

## **PANAFRICAN STRATEGY FOR THE PROGRESSIVE CONTROL OF PESTE DES PETITS RUMINANTS (PANAFRICAN PPR STRATEGY)**

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### **Résumé**

*La peste des petits ruminants (PPR) est une contrainte major aux moyens de subsistance et a la sécurité alimentaire des petits producteurs/éleveurs. L'épidémiologie et la biologie du virus de la PPR a beaucoup de choses en commun avec le virus de la peste bovine (PB), qui a été globalement éradiqué. Ce document présente une stratégie pour le contrôle progressif de la PPR en s'appuyant sur les enseignements tirés de l'éradication de la peste bovine. Le contrôle progressif de la PPR repose sur une approche modulaire consistant en une série de phases autonomes, chacune des phases ayant son propre ensemble de résultats. Les principaux résultats intermédiaires seront des modèles avérées applicables pour la fourniture de services durables pour le contrôle de la PPR et le renforcement des capacités des institutions de santé animale afin de cibler les services de contrôle pour certains points critiques. Le projet favorisera une méthode de gestion adaptée qui intègre des approches d'apprentissage qui stimuleront l'innovation institutionnelle de la santé animale. Une orientation coordonnée vers des objectifs à long terme en santé animale ajoute de la valeur aux investissements en cours dans la lutte contre les maladies infectieuses.*

### **Summary**

*Peste des petits ruminants (PPR) is a major constraint to the livelihoods and food security of small scale farmers. The epidemiology and biology of PPR virus has much in common with rinderpest virus (RP), an agent that has been globally eradicated. This document presents a strategy for the progressive control of PPR that builds upon the lessons learnt from rinderpest eradication. Progressive control relies upon a modular approach that consists of a series of self-sufficient phases each with its own set of sustainable results. Key intermediate results will be proven business models for sustainable PPR control service delivery and enhanced capacity of animal health institutions to target control services to critical control points. The program will foster an adaptive management approach that integrates learning approaches to drive animal health institutional innovation. The coordinated drive towards long term animal health goals will add value to on-going investments in infectious disease control.*

## Introduction

*Peste des petits ruminants* (PPR), or small ruminant plague, is a viral disease primarily affecting goats and sheep that causes significant economic impact in Africa and Asia. The virus is also known to cause fatal disease in camels and asymptomatic infection of cattle and wildlife. PPR was originally recognized in West Africa in 1942 and for many years was seen as a seasonally epidemic disease in Sahelian regions. The disease was subsequently recognized in Central and Eastern Africa, the Middle East, South Asia in 1970s, 80s, 90s respectively (Figure 1). Thereafter it appeared in Central Asia and most recently it entered Tibet and now threatens China.

As a disease of small ruminants, PPR is noted for its impact on the livelihoods and food security of the poor and marginalized segments of society. In recent years, PPR has caused major outbreaks in East Africa and has spread to Morocco. The rest of North Africa, Southern Europe, and Southern Africa are now considered at risk of infection unless coordinated action is taken. The socio-economic losses associated with PPR mainly result from the high case mortality rates that is characteristic of the disease. This negatively affects income from production and value-addition in marketing chains. PPR is a constraint to trade, although this impact is mitigated in local and regional markets due to its wide geographic distribution at present. Small ruminants are recognized as ready sources of food and cash and women and disadvantaged households often rely on small ruminants. Small ruminants are an important means to rebuild herds after environmental and political shocks. Thus, they are an important component of pastoral coping mechanism. The main benefits of sustained PPR control will be enhanced food security, coping mechanisms and poverty reduction.

