBT beef (also for bone-in beef), and that it would be important to understand any barriers to accessing these. For instance, the group felt that beef sourced from an FMD-endemic area would inherently affect marketability and acceptance of the product due to traditional misconceptions and stigma. Barriers to accessing such markets should be clearly spelt out, offering approaches for improvement. Equivalence as related to facilitating trade between areas with the same FMD status also needs to be acknowledged. Imposing higher sanitary conditions than those required by the importing country (of equivalent FMD status) should be avoided. There was recognition amongst the group that trust within African countries needs to improve for intra-African trade to improve.

Quarantine is a requirement for the trade in CBT beef under the WOA's TAHC. However, animals lose body condition whilst adapting to quarantine, which creates a barrier to market access and limits profit. Mobile quarantines could address this to some extent, although supplemental feeding during the dry season may still be required. Traceability (a requirement to access many markets) is met using ear tags. However, problems related to tag availability and supporting reading technology need to be solved.

International trade standards depend on member countries – the WOA's TAHC can be modified, as has happened before. In this regard, the group acknowledged the need to gather data generated from surveillance and monitoring operations that would support a change in the current WOA standard, to reduce the number of days in quarantine to less than 30. The group further briefly discussed the merits/demerits of vaccination vs quarantine. The role of DVS as an oversight authority to ensure compliance was pointed out, with the onus of compliance resting on the farmers.

Opportunities exist for Namibia and Botswana to jointly market wildlife friendly beef. Other areas for potential regional collaboration include surveillance, coordinated vaccination campaigns, strengthening regional laboratory capacity (particularly as related to improved testing capacity if quarantine is removed as a condition for CBT compliance) and setting KAZA standards for wildlife friendly beef.

The Future of Bwabwata National Park (BNP): Progress on Resolving Issues & Next Steps

BNP lies in the heart of KAZA and is a major transboundary movement area for wildlife. The presence of communities and cattle residing within the national park make the future of the park both uncertain as well as critical. The group discussed its future as affected by governance concerns, human-wildlife conflict, fencing related to animal disease control (particularly FMD and CBPP), conflict amongst traditional authorities and benefits accruing to resident and neighbouring communities.

Key points emerging from that discussion include:

- MEFT and MAWLR/DVS made it clear that they are aligned in their vision to see the park cleared of livestock and are supported by the legislative and policy framework at both the national and regional (KAZA) level. The KAZA Treaty itself calls for the free movement of wildlife across borders.
- An Advisory Committee for BNP was established and, along with a Parliamentary Standing Committee on the park, has been in consultations with the Chief on how to make the park a park – and not a settlement. The issue has been addressed at Cabinet and ministerial level as well.
- Three documents offer the framework for management of the park, i.e. guidelines, management plan and development plan.
- The livestock are generally not owned by the indigenous San communities who are the predominant residents of the park, but rather belong to people outside of the park.

- The Traditional Authority's custodianship of the park is also being raised with competing claims from different Traditional Authorities.
- Compensation to cattle owners has been considered after the cattle are removed but this does not address the issue of farmers' livelihoods in the long run.
- The voice of the communities, particularly the San, is important in implementing the decision to remove cattle from the park. The idea of making a compelling film, in a style like that of *Beauty and the Beef*, was discussed as a way to influence hearts and minds.
- There are two scenarios for removing the fence between BNP and Botswana to facilitate transboundary movement of wildlife: (1) removal of the fence with the cattle still in BNP, (2) removal of the fence after removing the cattle. In the case of the former, disease surveillance measures would have to be significantly strengthened, if Botswana would even consider this scenario. In both cases, the breakout group raised the need to:
 - enhance anti-poaching efforts in response to a projected increase in wildlife moving through BNP
 - improve HWC mitigation measures for the same reason
 - improve benefits accruing to resident and neighbouring communities through tourism and other livelihood interventions

