SADC CONTROL STRATEGY FOR PESTE DES PETIT RUMINANTS (PPR)

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For comments and suggestions contact:
mmulumba@sadc.int, bhulman@sadc.int or gchiduwa@sadc.int

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1. Introduction

Peste des Petits Ruminants (PPR) is a serious viral disease of goats and sheep that causes high mortality in these two species with significant economic impact. PPR is considered as the most destructive viral disease affecting small ruminant flocks. It was first described in Côte d'Ivoire in West Africa in 1942. The existence of the disease was subsequently confirmed in Nigeria, Senegal and Ghana. By 1972 the disease had spread to Sudan. Recently the disease has spread with intent into East Africa to arrive on the doorsteps of SADC. Given that the disease affects small ruminants it impacts negatively on the food security of disadvantaged small scale farmers. The disease, which can have a mortality rate of up to 100%, has the capacity to disturb the widely acknowledged view that small ruminants are an important means to rebuild herds after environmental and political shocks.

Figure 1: Global extent of PPR infection pre-SADC region invasion

PPR is caused by a virus from the Morbillivirus genus that is a close relative of the Rinderpest virus, a disease of cattle whose earth-wide eradication was celebrated by the World Organisation for Animal Health (OIE) in June 2011. Being easily transmissible by direct contact between live animals in shared pastures and at live animal markets the principal mode of transmission for the PPR is through movement of infected livestock, most of which is illegal. The disease has so far affected West, North (Morocco), East and Central Africa while Asia and the Middle East have also not been spared.

PPR virus strains are classified into four groups using genetic characterization, three from Africa and one from Asia. One of the African groups of PPRV is also found in Asia. The epidemiological significance of these groupings is less clear at present.

2. Background

The Southern African Development Community (SADC) region was spared from PPR until the recent infections in the United Republic of Tanzania (URT) and the Democratic Republic of Congo (DRC). With the infection of these two SADC countries, the following countries which share long borders with them are at immediate risk: Angola, Zambia, Malawi and Mozambique. Other continental SADC countries are also at risk (albeit lower for the time being) by virtue of their northern neighbours being at risk. Overall the disease poses a risk to about 50 million sheep and goats in the entire SADC region. The mohair industry in Lesotho would be particularly impacted should the disease spread to that country.
Since the disease was absent in the SADC region, most countries and the SADC Secretariat

have not developed strategies on how to stem the spread of the disease in the event of getting infected. Even knowledge of the transmission dynamics of the disease is not clear. If the disease were allowed to spread from the DRC and Tanzania into the whole of the 15-nation SADC countries, it could potentially devastate the livelihoods and food security of millions of vulnerable smallholder farmers and agro-pastoralists.

It was against this background and also in recognition of the emergency nature of the threat posed by PPR to the region that the SADC TADs project organized an urgent meeting on the control of PPR. The meeting was held in Chingola, Zambia. Six countries (2 infected and four sharing borders with them) plus Namibia (as Chair of SADC at the time) participated at the meeting. Collaborating partners that also participated included African Union Inter-African Bureau for Animal Resources (AU-IBAR), Food and Agriculture Organisation Emergency Centres for Transboundary Animal Diseases (FAO-ECTAD; Gaborone and Nairobi Offices), the World Organization for Animal Health (OIE) Sub-regional Representation from Gaborone and Global Alliance for Livestock Veterinary medicines (GALVmed). The objective of the meeting was to determine the current extent of the disease in the two infected countries (DRC and URT) and the status of the four neighbouring states. Further, the workshop came up with practical action plans for immediate implementation. This draft strategy draws from the outputs of the Chingola, Zambia workshop, the joint EIS/Lab subcommittee meeting held in Johannesburg in June 2011 and comments on the zero and first drafts from different quarters.

The Democratic Republic of Congo reported that since its emergence in 2010 to June 2012, PPR had caused the death of almost 120,000 small ruminants. It estimated the direct loss, i.e. value of dead sheep and goats, to be US$5.3 million. This estimate does not take into account socio-economic impact and other benefits of goats and sheep to the smallholder farmers. (Source: SADC Status of Animal Health Bulletin 2, 2012).

At the time of printing this document PPR had spread to the province of Cabinda in Angola increasing the number of affected countries to three.

3. Methodology

While appreciating the need for a regional approach to the control of PPR, this strategy recognizes the differences in farming systems, animal health delivery service policies, culture, small ruminant population numbers, country size and other factors that distinguish each member state's risk exposure to PPR. It's for this reason that Member States still have to adapt/develop individual country strategies that will feed into the regional strategy. However, some aspects of the respective national strategies, especially those related to surveillance and vaccination, have to be synchronized with those of neighbouring states if success is to be guaranteed. Strategy also recognises that PPR being a new disease in the region there is little experience in the region with regard to:

- Diagnosis and surveillance
- Susceptible host species
- Differentiation of infected and vaccinated animals (DIVA) to distinguish between antibodies due to vaccination and those due to the disease
- Legislation on use of PPR vaccine.

4. Objectives

The main objectives of the strategy are:

- To immediately contain/control PPR virus circulating in DRC and Tanzania
- To prevent the disease from spreading to Angola, Malawi, Mozambique and Zambia.
- To propose a methodology for the long term eradication of PPR from the SADC region

The strategy spells out the roles of Member States and SADC Secretariat in addressing the threat posed by PPR to the region. It is understood that the control and eventual eradication of PPR will follow a progressive path that is in tandem with continental and other Regional Economic Community (RECs) groupings on the continent.

5. Subdivision of the SADC region for PPR Control

For the purposes of PPR control three distinct regions can be identified, each with its own peculiarities when drawing up control options. These regions are:

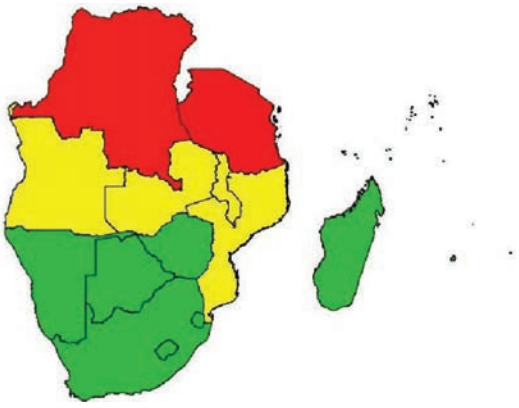

Figure 2: Map of SADC region as per PPR risk classification

5.1 Infected

The infected region refers to those countries with confirmed PPR cases in the SADC and covers DRC and Tanzania. Infection in these countries has spread to cover most of the territory to the point where their southern neighbours are now at risk of getting PPR if not already infected.

5.2 High risk

Four countries are at very high risk of getting PPR infection. They are sharing borders with the two infected countries. The borders stretch from the Atlantic to the Indian Ocean and

include Angola, Malawi, Mozambique and Zambia. Angola is currently grappling whether to notify of positive serology test without noticing clinical signs. Results were picked in the Northern border of Cabinda bordering DRC.

5.3 Low risk/currently free

Countries to the south of Angola, Zambia, and Mozambique are not considered to be at immediate risk of contracting PPR, especially if activities outlined in this strategy are implemented expeditiously. However, it is still important that the entire SADC region be on alert and carry out appropriate disease search interventions to determine the presence or absence of the disease

6. Components of the strategy

The strategy has been developed from the standpoint of five main intervention areas. These areas are Policy and legislation, Early Warning and Preparedness, Control Options, Diagnosis and Quality Control and Regional Coordination and Communication.

6.1 Policy and Legislation issues

This relates to existence or absence of an appropriate Policy and legislation environment at national level that allows for the successful and expedient handling of a PPR incursion in the country. The formulation and implementation of the SADC PPR control and eradication strategy is dependant national policy and legislation issues. This creates a chance to look at the existing opportunities or gaps created due to the existence or absence of PPR policy or legislation. The main issues that require scrutiny are discussed under the following heading:

6.1.1 Policy issues

PPR must be endorsed as a notifiable disease in all countries either by being mentioned as such or in reference to the OIE list. This is a prerequisite to ensure that funds will be released by governments in the event of an outbreak. Policies should be backed up by appropriate legislation to cover the actions of the veterinary authorities in the execution of their duties in the event of an outbreak. Governments must also have a clear policy on compensation in the event of some animals being destroyed. For such a policy to be a useful tool in disease control, it should be clear, unambiguous and easy to fast track payments to the affected farmers.

