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# PESTE DES PETITS RUMINANTS GLOBAL ERADICATION PROGRAMME

Contributing to food security, poverty alleviation and resilience

Five years (2017–2021)





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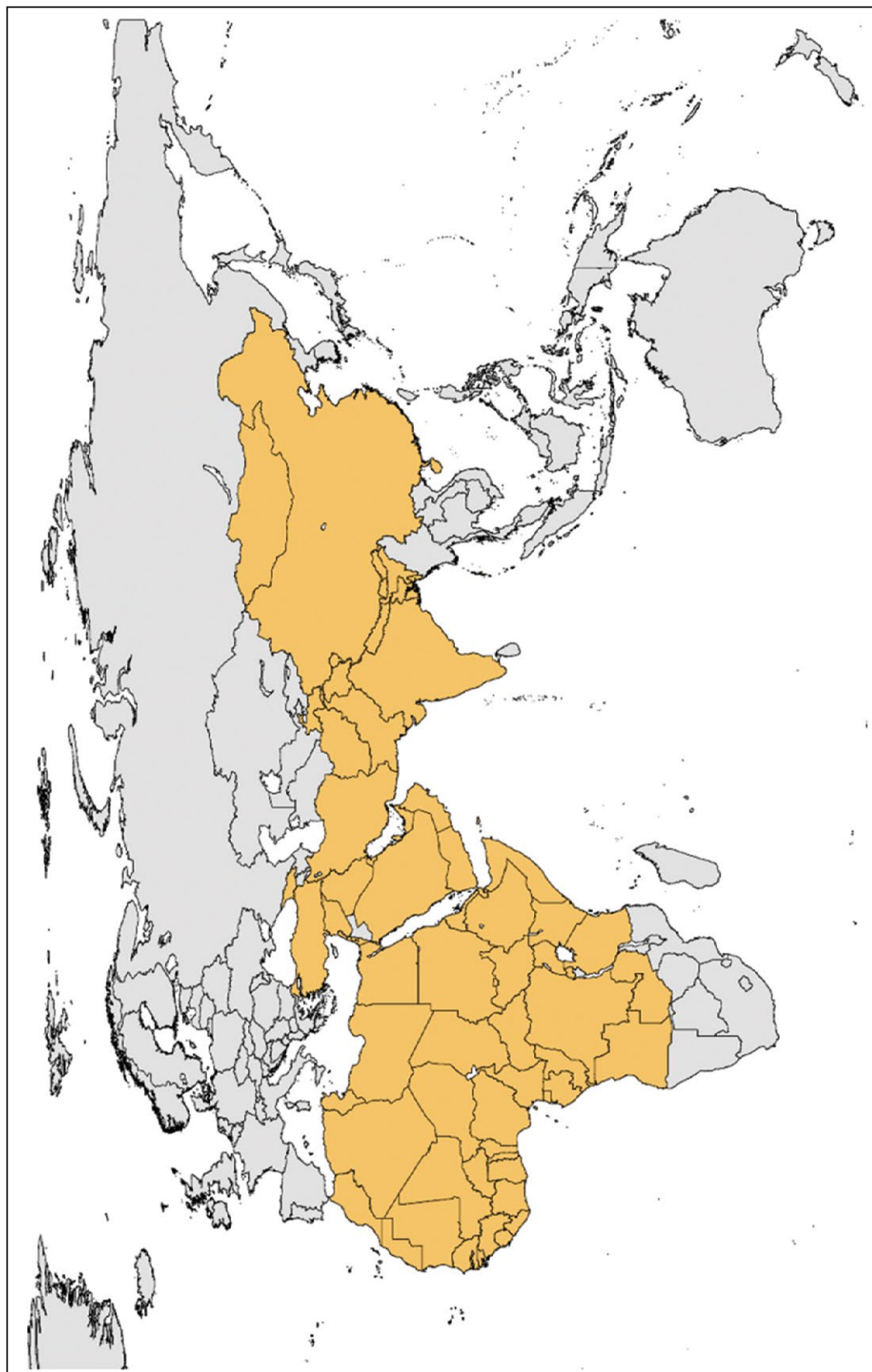
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Map 1: Areas reporting the presence of PPR in the past 10 years (as of 9 September 2016)