Annex 3: List of Participants

No.	Surname	Name	Designation	Organization/Institution	Country	Email
1	Amatotsero	Vanessa	Research Agricultural Economist	University of Cologne	Germany	Vanessa.amatotsen@ilr.uni-bonne.de
2	Atkinson	Shirley	AHEAD Programme Coordinator	Cornell University	USA	s.atkinson@cornell.edu
3	Bollig	Michael	Professor of Environmental Anthropology	University of Cologne	Germany	Michael.bollig@uni-koeln.de
4	Chinyoka	Simbarashe	Academic Coordinator, Animal Health Programme	University of Namibia	Namibia	schinyoka@unam.na
5	Chitate	Frank	Senior Lecturer, School of Veterinary Medicine	University of Namibia	Namibia	fchitate@unam.na
6	Cloete	Desmond	Chief Marketing Officer	Meat Board of Namibia	Namibia	desmond@nammic.com.na
7	Fabiano	Ezekiel	Senior Lecturer, Wildlife Management & Tourism Studies	University of Namibia	Namibia	fabianoezekiel@gmail.com
8	Hanssen	Lise	Project Coordinator	Kwando Carnivore Project	Namibia	lise@kwandocarnivores.org
9	Kapapero	Joseph	Chief Veterinarian, North-East Regions	Directorate of Veterinary Services	Namibia	kapapelok@gmail.com
10	Kativa	Thimoteus	Livestock Procurement Manager	MeatCo Foundation	Namibia	tkativa@meatco.com.na
11	Khaiseb	Siegfried	Deputy Chief Veterinary Officer, Central Veterinary Laboratory	Directorate of Veterinary Services	Namibia	Siegfried.Khaiseb@mawlr.gov.na
12	Klingelhoefter	Ekkehard	Senior Lecturer Wildlife Management & Tourism Studies	University of Namibia	Namibia	eklingelhoefter@unam.na
13	Knight	Mike	WWF KAZA Programme Director	WWF Namibia	Zambia	mknight@wwf.na

No.	Surname	Name	Designation	Organization/Institution	Country	Email
14	Mbala	Richard	Regional Marketing Officer, Zambezi Region	Meat Board of Namibia	Namibia	mbala@nammic.com.na
15	Meyer	Nils	Senior Project Manager	KfW	Germany	nils.meyer@kfw.de
16	Mlilo	Mfundo	Researcher, Economic Geography	University of Cologne	Germany	mmlilo@uni-koeln.de
17	Modisa	Letlhogile	Chief of Party	Green Climate Fund Project, Conservation International	Botswana	lmodisa@conservation.org
18	Mokopasetso	Mokganedi	Chief Veterinary Officer	Botswana Vaccine Institute	Botswana	mmokopasetso@bvi.co.bw
19	Muradzikwa	Erdwin	KAZA DreamFund Corridors Coordinator	WWF-Namibia	Namibia	emuradzikwa@wwf.na
20	Muradzikwa	Tanaka	Trainee	Namibia Nature Foundation (NNF)	Namibia	tanaka@nnf.org.na
21	Murphy	Carol	Sustainable Agricultural Officer	Namibia Nature Foundation (NNF)	Namibia	cmurphy@nnf.org.na
22	Nyambe	Nyambe	Executive Director	KAZA TFCA Secretariat	Botswana	nnyambe@kavangozambezi.org
23	Osofsky	Steve	Director, AHEAD Programme	Cornell University	USA	s.osofsky@cornell.edu
24	Penrith	Mary- Louise	Extraordinary Professor	University of Pretoria	South Africa	marylouise_penrith@yahoo.com
25	Pielok	Heinrick	Consultant, NamParks	GOPA	Namibia	Heinrich.pielok@gopa.de
26	Ramsden	Nidhi	AHEAD Technical Liaison	Seanama Conservation Consultancy	Botswana	nidhigureja@yahoo.com
27	Revilla Diez	Javier	Professor of Economic Geography	University of Cologne	Germany	j.revilladiez@uni-koeln.de
28	Rosen	Laura	Epidemiologist for KAZA AHSWG	Victoria Falls Wildlife Trust	Zimbabwe	kazaepi@gmail.com