The main mode of PPR transmission is animal movement, whether illegal or under permit. With the advent of free movement of people and goods (including livestock) as SADC region ever moves closer to a borderless region, it is no longer enough for a country to rely on national animal movement controls of its neighbour to stem the spread of transboundary animal diseases (TADs). Rather movement control for TADs requires a regional approach. The concept of zoning should be adopted in cases of PPR infection. The zoning can be

triggered by an infection in a province/region and involve a protection zone within that province/region and surveillance and vaccination on a zone basis should therefore be adopted by all SADC members states. To be used as a successful control tool, zoning will require affordable traceability measures to ensure differentiation of vaccinated from non-vaccinated animals and in the absence of a test to differentiate infected from vaccinated animals (DIVA), possibly vaccinated from infected animals.

6.1.2 Legal powers

Different Member States in the region have different statutes governing disease control especially TADs. It is however important that the legal powers vested in the veterinary authorities of each MS should be clearly understood by all involved with disease control and should be described in the instructions for dealing with the disease in question. The legal powers should include: the notification of suspected exotic disease; the access to holdings keeping animals, the slaughter of infected and contact animals, and, if required, pre-emptive slaughter (contiguous cull); the destruction of carcasses and access to sites to be used for this purpose, the payment of compensation, the control of movements including the designation of protection and surveillance zones, and emergency vaccination. It is desirable that the authorities responsible for disease control should have the legal authority to invoke aid and support from the police and other civil organizations in the event of an emergency.

6.1.3 Advocacy

It is generally accepted that advocacy is useful and required to ensure support from the line Ministries and treasury at national level. However, this advocacy does not always attract government funding in adequate measure for disease control. PPR, being both new and affecting mostly small scale farmers in the region, may fail to attract the necessary attention and resources compared to diseases like Foot and Mouth Disease (FMD). Indeed evidence of this failure is that it took more than two years after the first alarm was raised about the threat of PPR incursion into SADC for a regional meeting to be organised to address the threat. For this reason, additional measures to not only draw attention to the risks posed by the disease but more importantly to mobilise resources for its control will be required.

One suggestion is to enlist the support of eminent persons in society to complement the efforts of veterinary authorities in advocating for urgent control and eventual eradication of PPR from the SADC region. In addition, a SADC Council of Ministers resolution regarding PPR will be very helpful in supporting the advocacy at national level. Caution is however, required to ensure that upwards advocacy does not lead to neglect of the downward advocacy of communities and farmers.

6.1.4 Resource Mobilisation

It is recognised that eventually, all Member States will make resources available for the

progressive control/prevention of PPR infection. In the short term, there is merit in sourcing external funding for a five year containment programme which should also include building capacity in member states. It is proposed that the five year containment programme starts with a two year FAO regional Technical Cooperation Programme (TCP) and support from projects such as the SADC TADs and Vaccines for the Control of Neglected Animal Diseases in Africa (VACNADA). Other possible sources of financing would be the soon to be established Emergency fund for the Control of TADs in the SADC region. The possibility of contributions from countries which are still free from PPR and are eager to maintain that status should also be explored.

Figure 3: PPR infected goat in a typical goat house

6.1.5 Private-Public-Partnerships (PPP)

Given the characteristics of the small ruminant production in most SADC Member States (smallholder, poor, rural, poorly organised, communal grazing, poor infrastructure) there is little scope for major PPP, except for the involvement of private veterinarians in the delivery system. Where this may be an exception, PPP should be encouraged in tackling PPR because it is likely to be more sustainable than complete reliance on government and donor financing alone.

6.1.6 Delivery system

The control of PPR being a public good, it is recommended that the government should provide adequate cold-chain facilities in the target areas and cover other related delivery costs in the first 2 years of emergence of the disease before phasing out towards cost recovery. Given the compulsory nature of the vaccination and the limited geographical areas involved, vaccine distribution should be limited to the veterinary authorities, possibly with the assistance of selected (accredited) private veterinary practitioners.

It will also be important for Member States to adopt a harmonised approach to the choice of PPR vaccine and registration throughout the region. GALVmed have offered to assist countries with the preparation of dossiers which will be used to register the PPR vaccine in countries where the vaccine is not yet registered. Botswana Vaccine Institute (BVI) on the other hand has also indicated that they are able and prepared to produce PPR vaccine for the region. Given that this is an important and new TAD to the region it must be the governments' responsibility to ensure that vaccines are available, while delivery can be done by the private sector where possible under supervision of relevant veterinary authorities.

6.1.7 Capacity-building

Capacity building needs foreseen under Policy and Legislation relate to the training and facilitation of regulators (pharmaceutical authorities) on the need to have a harmonised registration of the PPR vaccine at regional (SADC) level. The second area of focus will be targeted at veterinary authorities and will be linked to building capacity in traceability systems, more specifically, vaccination and DIVA approaches.

6.2 Early Warning and Preparedness

6.2.1 Emergency preparedness plans (EPP)

All countries must have contingency and emergency preparedness plans which clearly spell out what actions must be taken in the event of a PPR outbreak. The outline of the contingency plan must include surveillance, risk factors and stakeholder identification and analysis and action plans. More specifically the plans should spell out;

- Nature of disease
- Risk analysis for PPR
- Prevention strategies
- Early warning contingency plan
- Strategies for control and eradication of PPR
- Support plans-resources, legislation etc.
- Action plans and budgets
- M&E

Countries which do not already have these plans should be assisted to develop them.

6.2.2 Risk analysis (RA)

For PPR control to be effective the approach must be risk based. Member States should be conversant with risk estimation techniques so that efforts can be concentrated on critical points of the disease transmission cycle to make sure that chances of success and impact are maximised. The risk analysis should focus on

- Distribution of susceptible population (primarily goats and sheep),
- Animal Movement,
- The number of known/established and unknown/seasonal stock routes,
- Trade,
- The number, activities and distribution of livestock auctions/markets,
- Cultural practices,
- Production systems,
- Quality of veterinary services,
- Insecurity (civil unrest),
- Knowledge about the disease,
- Wide range of susceptible and virus maintenance hosts(annex 1),

- Presence of a wildlife foci,
- Number, activities and distribution of grazing and water holes,
- Interaction of domestic /wild life at grazing/ watering point,
- PPR status across the international border/s,
- Presence of remote and inaccessible areas with limited veterinary contacts, and
- Road and highway access / communication /transportation.

6.2.3 Surveillance options

When analysing the surveillance options to employ, determining the objectives of the surveillance is important. Ideally surveillance should aim to:

- Define the extent of the disease,
- Detect new outbreaks,
- Establish disease-free zones,
- Monitor disease trend, and
- Inform decision making at various disease control critical points/levels.

Risk based surveillance is the most cost effective way of detecting and monitoring the disease.

The surveillance options will however vary from country to country and even within each country depending on status of infection, level of risk and purpose of the surveillance need to be classified as

- Low risk (currently free PPR free) – Surveillance should ffocus on early detection and response. Ssurveillance system should aim at demonstrating absence of the disease.
- High risk- surveillance should ffocus on detection of incursions – Early warning surveillance at “hot spots”.
- Infected areas – Ssurveillance should ffocus on detailed information on disease dynamics and patterns including extent of spread

6.2.4 Simulation exercises

Simulation exercises can be a valuable tool in preparing the country to cope with an actual PPR infection. Examples can be drawn from Avian influenza simulation exercises which played a key role in identifying the weak points in the system if the disease was to strike. Further, simulation exercises would also serve the additional purpose of creating awareness about PPR and the dangers it poses. Given the cost of carrying out actual field level simulation exercises, desktop simulations on PPR are recommended for all countries or at least all affected or high risk countries because they are cheaper and faster to carry out. However, there should be at least one field level simulation exercise in the region.

6.2.5 Other small ruminant diseases

Some diseases may pose a challenge in the diagnosis of PPR because of similarities in the

presentation of the disease (e.g. ORF, PASTEURALOSIS, POX, CCPP). Field personnel must be able to perform differential diagnosis to distinguish PPR from other diseases which present with similar symptoms. At the same time the chance to undertake surveillance for PPR should also be used to actively search for other small ruminant diseases. MS veterinary authorities should be advised to generate disease(s) recognition manual(s) consistent to PPR and other PPR related disease for ease of diagnosis and reporting disease outbreak

6.3 Control Options

6.3.1 Vaccination

To halt further spread of the disease, targeted vaccination of small ruminants based on critical control points such as livestock markets and transport routes used by traders and semi pastoralists is recommended Risk based vaccination of small ruminants across the length of DRC-Tanzania border with their southern neighbours based on the suspected/ known distribution of the disease and overall rating of the critical points in terms of risk posed is particularly relevant, as any virus here poses a risk to SADC as a whole.