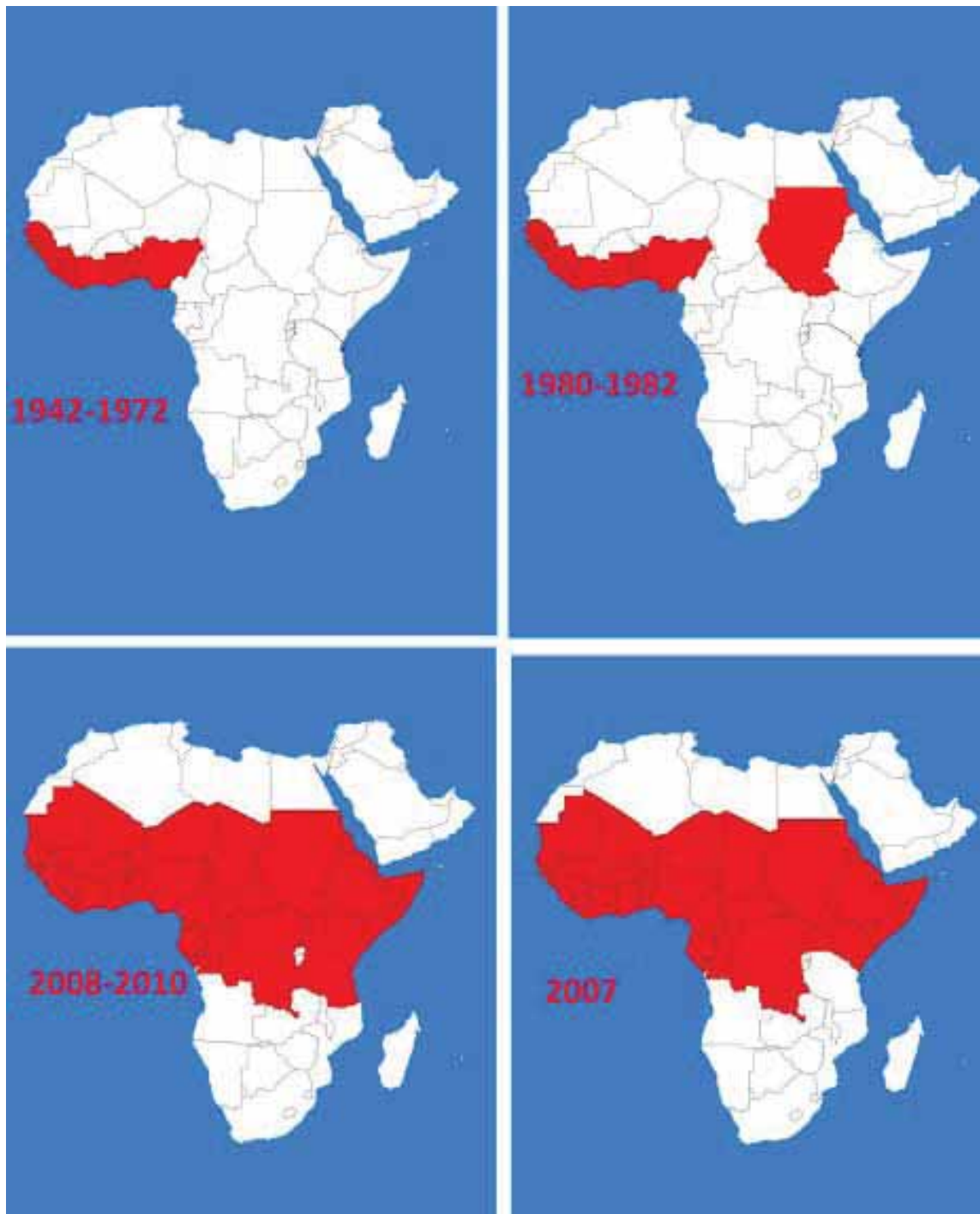
The etiologic agent is a member of the

Morbillivirus genus and a close relative of rinderpest virus, a disease of cattle that has recently been globally eradicated. The eradication of RP was aided by features of the disease and available control tools that contributed to successful control. There was only one sero type and live attenuated RP vaccines gave life-long protection against all strains of the virus. There was no carrier state: infection was short lived and resulted in either death or life-long immunity. The virus did not survive for long outside the animal host: it was readily destroyed by heat, sunlight, chemicals and disinfectants. Thus, the virus needed a continuous source of new susceptible animals to survive. Proven diagnostic tests were available. PPR shares all these characteristics.

At the level of animal health institutions, the eradication of RP has created an increased awareness and capacity for coordinated control interventions based upon sound epidemiological approaches that are driven by socio-economic incentives. In addition, considerable progress was made to enhance surveillance capacity, regulatory environments as well as private sector and community participation.

There is now significant demand for a coherent, long-term strategy for the progressive control of PPR. This document presents a strategy for the progressive control of PPR. The initial objective is to establish sustainable control systems that benefit poor livestock keepers and national economies. The strategy is consistent with a long-term objective of eradication, but does not require a commitment to eradication at the outset. Each phase of the strategy is self-sufficient in that it will provide economically justified, durable outputs with the resources provided. Further, the strategy consists of a set of regional programs anchored in the Regional Economic Communities (RECs) and integrated in a continental framework.

## Objective



**Figure 1:** The progressive spread of PPR across Africa. The Southern African Development Community is now under threat. Concerted action is urgently needed to turn the tide on PPR in a planned progressive approach to control that maximizes return on investment.

- The progressive control of PPR through:
- Enabling research to add value to existing tools
  - Proven, self-sustaining mechanisms for

- animal health service delivery
- Critical targeting of field interventions to maximize impact and cost-effectiveness
- PanAfrican management, coordination and learning systems that maximize the ability to

exploit new knowledge.