## ACRONYMS

<b>ASEAN</b>	Association of Southeast Asian Nations
<b>AU-IBAR</b>	African Union – Inter-African Bureau for Animal Resources
<b>CCPP</b>	Contagious caprine pleuro-pneumonia
<b>CCs</b>	Critical Competencies
<b>cELISA</b>	competitive ELISA
<b>CVL</b>	Central Veterinary Laboratory
<b>DIVA</b>	Differentiating Infected from Vaccinated Animals
<b>DSA</b>	Daily Subsistence Allowance
<b>EC</b>	European Commission
<b>ECO</b>	Economic Community Organisations (Central Asia)
<b>ELISA</b>	Enzyme-Linked Immuno-Sorbent Assay
<b>EPT-2</b>	Emerging Pandemic Threat phase 2 program (USAID-funded program)
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>GCC</b>	Gulf Cooperation Council
<b>GEP</b>	Global Eradication Programme
<b>GCES</b>	Global Control and Eradication Strategy
<b>GF-TADs</b>	Global Framework for the Progressive Control of Transboundary Animal Diseases
<b>GIP</b>	Gastro-Intestinal Parasites
<b>GREN</b>	Global Research and Expertise Network
<b>GREP</b>	Global Rinderpest Eradication Programme
<b>HIES</b>	Household Income and Expenditure Survey
<b>IAEA</b>	International Atomic Energy Agency
<b>ICE</b>	Immune-Capture ELISA
<b>ICT</b>	Information and Communication Technology
<b>IGAD</b>	Inter-Governmental Authority on Development
<b>LAMP</b>	Loop-mediated isothermal Amplification
<b>LMT</b>	Lab Mapping Tool
<b>LoA</b>	Letter of Agreement
<b>M&amp;E</b>	Monitoring and Evaluation
<b>NEALCO</b>	Northeast Africa Livestock Council
<b>NGO</b>	Non-Governmental Organisation
<b>NSP</b>	National Strategic Plan
<b>OIE</b>	World Organisation for Animal Health
<b>PCP</b>	Progressive Control Pathway
<b>PCR</b>	Polymerase Chain Reaction
<b>PE</b>	Participatory Epidemiology
<b>PES</b>	Pneumo-Enteritis Syndrome
<b>PMAT</b>	PPR Monitoring and Assessment Tool



PPR	<i>Peste des petits ruminants</i>
PPRV	PPR Virus
PRAPS	Regional Sahel Pastoralism Support Project
PRM	Programme-level Results Matrix
PVE	Post-Vaccination Evaluation
PVS	Performance of Veterinary Services (OIE tool)
$R_0$	Basic reproduction number
REC	Regional Economic Community
RLEC	Regional Leading Epidemiology Centre
RLL	Regional Leading Laboratory
RPLRP	Regional Pastoral Livelihoods Resilience Project
RRL	Regional Reference Laboratory
RT-PCR	Real-Time Polymerase Chain Reaction
SAARC	South Asian Association for Regional Cooperation
SDGs	UN Sustainable Development Goals
SGP	Sheep and goat pox
SHARE	Supporting Horn of Africa Resilience ( <i>European Union initiative</i> )
SO	(FAO) Strategic Objective
SOP	Standard Operation Procedures
SR	Small Ruminants
SRD	Small Ruminant Diseases
SSA	sub-Saharan Africa
TADs	Transboundary Animal Diseases
TBD	To Be Determined
TCP	(FAO) Technical Cooperation Programme
TOR	Terms of Reference
ToT	Training of Trainers
UNDP	United Nations Development Programme
VLSP	(OIE) Veterinary Legislation Support Programme
VNT	Virus Neutralization Test
VS	Veterinary Services
VSPA	Vaccine Standards and Pilot Approach to PPR Control in Africa (VSPA) in West Africa ( <i>funded by the Bill and Melinda Gates Foundation</i> )
WTO	World Trade Organization



## EXECUTIVE SUMMARY

Small ruminants (numbering around 2.1 billion head worldwide) are the primary livestock of many low-income, food-deficit households. They are reared within a variety of production systems, adding value to land.