The advantages of vaccination as a control option are that the vaccine is readily available and very cheap. It confers immunity which lasts for 3 years and hence most animals will only need two vaccinations in their life time.

Figure 4: PPR infected goats in DRC

However, annual vaccination is recommended due to the high reproductive rate of small ruminants. Current vaccine strains especially the Nigeria 75/1 is protective against other circulating strains. Information from Tanzania suggests that the circulating strain is not the Nigeria 75/1 but that of lineage IV. It will be important to determine which strain(s) are circulating in newly infected countries. Vaccination rates are very high due to daily kraaling.

The only current disadvantage for countries which are still free from infection is the lack of a DIVA test to distinguish between infection and vaccination. Proper affordable identification/ marking such as ear notching of the vaccinated animals is therefore of utmost importance because of the value it presents in distinguishing vaccinated animals from unvaccinated ones.

6.3.2 Stamping out

This option is favoured only in situations where the infected population is small and well defined and government has mechanisms in place to compensate the affected farmers. The

ability to regain previous disease free status quickly and therefore be able to trade again is the biggest advantage of this option. The option is best suited for high risk areas with low density of animals and for low risk areas.

The main disadvantage of this option is that it is usually an expensive and therefore unattractive exercise for the State and as a result there is little political will to implement stamping out. It also has social and economically devastating consequences for affected communities even if they will be compensated. Other disadvantages linked to this option are loss of genetic material, it diminishes the national herd, is difficult to carry out in light of lack of fences and zones to curtail movement in the event of an outbreak and last but least it is politically very difficult. Only in countries such as Lesotho and possibly (southern) Namibia where the mohair industry is very developed may such an option make sense, but also only if the disease is detected early and the losses can be minimised.

6.2.4 Zoning (protection)

Zoning as a concept for protection against PPR in the region should be viewed from two standpoints; zoning based on risk of infection by SADC Member States and also within countries themselves. Listing the countries in terms of risk continental SADC can be divided into infected zone- DRC and Tanzania, High risk zone- Angola, Malawi, Mozambique and Zambia, and Low Risk zone – Botswana, Lesotho, Namibia, South Africa, Swaziland and Zimbabwe. Internally as each individual country maps out its risk zones it is important to understand the dynamics of small stock rearing in those areas and how these may affect the risk, for example movement patterns, rearing systems and market factors.

6.2.5 Bio-security

To stem the spread of PPR in the region it will be critical to observe strict Biosecurity and biosafety measures. Illegal movements from high risk areas should result in stiff penalties for offenders. At the same time it will be important for veterinary authorities to develop systems from an incremental level upwards to facilitate trade once there is evidence that the disease is no longer present. Authorities should not be perceived to be unduly restricting legitimate trade but instead to be doing everything possible to facilitate legitimate trade whenever possible. Measures such as building of quarantine facilities at border points to screen and clear clean animals for trade should be encouraged.

There should however be restrictions on live animal movement from high risk areas. No trade of live animals should take place from such areas until freedom is attained in accordance with OIE guidelines. All stakeholders such as the police, customs officials and farmers themselves must be engaged to support the movement restrictions from infected areas.

6.3.5 Capacity-building needs

Member States should create awareness through simple technical messages for farmers,

traders, politicians, community leaders, the media, law enforcement officers, and the general public at large. There will be a need for all MS to train field staff in the available control options such as vaccination, stamping out, zoning, and biosecurity. MS should also provide the necessary material and financial resources to implement the available control options.

6.4 Diagnosis and Quality Control

6.4.1 Diagnosis and quality-assurance (QA)

The effective control of PPR is dependent on early and correct diagnosis of the disease. Each country must have capacity for immediate diagnosis for PPR. Appropriate specimen must be collected, preserved and transported to diagnostic laboratories as per OIE recommendations. Inter-laboratory testing, net-working and proficiency testing of PPR samples between SADC laboratories should be encouraged. In addition, each laboratory should have a quality management system in place following ISO17025.

Figure5: Specimen Collection

6.4.2 Diagnostic tests

CELISA is recommended as the minimum test for the region. In this regard, an up-to-date protocol for the test should be made available to all laboratories specifying the minimum requirements for sampling as indicated above. Other tests to be applied over and above the cELISA test depending on the capacity of each laboratory include the Indirect ELISA, Sandwich ELISA, Antigen detecting Test, Agar gel immune-diffusion, virus neutralization test (VNT), virus isolation, counter immune-electrophoresis, nucleic acid detection techniques and characterisation.

6.4.3 Biosecurity at laboratory level

Each laboratory should be a minimum P2 level with at least laminar flow cabinets fitted. SADC laboratory subcommittee should carry out audits to ensure that all the laboratories are following good laboratory practices.

6.4.4 Capacity-building needs

Capacity building requirements in the Member States should focus on ensuring that field PPR diagnostic requirements are met. The focus should be on provision of adequate equipment, training of laboratory and field personnel, knowledge management and access to vaccines in times of emergency. Twinning of SADC laboratories with reference laboratories for PPR and Inter laboratory collaboration between veterinary diagnostic laboratories in the SADC region should be encouraged. Existing capacities in the region should be tapped.

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

6.5 Regional Coordination and Communication

6.5.1 Regional coordination

Regional coordination should be seen from two levels, the regional office with the Member States and the regional office with other regional economic groupings such as the Common market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). Regional economic community (REC) coordination is important to capture synergies and

complementarities between the RECs. Coordination should be perceived as platform for dialogue to harmonize strategies, approaches, regulation and sharing knowledge and build a sense of ownership amongst member state. For the countries effective coordination of PPR entails a need to identify the weaknesses and strengths of member countries. The countries should identify focal points for coordination of PPR activities. The process for needs assessment should not take longer than one year to be completed for all member states. It is important to indicate that a multi-disease approach better than targeting a single TAD.

6.5.2 Communication

Communication of information on PPR should be channeled through a variety of methods including but not limited to workshops, published and laboratory based materials, websites, leaflets, brochures, posters and use of community radio stations. Each MS will therefore need to develop a communication strategy for PPR.

6.5.3 Publicity and awareness

The veterinary services in Member States rely on stockowners or on veterinarians attending to livestock to notify the possible occurrence of an exotic disease. Notification needs to be prompt and accurate so that all outbreaks are identified as soon as possible without raising too many false alarms. Prompt and accurate notification can only be achieved if the veterinary profession and stockowners are aware of the danger posed by PPR and are conversant with the clinical signs of the disease. For this purpose, Member States should ensure that awareness of the disease is maintained within the veterinary profession, in the livestock/agricultural community and by the general public. Information materials should be prepared and made available for the different target groups. Though it may not sound very practical, continuous education and awareness creation using a combination of tools/techniques at household/ farm level might be logical. However, education materials/ information targeting custodians of small ruminants i.e. young boys and women should be considered as an entry point.

6.5.4 Information and knowledge management

Recognizing that Member States send data to SADC, it is also incumbent upon SADC to feedback such information to all Member States. MS must strengthen their epidemiology units for the data collection, collation, storage and analysis for PPR and report to SADC on PPR status through LIMS. National

Figure 6: PPR has up to 80% mortality rate in acute cases

LIMS units should endeavor to collect, collate and submit complete LIMS reports. Regular submission of Livestock and Livestock Products Price reports and Livestock Production reports can facilitate a more comprehensive Socio-economic analysis of impact of PPR. This will make it easy for the SADC secretariat to provide in-depth and reliable analysis as and when required without looking for additional data. The Livestock production modules which should provide details of primary impact of livestock disease should be used equally as Animal Health modules of LIMS.

6.5.5 Monitoring & evaluation (M&E)

Monitoring and Evaluation should form an integral part of the activities for tracking of implementation progress. The strategy shall be reviewed from time to time based on the M&E reports.

6.5.6 Resource mobilisation

SADC should be in the forefront in mobilizing resources for regional PPR control efforts. However, collaborating partners like FAO, AU-IBAR and OIE should also be approached to play their part in mobilizing funds for PPR control.

6.5.7 Advocacy

The lessons learnt and knowledge acquired from tackling PPR outbreaks in other countries should be used in advocacy to prevent the spread of the disease in newly infected countries. The identification of eminent person(s) to articulate the risks posed by PPR and how they can be overcome is one good approach.