### Guiding Principles

The principles guiding the PPR progressive control strategy depend largely on experiences to date in the animal health sector. Some salient principles are:

- An adaptive management approach will be taken. The progressive control program will be structured to maximize uptake of lessons learnt during the implementation of the program. The technical and institutional strategy will be updated regularly to ensure maximum relevance to current knowledge and experience.
- Surveillance and control interventions will be risk-based and epidemiologically targeted to maximize impact and economic efficiency. Specific epidemiological research will be carried out to identify critical points for control interventions.
- The program will continue the tradition of being innovative in surveillance and control through the incorporation of action research within on-going field activities.
- Partnership to mobilize the broad resources of animal health institutions at national, regional and international levels
- Regional strategies will be tailored to local small ruminant health priorities. PPR control will be combined with other activities such as vaccination against contagious caprine pleuropneumonia and/or sheep and goat pox, provision of therapeutic services for the control of ecto and endo-parasites and other endemic diseases impacting on small ruminant production and productivity etc. to increase efficiency, broaden impact and

encourage fuller participation.

- The Pan African program will be implemented in the context of global PPR progressive control programs and OIE principles.

### Risk-based Targeting of Surveillance and Control Interventions

It is a recognised principle that the probability of disease transmission is not uniform across national populations. There are often a number of risk factors that contribute to the overall risk of disease transmission in a particular community, production system or value chain. These risk factors are often quite simple attributes of the sub-population such as the amount of movement, exchange of animals, distance from services and inter-species contact or interaction with wildlife.

When the nature and distribution of risk factors for transmission and maintenance of an agent are known, it becomes possible to target surveillance and control measures to high risk settings. This maximizes impact and minimizes cost. Effective targeting of high risk communities through participatory disease surveillance was one of the factors in the success of rinderpest eradication, but can also make control programs more efficient where the goal is sustained suppression of disease and disease impact rather than eradication.

The risk factors for transmission and maintenance of PPR are partially understood, but more information on the interaction of wildlife and livestock as well as on the role of specific production systems/activities would contribute to effective targeting. The tools that can contribute to more effective targeting are

- Epidemiological studies on testable hypotheses
- Longitudinal studies to elucidate transmission dynamics
- Participatory epidemiological assessments

- Risk analysis
- Surveillance

Networks for standardized diagnostics were a significant contributor to the success of rinderpest eradication. Networking can promote the use of bench-marked tests that allows data to be compared with confidence across diverse ecological zones and production systems. This adds value to surveillance data and facilitates risk-based targeting.

Targeting strategies should be annually reviewed in light of epidemiological intelligence on disease outbreaks and the risk of disease outbreaks. This is an integral part of the adaptive management approach of the Pan African PPR Strategy.

### **Animal Health Service Delivery**

Animal health service delivery includes a range of activities to prevent, detect and mitigate disease. From this perspective, service delivery for PPR includes surveillance and diagnostic services, vaccination and biosecurity actions to reduce the risk of outbreaks, vaccination and biosecurity actions taken to contain outbreaks, as well as treatment of secondary bacterial pneumonias resulting from PPR infection. The global eradication of rinderpest provided a tangible goal that helped to drive innovations in the delivery of animal health services. These innovations included new partnerships to deliver surveillance and control services under the overall management and supervision of veterinary authorities.

This process of animal health institutional change will continue as part of the progressive control of PPR. The Pan African PPR Strategy includes action to understand optimal bundling of control and surveillance interventions from both an epidemiological and socio-economic perspective. An evidence-based approach will be taken that captures synergies with on-going

initiatives for the evaluation of services, improvement of governance in the sector, and action research initiated by the PPR progressive control activity to test specific solutions.

Vaccination programs will utilize vaccine produced from the Nigeria 75/1 strain as described in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2010. This vaccine has been shown to be safe and effective. It is not thermostable. Adoption of thermostable vaccine manufacturing technology will enable more intensive coverage. Only vaccine that has been certified by the Pan African Veterinary Vaccine Center (PANVAC) will be used.

The large size of small ruminant populations in Africa and the rates at which these populations replace themselves place high demands on vaccination programs. As about 50% of a small ruminant population is new each year, flock immunity is unlikely to increase using a strategy of repeated annual vaccination campaigns. Large numbers of vaccinations may be required even in targeted programs and these vaccinations may need to be delivered in a concise time period to achieve high flock immunity.