*Peste des petits ruminants* (PPR) is a highly contagious disease of wild and domestic small ruminants caused by a *Morbillivirus* (family Paramyxoviridae). It occurs throughout Africa (apart from the most southern countries), the Middle East, Turkey, West and South Asia, and China. First reported in 1942, PPR has been spreading at an alarming rate over the last 15 years, reaching regions previously not infected and putting hundreds of millions of small ruminants at risk. In populations not previously exposed to PPR, the disease has been associated with devastating socio-economic losses and serious damage to the livelihoods, food security and nutrition of millions of small-scale farmers and pastoralists. The annual global impacts of PPR have been estimated at between US\$1.4 billion and US\$2.1 billion.<sup>1</sup> Loss of livestock because of PPR forces pastoralists and rural farmers to migrate away from their lands and cultures in search of alternative livelihoods. These losses induce poverty, malnutrition, social and economic instability, and conflict.

Investing in the eradication of PPR will significantly contribute to food security and reducing poverty in the world's most vulnerable pastoral and rural communities. As a result it will directly benefit the livelihoods and stability of millions of pastoralists and livestock smallholders in affected countries.

Global consensus has been reached on the need to control and eradicate PPR. The PPR Global Control and Eradication Strategy (PPR GCES) was endorsed at the International Conference for the Control and Eradication of PPR, organized by FAO and OIE, and held in Abidjan, Côte d'Ivoire, 31 March–2 April 2015. Eradication of the disease by 2030 is its goal. The strengthening of veterinary services (VS) envisaged in support of stamping out PPR will also help to control other small ruminant diseases prioritized by stakeholders.

The push for PPR global eradication is framed as a 15-year process running to 2030. The first five-year PPR Global Eradication Programme (PPR GEP) lays the foundation for implementing the strategy. The activities of these first five years influence, and are complementary to achieving, the goals and targets set out in the 2030 Agenda for Sustainable Development. The PPR GEP aims to work with partners to strengthen implementation models, and to reactivate and build on the partnerships forged by the Global Rinderpest Eradication Programme (GREP).

### Programme objectives

The PPR GEP lays the foundation for eradicating PPR by first reducing its prevalence in the countries currently infected. The programme will also develop the capacity for non-infected countries to demonstrate the absence of PPR virus (PPRV), as a basis for official OIE endorsement of PPR-free status. Over the five years of the programme, national VS will become key players in its successful implementation. Where appropriate, the programme will additionally support activities to reduce the prevalence of other prioritized small ruminant diseases (SRD), in

<sup>1</sup> PPR GCES 2015

particular those with the best chance of boosting the PPR GEP's objectives. The 62 countries that report PPR presence and the 14 suspected of being infected or at risk will be the PPR GEP's main focus.

### Programme approach

The PPR GEP, as part of the PPR GCES more widely, is a multi-country, multi-stage process that will decrease epidemiological risk levels and increase prevention and control. The four stages it sets out involve assessment, control, eradication and maintenance of PPR-free status. Regardless of the stage in which a country initially places itself, it will be supported to achieve the capacity it needs for the five key elements of PPR prevention and control: diagnostic system; surveillance system; prevention and control system; legal framework; and stakeholder involvement. Putting these five elements in place will enable any country to move with confidence to the next stage of control and eradication. The PPR monitoring and assessment tool (PMAT) is used as part of the overall PPR GCES. The tool measures activities and their impacts at each stage by requiring countries to input epidemiological and activities-based evidence, which it converts into guidance and milestones.

Because of the transboundary nature of PPR, the PPR GCES identifies nine regions/subregions and promotes regular regional coordination meetings and exchange of information between stakeholders. The PPR GEP additionally introduces an epizone approach, which combines regions/areas with similar epidemiology into zones and requires concerted control and eradication efforts across regional borders.