6.6 Post vaccination/containment process

PPR shall be controlled by vaccination with an appropriate vaccine in areas where the disease occurred. Vaccination of the entire susceptible population should result in the virus dying out, there as allowing discontinuation of vaccination after only a couple of years. The effectiveness of the vaccination strategy should be reviewed within an appropriate timeframe. It is suggested that initially 3-to-5 years of vaccination should be completed before assessment of its effectiveness. In the context of the 5 years national preparedness and response plan, based up on the expert recommendation, sheep and goat vaccination may come to an end on the following situations:

- based on the analysis of the national, regional and international PPR situation and if the risk of introduction of the disease is remote;
- if effectiveness of vaccination is proved to be low and other interventions are preferred

Tracing and surveillance will be used to determine the distribution of the disease and the disease-free areas. Wildlife, if present, must be included in the survey. Trace-in should include all movements of sheep and goats, their products, people and fomites onto the premises over the period of 21 days before the first case. Trace-out is to include all movements off the infectious flocks since 30 days before the first case.

6.7 Research needs

Urgent research is required in the development of Pen side tests, DIVA tests and genotyping of strains at molecular level. Epidemiological research is also needed to understand transmission dynamics, drivers of virus lineage and maintenance in various ecosystems. There is also need to involve universities in impact assessment studies. Other areas include research on development of thermo tolerant vaccines the role of wildlife and other domesticated animals (cattle, donkeys) in disease outbreaks and the identification of critical points and optimal methods for intervention.

6.8 Socio-economic issues

Studies should be undertaken to identify incentives which will enhance the participation of farmers in the control of PPR. Appropriate strategies will only be implemented after Cost-benefit analysis of control measures. Other studies are required to establish the drivers of PPR epidemics.

7 Research

Research should also explore the modest model of disease control/mitigation. Involvement of other players (i.e. farmers, livestock keepers groups, animal health delivery agents, NGOs and civil society) are the main focus group to exploit. Financing mechanisms

7.1 Government

PPR is a TAD and therefore fully qualifies as a public good whose control must be funded by government. For this to take place the profile of PPR must be raised to that commensurate with other equally serious TADs such as FMD and CBPP. Governments usually require full details on the impact and the cost of control options. The availability of various control options and their cost also assist in allocation of funds towards control.

7.2 Private sector involvement

The involvement of the private sector in PPR control should be encouraged even though it should be appreciated that in emergency situations like those existing now in our region, the immediate responsibility of control of PPR lies with the government.

7.3 Public Private Partnerships

Given characteristics of the small ruminant sector in most Member States (poor, rural, poorly organised) there is little scope for major PPP, except for the involvement of private veterinarians in the delivery system. The exception to this may be in countries such as Lesotho where the mohair industry is very important to the economy and Namibia where Goat exports to South Africa are significant, private companies involved in the business could form important partnerships.

7.4 Other funding mechanisms

Other mechanisms which would merit exploration include the setting up of a regional PPR fund. Further, countries should keep an open mind on possible cross-border funding of vaccination campaigns.

8 Conclusion

The presence of the PPR in the SADC region is a very worrisome situation which should be remedied as soon as possible. Countries already infected and those at high risk must be assisted to take immediate measures to contain further spread of the disease southwards. These measures should include updating of preparedness plans or developing new ones if they do not exist, strengthening controls of animal movement from the infected areas, improving surveillance and creating awareness of the disease to all stakeholders. A detailed risk assessment of the situation in Angola, Malawi, Mozambique, Tanzania and Zambia should be undertaken as a matter of priority. Further, harmonised surveillance 50 km along the common borders of DRC and Tanzania with their southern neighbours should be undertaken urgently.

In infected countries strict animal movement control and vaccination of small stock until demonstration of freedom from clinical disease is recommended. In high risk areas the recommendation is to vaccinate until the risk has diminished. In low risk and disease free areas surveillance must be intensified to prove continued absence of the disease and should the disease appear stamping out if the foci is small followed by vaccination is the recommended course of action. If the following measures are employed control of the PPR in the SADC region can be achieved within 5 years with eradication being a real possibility within 10 years.

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Transboundary and Emerging Diseases

10 Annexes

PPR surveillance Protocol

11 Additional Notes

Vaccination modalities

The objective is to provide adequate vaccination coverage at a reasonable cost, routine mass vaccination once or perhaps twice a year (as is the case now) is very expensive to achieve and lessons from Rinderpest eradication campaigns shows it is very hard to achieve and then maintain high levels of herd/flock immunity this way. A risk based approach with good (passive and active) surveillance, including clinical PPR scouting, supported by quickly administration of outbreaks and surrounding areas will have equal or greater impact. The objective should be to map the high risk areas for PPR, following seasonal movements, festivals, trade etc. Consequently resources can be concentrated more on these critical surveillance/hot-points. Therefore, the following vaccination modalities will be adopted:

11.1 Targeted vaccination (Risk based)

- Sheep and goats in and around critical surveillance points are considered as sites for mandatory targeted vaccination.
- A small proportion of tagged animals (10-20%) are left as unvaccinated sentinel population (OIE recommendations - DIVA strategy) to test the effectiveness of the vaccination program and assess the presence of circulating (encroached) PPR virus in that village.
- Animals of less than 6 months will not be considered in this vaccination program, mainly due to the maternal antibodies.
- Unvaccinated identified sentinel flocks must be permanently identified (tagged) and placed in the vaccinated flock.

- There must be a monitoring system in place to assess the effectiveness of vaccination and to check the overall PPR status of the flock.
- This vaccination modality will be implemented with cost sharing (only cost of vaccines).
- In order to ensure a healthier population of sheep and goats, this targeted/ring vaccination will be integrated with the delivery of other sheep and goat vaccines e.g. got pox, CCPP vaccines and antihelmintics.
- In order to ensure timely and extensive ground coverage, MARF will work in partnership with private veterinary service providers in the provision of vaccination services.

11.2 Ring vaccination

This is a vaccination modality to be adopted in response to an outbreak in a radius of 5 – 10 km around an infectious village. Depending on the sheep and goat density, movement and market activities, vaccination activity in the area could shrink (low risk of spread) or expand (high risk of spread).

11.3 Vaccine administration

The following should be considered in the process of vaccine administration by the vaccination teams of veterinarians, technicians and assistants ('vaccinators'):

- The vaccination teams must be trained in both the vaccination procedures and appropriate personal protection measures including the correct use of personal protective equipment (PPE).
- Team members should follow manufacturers' recommendations on the storage, delivery and administration of vaccines.
- Team members should ensure that detailed records of vaccination (number and species vaccinated, location, date, identification numbers of sentinel flocks etc.) are recorded and entered in relevant databases or information system for analysis.
- Vaccination team members should also be well trained in bio-security measures to ensure they follow appropriate cleaning and disinfection procedures that minimize any risk of their spreading PPR viruses or other poultry pathogens between flocks.
- Depending on availability of human resources in a particular locality and scale of operation, stockowners could also receive adequate tailor-made training in administration of vaccine, supplied with vaccine and participate in vaccination programs under properly controlled conditions allowing appropriate record keeping.

11.4 Practical considerations of vaccination

- Vaccination cannot be used as a panacea or in isolation from other measures that must be applied in the face of on-going outbreaks (e.g. stamping out, bio-security, disinfection).

- Sufficient quantities of appropriate vaccines must be available for the planned duration of the vaccination program.
- Logistic arrangements must be in place for delivery and administration of vaccine.
- An exit strategy (after which vaccine would no longer be used) should be identified.
- OIE recommendations should be followed, including in relation to the implementation of a DIVA strategy.

Considerations of risk based surveillance should focus on the following:

- High risk areas
- Vaccinated areas
- Endemic areas
- Newly infected areas,
- Perceived free areas.
- Presence of wild life and the associated interaction with domestic livestock species
- Role of specific country production system
- Existence and capability of the formal /informal animal health delivery agents including laboratory capacities
- Location and the proximity of the nearest known epidemic/endemic foci
- Areas with poor (passive) reporting history

Perception of the threat and envisaged output determines whether active or passive surveillance should be used. For instance if you are looking for a new virus strain lineage, a targeted risk based surveillance may be relevant. However, for the case of just an outbreak in a PPR strain known area – passive surveillance may suffice. Moreover and where feasible integrated surveillance systems involving participation of key stakeholders are likely to be more informative in providing accurate disease information. Participatory surveillance complemented by clinical surveillance should be part and parcel of the national PPR surveillance. The advantage of participatory surveillance over the others is that the beneficiaries will be taken on board right from surveillance to disease control stages. Under such circumstances the sense of ownership is cultivated.