From the outset, the campaign must address an important policy issue. The scale of vaccination demanded indicates that publicly funded vaccination campaigns will be difficult to sustain. This suggests that a coordinated commercial approach that mobilizes private sector delivery agents and investment may be needed. This suggests that service delivery models that include profit-oriented, payment-for-services options will be needed to generate sufficient financing. This is essentially the current model in many countries: industry-driven, coordinated control programs. On the other hand, the epidemiology of PPR may require intensive focal vaccination to achieve sufficient flock immunity to interrupt transmission at critical control points. Intensive vaccination can be more challenging to achieve in service

delivery systems that include payment for services. Thus, a range of proven service delivery models are needed as well as guidance on the conditions under which different models may be appropriate to conditions and objectives.

The Pan-African PPR Strategy advocates for a period of experimentation where a series of service delivery options are evaluated under different conditions. This will build an evidence base for making informed policy decisions. The issues to be explored are:

- Cost sharing and commercialized approaches
- Options for service delivery partnerships
- Business models and animal health institutions
- Governance approaches

**The delivery options should be evaluated from the perspective of:**

- Epidemiological impact on PPR consistent with program goals
- Financial sustainability
- Quality and accessibility of animal health services
- Contribution to strong animal health institutions

**Research**

In line with the adaptive management approach, a number of learning and research activities will be undertaken to enhance the institutional capacity, technical tools and ability to target interventions. Underpinning this is the need for a clear and up-to-date understanding of the socio-economic context in which PPR progressive control is being undertaken so that interventions are delivered in a manner that allows socio-economic forces to effectively drive the program to a successful, sustainable outcome.

**Targeted research will be carried out in the following areas:**

- Economic analysis of the impacts, benefit-cost of progressive control, cost-effectiveness of control options, and incentives for economic contribution and participation
- Epidemiologic research to better understand transmission dynamics, the different roles of wildlife and livestock species, production systems, ecosystems and viral lineages with the goal of identifying critical points and optimal methods of intervention at critical control points.
- Action research and policy dialogue on public-private-community partnerships to deliver control and surveillance services. Questions include the best use of community animal health workers, gender issues, and the role of producers' associations, non-governmental organizations or other civil society actors in service delivery. The goal is to develop and test new business models for the sustained, commercialized delivery of disease control services
- Good diagnostic tools exist. However, refinement and elaboration of diagnostics will add value to the range of existing tools. Work to define minimal performance characteristics of diagnostic assays and establish benchmarking procedures for diagnostic networks is needed. Standardization of tools should include tests for confirming outbreaks, tracking molecular epidemiology, supporting diagnostics for the field (pen-side tests) and sero-monitoring of vaccinated flocks.
- Currently recognized vaccines based on the Nigeria 75/1 strain of attenuated PPR virus have been found to be safe and effective in both research trials and during widespread field use. This technology is more than sufficient for the initiation of progressive control activities. However, improvements in vaccine thermostability and the ability to distinguish between animals immune through vaccination

and those that are immune due to recovery from natural infection would be advantageous.

1. Several approaches to thermostable vaccines have been described to the level of proof of concept. More work is needed to compare alternative approaches and to develop a full database on thermostability as an evidence base to support the confident roll out of a thermostable vaccine on a broad scale.

2. Research to develop a marked vaccine and complementary serological tests as part of a differentiating infected from vaccinated animals (DIVA) strategy for vaccines based on the Nigeria 75/1 strain will be supported.

The Pan PPR strategy will support research as an integral part of the coordination activity. As was the experience with RP eradication, optimal impact of research resulted from research embedded in the action program. Independent

research will also be encouraged. Key research stakeholders in PPR and morbillivirus research are the reference laboratories recognized by the World Organization for Animal Health (OIE) and the UN Food and Agriculture Organization (FAO), the International Livestock Research Institute (ILRI), the Joint Division of FAO and the International Atomic Energy Agency (IAEA), National Diagnostic Laboratories and National Agricultural Research Services (NARS) and academic institutions where appropriate. As in the past, the role of non-governmental organizations (NGOs) as a source of innovation and a valuable partner for action research and field validation of new approaches will continue.

### **Coordination and Partnership**

One of the lessons learnt from the global eradication of rinderpest was that effective



**Figure 2:** The Pan African PPR Strategy will be anchored in the regional economic communities in order to ensure strong ownership and local relevance. Control interventions that address local small ruminant health priorities will be bundled to ensure maximum impact at the household level and strong producer participation.

coordination adds value to animal health investment by channelling otherwise divergent activities towards a coherent and sustainable objective. A sense of ownership among stakeholders contributes to the success of coordinated programs.