No.	Surname	Name	Designation	Organization/Institution	Country	Email
29	Samkange	Alaster	Head of Dept Clinical Studies, School of Veterinary Medicine	University of Namibia	Namibia	asamkange@unam.na
30	Samuntu	Freddy	Research Consultant & Private Veterinarian	Meat Board of Namibia	Namibia	fsamuntu@gmail.com
31	Set	Paul	State Veterinarian – Zambezi Region	Directorate of Veterinary Services	Namibia	eggyda93@gmail.com
32	Sharpe	Janine	Game Capture Wildlife Veterinarian	Ministry of Environment, Forestry & Tourism	Namibia	janine.sharpe@mef.gov.na
33	Shikomba	Sandra	Wildlife Veterinarian	Ministry of Environment, Forestry & Tourism	Namibia	sandra.shikomba@mef.gov.na
34	Shikongo	Beatrice	State Veterinarian, Zambezi Region	Directorate of Veterinary Services	Namibia	shikongobm13@gmail.com
35	Shilongo	Albertina	Chief Veterinary Officer & Director	Directorate of Veterinary Services	Namibia	Albertina.Shilongo@mawlr.gov.na
36	Shuro	Thompson	State Veterinarian, Kavango Region	Directorate of Veterinary Services	Namibia	shurot@hotmail.com
37	Sikopo	Colgar	Deputy Executive Director, Natural Resources Management	Ministry of Environment, Forestry & Tourism	Namibia	colgar.sikopo@mef.gov.na
38	Songhurst	Anna	Director	Ecoexist Trust	Botswana	anna.songhurst@hotmail.com
39	Taylor	Russell	KAZA Conservation Advisor	WWF-Namibia	Zimbabwe	rtaylor@wwf.na
40	Tjikua	Erwin	Chief Control Warden, Kavango East	Ministry of Environment, Forestry & Tourism	Namibia	tjikuaerwin@gmail.com
41	Uiseb	Kenneth	Deputy Director, Wildlife Research & Monitoring	Ministry of Environment, Forestry & Tourism	Namibia	kenneth.uiseb@mef.gov.na
42	Van Rooyen	Jacques	Director, Herding for Health Programme	Conservation International	South Africa	jvanrooyen@conservation.org

Annex 4: Summary of Options and Key Requirements for Export of Beef from FMD Endemic Areas

This assumes the following requirements for relevant OIE standards are in place and are therefore not included in the table:

- FMD is a notifiable disease and an official control programme that includes surveillance and routine vaccination is in place.
- Beef for export to other zones or countries is derived from animals slaughtered in an approved abattoir with ante- and post-mortem inspection.
- Cleaned and disinfected motorized transport is used to bring cattle for slaughter to the abattoir.

Note that FMD-free compartments (OIE Terrestrial Animal Health Code [TAHC] Article 8.8.4) are currently not a practical option in FMD endemic areas because FMD-vaccinated animals / FMD vaccination are excluded from compartments under the current OIE standard.

It's also important to note that countries can legitimately negotiate bilateral agreements with willing partners that differ from OIE standards. Finally, this table does not address the export of live animals.

Commodity/product	Target market	30-day official cattle quarantine	Standard or justification
Canned meat	All markets	No	OIE TAHC Article 8.8.31. Article provides details of temperatures, pressures and degree of desiccation required.
Meat that has been thoroughly cooked			
Salted/dried (break-dry) meat			
Bone-in beef (carcasses, half carcasses, quarters, cuts); deboned beef and processed products to client's preference	Countries/zones not free of FMD (i.e. same or lower status)	No	OIE TAHC Chapter 5.3 as related to World Trade Organization Sanitary and Phytosanitary (SPS) Agreement (equivalence); client requirements by agreement.
Matured (pH <6), deboned beef, visible lymph nodes removed	FMD-free countries/zones	Yes ⁷	OIE TAHC Article 8.8.22
Any other commodities	FMD-free countries/zones	Yes ⁷	Export of commodities that are not covered by an existing standard would be subject to negotiation between trading partners

⁷ Because it is not feasible to certify absence of infection within a 10km radius over the past 30 days in FMD endemic areas due to the presence of wildlife