Notes

SADC SECRETARIAT
P/BAG 0095, GABORONE, BOTSWANA
TEL: (267) 395 1863, FAX: (267) 397 2848, Email: registry@sadc.int, Website: www.sadc.int

Designed & Printed by Multitech Consultancy Tel: +267 3923197 / 72154267 / 3935064 Fax: +267 3923243

SADC CONTROL STRATEGY FOR PESTE DES PETIT RUMINANTS (PPR)

For comments and suggestions contact:
mmulumba@sadc.int, bhulman@sadc.int or gchiduwa@sadc.int

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1. Introduction

Peste des Petits Ruminants (PPR) is a serious viral disease of goats and sheep that causes high mortality in these two species with significant economic impact. PPR is considered as the most destructive viral disease affecting small ruminant flocks. It was first described in Côte d'Ivoire in West Africa in 1942. The existence of the disease was subsequently confirmed in Nigeria, Senegal and Ghana. By 1972 the disease had spread to Sudan. Recently the disease has spread with intent into East Africa to arrive on the doorsteps of SADC. Given that the disease affects small ruminants it impacts negatively on the food security of disadvantaged small scale farmers. The disease, which can have a mortality rate of up to 100%, has the capacity to disturb the widely acknowledged view that small ruminants are an important means to rebuild herds after environmental and political shocks.

Figure 1: Global extent of PPR infection pre-SADC region invasion

PPR is caused by a virus from the Morbillivirus genus that is a close relative of the Rinderpest virus, a disease of cattle whose earth-wide eradication was celebrated by the World Organisation for Animal Health (OIE) in June 2011. Being easily transmissible by direct contact between live animals in shared pastures and at live animal markets the principal mode of transmission for the PPR is through movement of infected livestock, most of which is illegal. The disease has so far affected West, North (Morocco), East and Central Africa while Asia and the Middle East have also not been spared.

PPR virus strains are classified into four groups using genetic characterization, three from Africa and one from Asia. One of the African groups of PPRV is also found in Asia. The epidemiological significance of these groupings is less clear at present.

2. Background

The Southern African Development Community (SADC) region was spared from PPR until the recent infections in the United Republic of Tanzania (URT) and the Democratic Republic of Congo (DRC). With the infection of these two SADC countries, the following countries which share long borders with them are at immediate risk: Angola, Zambia, Malawi and Mozambique. Other continental SADC countries are also at risk (albeit lower for the time being) by virtue of their northern neighbours being at risk. Overall the disease poses a risk to about 50 million sheep and goats in the entire SADC region. The mohair industry in Lesotho would be particularly impacted should the disease spread to that country.
Since the disease was absent in the SADC region, most countries and the SADC Secretariat

have not developed strategies on how to stem the spread of the disease in the event of getting infected. Even knowledge of the transmission dynamics of the disease is not clear. If the disease were allowed to spread from the DRC and Tanzania into the whole of the 15-nation SADC countries, it could potentially devastate the livelihoods and food security of millions of vulnerable smallholder farmers and agro-pastoralists.

It was against this background and also in recognition of the emergency nature of the threat posed by PPR to the region that the SADC TADs project organized an urgent meeting on the control of PPR. The meeting was held in Chingola, Zambia. Six countries (2 infected and four sharing borders with them) plus Namibia (as Chair of SADC at the time) participated at the meeting. Collaborating partners that also participated included African Union Inter-African Bureau for Animal Resources (AU-IBAR), Food and Agriculture Organisation Emergency Centres for Transboundary Animal Diseases (FAO-ECTAD; Gaborone and Nairobi Offices), the World Organization for Animal Health (OIE) Sub-regional Representation from Gaborone and Global Alliance for Livestock Veterinary medicines (GALVmed). The objective of the meeting was to determine the current extent of the disease in the two infected countries (DRC and URT) and the status of the four neighbouring states. Further, the workshop came up with practical action plans for immediate implementation. This draft strategy draws from the outputs of the Chingola, Zambia workshop, the joint EIS/Lab subcommittee meeting held in Johannesburg in June 2011 and comments on the zero and first drafts from different quarters.

The Democratic Republic of Congo reported that since its emergence in 2010 to June 2012, PPR had caused the death of almost 120,000 small ruminants. It estimated the direct loss, i.e. value of dead sheep and goats, to be US$5.3 million. This estimate does not take into account socio-economic impact and other benefits of goats and sheep to the smallholder farmers. (Source: SADC Status of Animal Health Bulletin 2, 2012).

At the time of printing this document PPR had spread to the province of Cabinda in Angola increasing the number of affected countries to three.

3. Methodology

While appreciating the need for a regional approach to the control of PPR, this strategy recognizes the differences in farming systems, animal health delivery service policies, culture, small ruminant population numbers, country size and other factors that distinguish each member state's risk exposure to PPR. It's for this reason that Member States still have to adapt/develop individual country strategies that will feed into the regional strategy. However, some aspects of the respective national strategies, especially those related to surveillance and vaccination, have to be synchronized with those of neighbouring states if success is to be guaranteed. Strategy also recognises that PPR being a new disease in the region there is little experience in the region with regard to:

- Diagnosis and surveillance
- Susceptible host species
- Differentiation of infected and vaccinated animals (DIVA) to distinguish between antibodies due to vaccination and those due to the disease
- Legislation on use of PPR vaccine.

4. Objectives

The main objectives of the strategy are:

- To immediately contain/control PPR virus circulating in DRC and Tanzania
- To prevent the disease from spreading to Angola, Malawi, Mozambique and Zambia.
- To propose a methodology for the long term eradication of PPR from the SADC region

The strategy spells out the roles of Member States and SADC Secretariat in addressing the threat posed by PPR to the region. It is understood that the control and eventual eradication of PPR will follow a progressive path that is in tandem with continental and other Regional Economic Community (RECs) groupings on the continent.

5. Subdivision of the SADC region for PPR Control

For the purposes of PPR control three distinct regions can be identified, each with its own peculiarities when drawing up control options. These regions are:

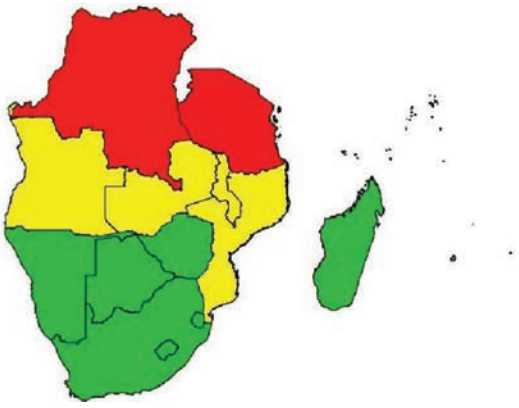

Figure 2: Map of SADC region as per PPR risk classification

5.1 Infected

The infected region refers to those countries with confirmed PPR cases in the SADC and covers DRC and Tanzania. Infection in these countries has spread to cover most of the territory to the point where their southern neighbours are now at risk of getting PPR if not already infected.

5.2 High risk

Four countries are at very high risk of getting PPR infection. They are sharing borders with the two infected countries. The borders stretch from the Atlantic to the Indian Ocean and

include Angola, Malawi, Mozambique and Zambia. Angola is currently grappling whether to notify of positive serology test without noticing clinical signs. Results were picked in the Northern border of Cabinda bordering DRC.

5.3 Low risk/currently free

Countries to the south of Angola, Zambia, and Mozambique are not considered to be at immediate risk of contracting PPR, especially if activities outlined in this strategy are implemented expeditiously. However, it is still important that the entire SADC region be on alert and carry out appropriate disease search interventions to determine the presence or absence of the disease

6. Components of the strategy

The strategy has been developed from the standpoint of five main intervention areas. These areas are Policy and legislation, Early Warning and Preparedness, Control Options, Diagnosis and Quality Control and Regional Coordination and Communication.

6.1 Policy and Legislation issues

This relates to existence or absence of an appropriate Policy and legislation environment at national level that allows for the successful and expedient handling of a PPR incursion in the country. The formulation and implementation of the SADC PPR control and eradication strategy is dependant national policy and legislation issues. This creates a chance to look at the existing opportunities or gaps created due to the existence or absence of PPR policy or legislation. The main issues that require scrutiny are discussed under the following heading:

6.1.1 Policy issues

PPR must be endorsed as a notifiable disease in all countries either by being mentioned as such or in reference to the OIE list. This is a prerequisite to ensure that funds will be released by governments in the event of an outbreak. Policies should be backed up by appropriate legislation to cover the actions of the veterinary authorities in the execution of their duties in the event of an outbreak. Governments must also have a clear policy on compensation in the event of some animals being destroyed. For such a policy to be a useful tool in disease control, it should be clear, unambiguous and easy to fast track payments to the affected farmers.