The role of coordination is to convene inclusive dialogue to define and refine strategies, to harmonize approaches across regions and the continent, to assist in the process of governance including the development of policy, regulations and legislation. Coordination means knowledge management and information exchange. Guidance on monitoring and evaluation activities is considered an important coordination task. Coordination includes strong action to advocate for program support in technical, political and financial terms at all levels.

AU-IBAR is best placed to coordinate the Pan African PPR Strategy due to the recognition of their:

- Continental mandate as the organization of African states for the coordination of the utilization of animal resources
- Proven leadership in RP eradication
- African ownership and strong commitment
- Convening authority in Africa

It is the policy of the African Union that programs are implemented through the regional economic communities (RECs) (Figure 2). Following this policy, the Pan African PPR Strategy can develop locally appropriate strategies that address regional small ruminant health problems thus assuring greater participation and impact. Working through the RECs, will also enhance ownership.

At the national level, veterinary services will lead program activities. It is anticipated that veterinary services will act in a manner consistent with the principles of good governance and seek to facilitate and manage activities by creating an enabling environment for broad stakeholder participation. It is

anticipated that national services will work with private practitioners, veterinary associations, community-based organizations/programs, producers and producer associations, non-governmental organizations (NGOs) as well as value chain stakeholders and trading partners to implement PPR progressive control.

Key partners for research and diagnostics service networks are the OIE and FAO Morbillivirus Reference Centers, ILRI, national diagnostic laboratories, IAEA and NARS. In terms of vaccine, AU-PANVAC and vaccine producers are key partners. The program will undertake to facilitate the production of high quality vaccine as an essential input.

International organizations such as the OIE and FAO are essential partners. It is anticipated that the Pan African Strategy will be implemented in the context of a global program facilitated by the international organizations. The OIE's leadership in terms of establishing standards for participation in trade and achievable pathways to national freedom from disease will play a key role in shaping the strategy.

One of the lessons from rinderpest was that the NGOs played several key roles in facilitating eradication. In fact, eradication would not have been accomplished without them. They often stepped forward to create service delivery systems in some of the most daunting and dangerous environments. The NGOs also took the lead in the animal health institutional enhancements that were conditions for the success of rinderpest eradication as well as being positive outcomes in their own right. Finally, the NGOs have been key partners in the validation of new approaches and the empowerment of stakeholders to advocate for animal health institutional change.

### **Communication and Knowledge Management**

Effective knowledge management will be



an important component of the coordination strategy. AU-IBAR will act as the host organization in terms of collating information on the disease situation and disease impact. National reporting through the ARIS-2 system will be strengthened with appropriate attention to digital reporting technologies for field use. In this manner, progressive control of PPR will have knock-on benefits in terms of better information exchange. Every effort will be made to harmonize disease reporting systems across the region and globally.

AU-IBAR will host forums for sharing of knowledge on epidemiology, vaccines and diagnostics, and animal health institutions that bring together diverse professionals specialized in action, learning and discovery. The knowledge management unit will seek to develop new applications for information exchange that take advantage of the revolution in social networking technologies. The goal will be to maximize adaptive learning and to promote progressive evolution in practices and policies. To this end, the knowledge management unit will maintain up to date guidance documents on strategy, technical tools, and policy on the web.

### **Capturing Lessons**

The foundation of the adaptive management approach is a complete study of the lessons from RP eradication. To this end, the initial stages of the Pan African PPR Strategy call for objective assessments of the interventions implemented as part of RP eradication. These studies should look at institutional, economic, environmental and epidemiological impact of the global eradication.

One salient lesson from RP eradication

was that not enough was done to measure impact. The Pan African PPR Strategy proposes that action should be taken to maximize learning in order to institutionalize adaptive management from the outset. To accomplish this, the program will gather baseline information and establish sets of process and performance indicators, impact indicators and desired outcomes.

Animal health institutional change and capacity development is critical to the success of progressive control. In order to maximize learning in this area, a more systematic approach to understanding animal health institutions and institutional change will be undertaken. This will include:

- Institutional mapping
- Documenting service delivery systems and their performance
- Documenting surveillance systems and their performance
- Analysis of incentives and drivers for participation as they relate to the above

### **Conclusion**

PPR is an important constraint to food security and the livelihoods of poor farmers. Existing knowledge, experience and technology provide a solid platform for embarking on program of progressive control of PPR across Africa. The progressive control program will take an adaptive approach that seeks to learn from program experiences to continuously enhance impact and efficiency. The coordination of efforts to control PPR will add value to current investments to mitigate epidemics or activities seeking to promote food security. Responsible coordination and programming of inputs that reflect economic and epidemiological realities of PPR are needed.