The main mode of PPR transmission is animal movement, whether illegal or under permit. With the advent of free movement of people and goods (including livestock) as SADC region ever moves closer to a borderless region, it is no longer enough for a country to rely on national animal movement controls of its neighbour to stem the spread of transboundary animal diseases (TADs). Rather movement control for TADs requires a regional approach. The concept of zoning should be adopted in cases of PPR infection. The zoning can be

triggered by an infection in a province/region and involve a protection zone within that province/region and surveillance and vaccination on a zone basis should therefore be adopted by all SADC members states. To be used as a successful control tool, zoning will require affordable traceability measures to ensure differentiation of vaccinated from non-vaccinated animals and in the absence of a test to differentiate infected from vaccinated animals (DIVA), possibly vaccinated from infected animals.

6.1.2 Legal powers

Different Member States in the region have different statutes governing disease control especially TADs. It is however important that the legal powers vested in the veterinary authorities of each MS should be clearly understood by all involved with disease control and should be described in the instructions for dealing with the disease in question. The legal powers should include: the notification of suspected exotic disease; the access to holdings keeping animals, the slaughter of infected and contact animals, and, if required, pre-emptive slaughter (contiguous cull); the destruction of carcasses and access to sites to be used for this purpose, the payment of compensation, the control of movements including the designation of protection and surveillance zones, and emergency vaccination. It is desirable that the authorities responsible for disease control should have the legal authority to invoke aid and support from the police and other civil organizations in the event of an emergency.

6.1.3 Advocacy

It is generally accepted that advocacy is useful and required to ensure support from the line Ministries and treasury at national level. However, this advocacy does not always attract government funding in adequate measure for disease control. PPR, being both new and affecting mostly small scale farmers in the region, may fail to attract the necessary attention and resources compared to diseases like Foot and Mouth Disease (FMD). Indeed evidence of this failure is that it took more than two years after the first alarm was raised about the threat of PPR incursion into SADC for a regional meeting to be organised to address the threat. For this reason, additional measures to not only draw attention to the risks posed by the disease but more importantly to mobilise resources for its control will be required.

One suggestion is to enlist the support of eminent persons in society to complement the efforts of veterinary authorities in advocating for urgent control and eventual eradication of PPR from the SADC region. In addition, a SADC Council of Ministers resolution regarding PPR will be very helpful in supporting the advocacy at national level. Caution is however, required to ensure that upwards advocacy does not lead to neglect of the downward advocacy of communities and farmers.

6.1.4 Resource Mobilisation

It is recognised that eventually, all Member States will make resources available for the

progressive control/prevention of PPR infection. In the short term, there is merit in sourcing external funding for a five year containment programme which should also include building capacity in member states. It is proposed that the five year containment programme starts with a two year FAO regional Technical Cooperation Programme (TCP) and support from projects such as the SADC TADs and Vaccines for the Control of Neglected Animal Diseases in Africa (VACNADA). Other possible sources of financing would be the soon to be established Emergency fund for the Control of TADs in the SADC region. The possibility of contributions from countries which are still free from PPR and are eager to maintain that status should also be explored.

Figure 3: PPR infected goat in a typical goat house

6.1.5 Private-Public-Partnerships (PPP)

Given the characteristics of the small ruminant production in most SADC Member States (smallholder, poor, rural, poorly organised, communal grazing, poor infrastructure) there is little scope for major PPP, except for the involvement of private veterinarians in the delivery system. Where this may be an exception, PPP should be encouraged in tackling PPR because it is likely to be more sustainable than complete reliance on government and donor financing alone.

6.1.6 Delivery system

The control of PPR being a public good, it is recommended that the government should provide adequate cold-chain facilities in the target areas and cover other related delivery costs in the first 2 years of emergence of the disease before phasing out towards cost recovery. Given the compulsory nature of the vaccination and the limited geographical areas involved, vaccine distribution should be limited to the veterinary authorities, possibly with the assistance of selected (accredited) private veterinary practitioners.

It will also be important for Member States to adopt a harmonised approach to the choice of PPR vaccine and registration throughout the region. GALVmed have offered to assist countries with the preparation of dossiers which will be used to register the PPR vaccine in countries where the vaccine is not yet registered. Botswana Vaccine Institute (BVI) on the other hand has also indicated that they are able and prepared to produce PPR vaccine for the region. Given that this is an important and new TAD to the region it must be the governments' responsibility to ensure that vaccines are available, while delivery can be done by the private sector where possible under supervision of relevant veterinary authorities.

6.1.7 Capacity-building

Capacity building needs foreseen under Policy and Legislation relate to the training and facilitation of regulators (pharmaceutical authorities) on the need to have a harmonised registration of the PPR vaccine at regional (SADC) level. The second area of focus will be targeted at veterinary authorities and will be linked to building capacity in traceability systems, more specifically, vaccination and DIVA approaches.

6.2 Early Warning and Preparedness

6.2.1 Emergency preparedness plans (EPP)

All countries must have contingency and emergency preparedness plans which clearly spell out what actions must be taken in the event of a PPR outbreak. The outline of the contingency plan must include surveillance, risk factors and stakeholder identification and analysis and action plans. More specifically the plans should spell out;

- Nature of disease
- Risk analysis for PPR
- Prevention strategies
- Early warning contingency plan
- Strategies for control and eradication of PPR
- Support plans-resources, legislation etc.
- Action plans and budgets
- M&E

Countries which do not already have these plans should be assisted to develop them.

6.2.2 Risk analysis (RA)

For PPR control to be effective the approach must be risk based. Member States should be conversant with risk estimation techniques so that efforts can be concentrated on critical points of the disease transmission cycle to make sure that chances of success and impact are maximised. The risk analysis should focus on

- Distribution of susceptible population (primarily goats and sheep),
- Animal Movement,
- The number of known/established and unknown/seasonal stock routes,
- Trade,
- The number, activities and distribution of livestock auctions/markets,
- Cultural practices,
- Production systems,
- Quality of veterinary services,
- Insecurity (civil unrest),
- Knowledge about the disease,
- Wide range of susceptible and virus maintenance hosts(annex 1),

- Presence of a wildlife foci,
- Number, activities and distribution of grazing and water holes,
- Interaction of domestic /wild life at grazing/ watering point,
- PPR status across the international border/s,
- Presence of remote and inaccessible areas with limited veterinary contacts, and
- Road and highway access / communication /transportation.

6.2.3 Surveillance options

When analysing the surveillance options to employ, determining the objectives of the surveillance is important. Ideally surveillance should aim to:

- Define the extent of the disease,
- Detect new outbreaks,
- Establish disease-free zones,
- Monitor disease trend, and
- Inform decision making at various disease control critical points/levels.

Risk based surveillance is the most cost effective way of detecting and monitoring the disease.

The surveillance options will however vary from country to country and even within each country depending on status of infection, level of risk and purpose of the surveillance need to be classified as

- Low risk (currently free PPR free) – Surveillance should ffocus on early detection and response. Ssurveillance system should aim at demonstrating absence of the disease.
- High risk- surveillance should ffocus on detection of incursions – Early warning surveillance at “hot spots”.
- Infected areas – Ssurveillance should ffocus on detailed information on disease dynamics and patterns including extent of spread

6.2.4 Simulation exercises

Simulation exercises can be a valuable tool in preparing the country to cope with an actual PPR infection. Examples can be drawn from Avian influenza simulation exercises which played a key role in identifying the weak points in the system if the disease was to strike. Further, simulation exercises would also serve the additional purpose of creating awareness about PPR and the dangers it poses. Given the cost of carrying out actual field level simulation exercises, desktop simulations on PPR are recommended for all countries or at least all affected or high risk countries because they are cheaper and faster to carry out. However, there should be at least one field level simulation exercise in the region.

6.2.5 Other small ruminant diseases

Some diseases may pose a challenge in the diagnosis of PPR because of similarities in the

presentation of the disease (e.g. ORF, PASTEURALOSIS, POX, CCPP). Field personnel must be able to perform differential diagnosis to distinguish PPR from other diseases which present with similar symptoms. At the same time the chance to undertake surveillance for PPR should also be used to actively search for other small ruminant diseases. MS veterinary authorities should be advised to generate disease(s) recognition manual(s) consistent to PPR and other PPR related disease for ease of diagnosis and reporting disease outbreak

6.3 Control Options

6.3.1 Vaccination

To halt further spread of the disease, targeted vaccination of small ruminants based on critical control points such as livestock markets and transport routes used by traders and semi pastoralists is recommended Risk based vaccination of small ruminants across the length of DRC-Tanzania border with their southern neighbours based on the suspected/ known distribution of the disease and overall rating of the critical points in terms of risk posed is particularly relevant, as any virus here poses a risk to SADC as a whole.

The advantages of vaccination as a control option are that the vaccine is readily available and very cheap. It confers immunity which lasts for 3 years and hence most animals will only need two vaccinations in their life time.

Figure 4: PPR infected goats in DRC

However, annual vaccination is recommended due to the high reproductive rate of small ruminants. Current vaccine strains especially the Nigeria 75/1 is protective against other circulating strains. Information from Tanzania suggests that the circulating strain is not the Nigeria 75/1 but that of lineage IV. It will be important to determine which strain(s) are circulating in newly infected countries. Vaccination rates are very high due to daily kraaling.

The only current disadvantage for countries which are still free from infection is the lack of a DIVA test to distinguish between infection and vaccination. Proper affordable identification/ marking such as ear notching of the vaccinated animals is therefore of utmost importance because of the value it presents in distinguishing vaccinated animals from unvaccinated ones.

6.3.2 Stamping out

This option is favoured only in situations where the infected population is small and well defined and government has mechanisms in place to compensate the affected farmers. The

ability to regain previous disease free status quickly and therefore be able to trade again is the biggest advantage of this option. The option is best suited for high risk areas with low density of animals and for low risk areas.

The main disadvantage of this option is that it is usually an expensive and therefore unattractive exercise for the State and as a result there is little political will to implement stamping out. It also has social and economically devastating consequences for affected communities even if they will be compensated. Other disadvantages linked to this option are loss of genetic material, it diminishes the national herd, is difficult to carry out in light of lack of fences and zones to curtail movement in the event of an outbreak and last but least it is politically very difficult. Only in countries such as Lesotho and possibly (southern) Namibia where the mohair industry is very developed may such an option make sense, but also only if the disease is detected early and the losses can be minimised.

6.2.4 Zoning (protection)

Zoning as a concept for protection against PPR in the region should be viewed from two standpoints; zoning based on risk of infection by SADC Member States and also within countries themselves. Listing the countries in terms of risk continental SADC can be divided into infected zone- DRC and Tanzania, High risk zone- Angola, Malawi, Mozambique and Zambia, and Low Risk zone – Botswana, Lesotho, Namibia, South Africa, Swaziland and Zimbabwe. Internally as each individual country maps out its risk zones it is important to understand the dynamics of small stock rearing in those areas and how these may affect the risk, for example movement patterns, rearing systems and market factors.

6.2.5 Bio-security

To stem the spread of PPR in the region it will be critical to observe strict Biosecurity and biosafety measures. Illegal movements from high risk areas should result in stiff penalties for offenders. At the same time it will be important for veterinary authorities to develop systems from an incremental level upwards to facilitate trade once there is evidence that the disease is no longer present. Authorities should not be perceived to be unduly restricting legitimate trade but instead to be doing everything possible to facilitate legitimate trade whenever possible. Measures such as building of quarantine facilities at border points to screen and clear clean animals for trade should be encouraged.

There should however be restrictions on live animal movement from high risk areas. No trade of live animals should take place from such areas until freedom is attained in accordance with OIE guidelines. All stakeholders such as the police, customs officials and farmers themselves must be engaged to support the movement restrictions from infected areas.

6.3.5 Capacity-building needs

Member States should create awareness through simple technical messages for farmers,

traders, politicians, community leaders, the media, law enforcement officers, and the general public at large. There will be a need for all MS to train field staff in the available control options such as vaccination, stamping out, zoning, and biosecurity. MS should also provide the necessary material and financial resources to implement the available control options.

6.4 Diagnosis and Quality Control

6.4.1 Diagnosis and quality-assurance (QA)

The effective control of PPR is dependent on early and correct diagnosis of the disease. Each country must have capacity for immediate diagnosis for PPR. Appropriate specimen must be collected, preserved and transported to diagnostic laboratories as per OIE recommendations. Inter-laboratory testing, net-working and proficiency testing of PPR samples between SADC laboratories should be encouraged. In addition, each laboratory should have a quality management system in place following ISO17025.

Figure5: Specimen Collection

6.4.2 Diagnostic tests

CELISA is recommended as the minimum test for the region. In this regard, an up-to-date protocol for the test should be made available to all laboratories specifying the minimum requirements for sampling as indicated above. Other tests to be applied over and above the cELISA test depending on the capacity of each laboratory include the Indirect ELISA, Sandwich ELISA, Antigen detecting Test, Agar gel immune-diffusion, virus neutralization test (VNT), virus isolation, counter immune-electrophoresis, nucleic acid detection techniques and characterisation.

6.4.3 Biosecurity at laboratory level

Each laboratory should be a minimum P2 level with at least laminar flow cabinets fitted. SADC laboratory subcommittee should carry out audits to ensure that all the laboratories are following good laboratory practices.

6.4.4 Capacity-building needs

Capacity building requirements in the Member States should focus on ensuring that field PPR diagnostic requirements are met. The focus should be on provision of adequate equipment, training of laboratory and field personnel, knowledge management and access to vaccines in times of emergency. Twinning of SADC laboratories with reference laboratories for PPR and Inter laboratory collaboration between veterinary diagnostic laboratories in the SADC region should be encouraged. Existing capacities in the region should be tapped.

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

PPR Pictures from DRC and Tanzania

6.5 Regional Coordination and Communication

6.5.1 Regional coordination

Regional coordination should be seen from two levels, the regional office with the Member States and the regional office with other regional economic groupings such as the Common market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). Regional economic community (REC) coordination is important to capture synergies and

complementarities between the RECs. Coordination should be perceived as platform for dialogue to harmonize strategies, approaches, regulation and sharing knowledge and build a sense of ownership amongst member state. For the countries effective coordination of PPR entails a need to identify the weaknesses and strengths of member countries. The countries should identify focal points for coordination of PPR activities. The process for needs assessment should not take longer than one year to be completed for all member states. It is important to indicate that a multi-disease approach better than targeting a single TAD.

6.5.2 Communication

Communication of information on PPR should be channeled through a variety of methods including but not limited to workshops, published and laboratory based materials, websites, leaflets, brochures, posters and use of community radio stations. Each MS will therefore need to develop a communication strategy for PPR.

6.5.3 Publicity and awareness

The veterinary services in Member States rely on stockowners or on veterinarians attending to livestock to notify the possible occurrence of an exotic disease. Notification needs to be prompt and accurate so that all outbreaks are identified as soon as possible without raising too many false alarms. Prompt and accurate notification can only be achieved if the veterinary profession and stockowners are aware of the danger posed by PPR and are conversant with the clinical signs of the disease. For this purpose, Member States should ensure that awareness of the disease is maintained within the veterinary profession, in the livestock/agricultural community and by the general public. Information materials should be prepared and made available for the different target groups. Though it may not sound very practical, continuous education and awareness creation using a combination of tools/techniques at household/ farm level might be logical. However, education materials/ information targeting custodians of small ruminants i.e. young boys and women should be considered as an entry point.

6.5.4 Information and knowledge management

Recognizing that Member States send data to SADC, it is also incumbent upon SADC to feedback such information to all Member States. MS must strengthen their epidemiology units for the data collection, collation, storage and analysis for PPR and report to SADC on PPR status through LIMS. National

Figure 6: PPR has up to 80% mortality rate in acute cases

LIMS units should endeavor to collect, collate and submit complete LIMS reports. Regular submission of Livestock and Livestock Products Price reports and Livestock Production reports can facilitate a more comprehensive Socio-economic analysis of impact of PPR. This will make it easy for the SADC secretariat to provide in-depth and reliable analysis as and when required without looking for additional data. The Livestock production modules which should provide details of primary impact of livestock disease should be used equally as Animal Health modules of LIMS.

6.5.5 Monitoring & evaluation (M&E)

Monitoring and Evaluation should form an integral part of the activities for tracking of implementation progress. The strategy shall be reviewed from time to time based on the M&E reports.

6.5.6 Resource mobilisation

SADC should be in the forefront in mobilizing resources for regional PPR control efforts. However, collaborating partners like FAO, AU-IBAR and OIE should also be approached to play their part in mobilizing funds for PPR control.

6.5.7 Advocacy

The lessons learnt and knowledge acquired from tackling PPR outbreaks in other countries should be used in advocacy to prevent the spread of the disease in newly infected countries. The identification of eminent person(s) to articulate the risks posed by PPR and how they can be overcome is one good approach.

6.6 Post vaccination/containment process

PPR shall be controlled by vaccination with an appropriate vaccine in areas where the disease occurred. Vaccination of the entire susceptible population should result in the virus dying out, there as allowing discontinuation of vaccination after only a couple of years. The effectiveness of the vaccination strategy should be reviewed within an appropriate timeframe. It is suggested that initially 3-to-5 years of vaccination should be completed before assessment of its effectiveness. In the context of the 5 years national preparedness and response plan, based up on the expert recommendation, sheep and goat vaccination may come to an end on the following situations:

- based on the analysis of the national, regional and international PPR situation and if the risk of introduction of the disease is remote;
- if effectiveness of vaccination is proved to be low and other interventions are preferred

Tracing and surveillance will be used to determine the distribution of the disease and the disease-free areas. Wildlife, if present, must be included in the survey. Trace-in should include all movements of sheep and goats, their products, people and fomites onto the premises over the period of 21 days before the first case. Trace-out is to include all movements off the infectious flocks since 30 days before the first case.

6.7 Research needs

Urgent research is required in the development of Pen side tests, DIVA tests and genotyping of strains at molecular level. Epidemiological research is also needed to understand transmission dynamics, drivers of virus lineage and maintenance in various ecosystems. There is also need to involve universities in impact assessment studies. Other areas include research on development of thermo tolerant vaccines the role of wildlife and other domesticated animals (cattle, donkeys) in disease outbreaks and the identification of critical points and optimal methods for intervention.

6.8 Socio-economic issues

Studies should be undertaken to identify incentives which will enhance the participation of farmers in the control of PPR. Appropriate strategies will only be implemented after Cost-benefit analysis of control measures. Other studies are required to establish the drivers of PPR epidemics.

7 Research

Research should also explore the modest model of disease control/mitigation. Involvement of other players (i.e. farmers, livestock keepers groups, animal health delivery agents, NGOs and civil society) are the main focus group to exploit. Financing mechanisms

7.1 Government

PPR is a TAD and therefore fully qualifies as a public good whose control must be funded by government. For this to take place the profile of PPR must be raised to that commensurate with other equally serious TADs such as FMD and CBPP. Governments usually require full details on the impact and the cost of control options. The availability of various control options and their cost also assist in allocation of funds towards control.

7.2 Private sector involvement

The involvement of the private sector in PPR control should be encouraged even though it should be appreciated that in emergency situations like those existing now in our region, the immediate responsibility of control of PPR lies with the government.

7.3 Public Private Partnerships

Given characteristics of the small ruminant sector in most Member States (poor, rural, poorly organised) there is little scope for major PPP, except for the involvement of private veterinarians in the delivery system. The exception to this may be in countries such as Lesotho where the mohair industry is very important to the economy and Namibia where Goat exports to South Africa are significant, private companies involved in the business could form important partnerships.

7.4 Other funding mechanisms

Other mechanisms which would merit exploration include the setting up of a regional PPR fund. Further, countries should keep an open mind on possible cross-border funding of vaccination campaigns.

8 Conclusion

The presence of the PPR in the SADC region is a very worrisome situation which should be remedied as soon as possible. Countries already infected and those at high risk must be assisted to take immediate measures to contain further spread of the disease southwards. These measures should include updating of preparedness plans or developing new ones if they do not exist, strengthening controls of animal movement from the infected areas, improving surveillance and creating awareness of the disease to all stakeholders. A detailed risk assessment of the situation in Angola, Malawi, Mozambique, Tanzania and Zambia should be undertaken as a matter of priority. Further, harmonised surveillance 50 km along the common borders of DRC and Tanzania with their southern neighbours should be undertaken urgently.

In infected countries strict animal movement control and vaccination of small stock until demonstration of freedom from clinical disease is recommended. In high risk areas the recommendation is to vaccinate until the risk has diminished. In low risk and disease free areas surveillance must be intensified to prove continued absence of the disease and should the disease appear stamping out if the foci is small followed by vaccination is the recommended course of action. If the following measures are employed control of the PPR in the SADC region can be achieved within 5 years with eradication being a real possibility within 10 years.

9 References

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Transboundary and Emerging Diseases

10 Annexes

PPR surveillance Protocol

11 Additional Notes

Vaccination modalities

The objective is to provide adequate vaccination coverage at a reasonable cost, routine mass vaccination once or perhaps twice a year (as is the case now) is very expensive to achieve and lessons from Rinderpest eradication campaigns shows it is very hard to achieve and then maintain high levels of herd/flock immunity this way. A risk based approach with good (passive and active) surveillance, including clinical PPR scouting, supported by quickly administration of outbreaks and surrounding areas will have equal or greater impact. The objective should be to map the high risk areas for PPR, following seasonal movements, festivals, trade etc. Consequently resources can be concentrated more on these critical surveillance/hot-points. Therefore, the following vaccination modalities will be adopted:

11.1 Targeted vaccination (Risk based)

- Sheep and goats in and around critical surveillance points are considered as sites for mandatory targeted vaccination.
- A small proportion of tagged animals (10-20%) are left as unvaccinated sentinel population (OIE recommendations - DIVA strategy) to test the effectiveness of the vaccination program and assess the presence of circulating (encroached) PPR virus in that village.
- Animals of less than 6 months will not be considered in this vaccination program, mainly due to the maternal antibodies.
- Unvaccinated identified sentinel flocks must be permanently identified (tagged) and placed in the vaccinated flock.

- There must be a monitoring system in place to assess the effectiveness of vaccination and to check the overall PPR status of the flock.
- This vaccination modality will be implemented with cost sharing (only cost of vaccines).
- In order to ensure a healthier population of sheep and goats, this targeted/ring vaccination will be integrated with the delivery of other sheep and goat vaccines e.g. got pox, CCPP vaccines and antihelmintics.
- In order to ensure timely and extensive ground coverage, MARF will work in partnership with private veterinary service providers in the provision of vaccination services.

11.2 Ring vaccination

This is a vaccination modality to be adopted in response to an outbreak in a radius of 5 – 10 km around an infectious village. Depending on the sheep and goat density, movement and market activities, vaccination activity in the area could shrink (low risk of spread) or expand (high risk of spread).

11.3 Vaccine administration

The following should be considered in the process of vaccine administration by the vaccination teams of veterinarians, technicians and assistants ('vaccinators'):

- The vaccination teams must be trained in both the vaccination procedures and appropriate personal protection measures including the correct use of personal protective equipment (PPE).
- Team members should follow manufacturers' recommendations on the storage, delivery and administration of vaccines.
- Team members should ensure that detailed records of vaccination (number and species vaccinated, location, date, identification numbers of sentinel flocks etc.) are recorded and entered in relevant databases or information system for analysis.
- Vaccination team members should also be well trained in bio-security measures to ensure they follow appropriate cleaning and disinfection procedures that minimize any risk of their spreading PPR viruses or other poultry pathogens between flocks.
- Depending on availability of human resources in a particular locality and scale of operation, stockowners could also receive adequate tailor-made training in administration of vaccine, supplied with vaccine and participate in vaccination programs under properly controlled conditions allowing appropriate record keeping.

11.4 Practical considerations of vaccination

- Vaccination cannot be used as a panacea or in isolation from other measures that must be applied in the face of on-going outbreaks (e.g. stamping out, bio-security, disinfection).

- Sufficient quantities of appropriate vaccines must be available for the planned duration of the vaccination program.
- Logistic arrangements must be in place for delivery and administration of vaccine.
- An exit strategy (after which vaccine would no longer be used) should be identified.
- OIE recommendations should be followed, including in relation to the implementation of a DIVA strategy.

Considerations of risk based surveillance should focus on the following:

- High risk areas
- Vaccinated areas
- Endemic areas
- Newly infected areas,
- Perceived free areas.
- Presence of wild life and the associated interaction with domestic livestock species
- Role of specific country production system
- Existence and capability of the formal /informal animal health delivery agents including laboratory capacities
- Location and the proximity of the nearest known epidemic/endemic foci
- Areas with poor (passive) reporting history

Perception of the threat and envisaged output determines whether active or passive surveillance should be used. For instance if you are looking for a new virus strain lineage, a targeted risk based surveillance may be relevant. However, for the case of just an outbreak in a PPR strain known area – passive surveillance may suffice. Moreover and where feasible integrated surveillance systems involving participation of key stakeholders are likely to be more informative in providing accurate disease information. Participatory surveillance complemented by clinical surveillance should be part and parcel of the national PPR surveillance. The advantage of participatory surveillance over the others is that the beneficiaries will be taken on board right from surveillance to disease control stages. Under such circumstances the sense of ownership is cultivated.

Notes

SADC SECRETARIAT
P/BAG 0095, GABORONE, BOTSWANA
TEL: (267) 395 1863, FAX: (267) 397 2848, Email: registry@sadc.int, Website: www.sadc.int

Designed & Printed by Multitech Consultancy Tel: +267 3923197 / 72154267 / 3935064 Fax: +267 3923243