### Programme framework

Planned activities for the next five years are as follows:

#### **Component 1: Promoting an enabling environment and reinforcing veterinary capacities**

Building the right environment for implementing the PPR GEP requires a logical and structured framework for action, the full support and involvement of farmers and herders, an adapted legal framework, and strengthened VS.

##### *Subcomponent 1.1: PPR strategy and technical plans*

Countries entering the PPR eradication step-wise approach will develop a National Strategic Plan (NSP), complemented by relevant technical plans as follows:

- i. National Assessment Plan (for countries entering at Stage 1);
- ii. National Control Plan (for countries entering at Stage 2); and
- iii. National Eradication Plan (for countries entering at Stage 3).

These plans will be integrated with the epidemiological assessment described in Component 2. Regional Economic Communities (RECs) will also be supported in developing their own regional strategies tailored to the GCES.

##### *Subcomponent 1.2: Stakeholder awareness and engagement*

Awareness of PPR among various participants in the small ruminant (SR) value chain is critical if they are to engage effectively in the programme. Stakeholder organizations and activities will be mapped nationally, alongside developing and disseminating advocacy, communication strategies and materials. Active partnerships between public VS and non-governmental organizations (NGOs), private sector and civil society organizations will be promoted. Appropriate training for

community-based animal health workers (CAHWs), operating under veterinary supervision, will be championed wherever needed.

### *Subcomponent 1.3: Legal framework*

An adequate legal framework is the cornerstone providing national and local authorities, and VS in particular, with the necessary authority and capability to implement measures to eradicate PPR. The OIE Veterinary Legislation Support Programme will assist countries in appropriately updating their legal frameworks to allow for this to happen. Other legal aspects to consider with the relevant national authorities include land tenure, commerce, import-export, CODEX, commodity trade and child labour. In collaboration with the RECs, the PPR GEP will facilitate regional seminars to harmonize veterinary strategy.

### *Subcomponent 1.4: Strengthening veterinary services*

Countries that have already had an OIE Performance of Veterinary Services (PVS) evaluation will have these findings and recommendations reviewed by relevant authorities and policy-makers in the PPR GEP context. Countries in which the PVS evaluation is older than five years will be encouraged to request a PVS evaluation follow-up, or a PVS gap analysis (if not already done). PVS evaluation and gap analysis reports will be analysed by the OIE regional and subregional representations, coordinating with the relevant RECs, to better define needs.

## **Component 2: Support to the diagnostic and surveillance systems**

The PPR GEP will support efforts to better understand the presence (or possibly the absence) of PPR in a country or region, its distribution among the different farming systems and, ultimately, its impact on these systems. This requires an assessment of the epidemiological situation and the establishment of a functional surveillance system. The programme will support regional laboratory and epidemiology networks in better coordination and exchange of information.

### *Subcomponent 2.1. Epidemiological assessment*

At the national level, PPR status will be updated annually using the PMAT. Countries will formulate a national assessment plan and undertake field assessments to identify risk hotspots and transmission pathways, through risk analysis principles applied to epidemiological systems and value chains. Regional assessments will also be carried out to maintain a country's PPR-free status, where applicable.

### *Subcomponent 2.2. Strengthening surveillance systems and laboratory capacities*

At the outset of the programme, the purpose of surveillance will be to inform strategy development and enable eradication. The objective is to identify populations that are critical in maintaining the virus, and then develop appropriate vaccination strategies. The programme will provide a series of training courses in outbreak investigations, participatory epidemiology and participatory disease surveillance – including syndromic approaches, epidemiology and risk assessment. It will also support the development of the FAO-led Field Epidemiology Training Programme for Veterinarians (FETPVs) to tackle PPR.

Capacities for laboratory diagnostics and testing, differential diagnosis of PPR and characterization of field virus isolates will be strengthened. At regional level, at least nine Regional Leading Laboratories (RLL) will be identified and assisted in developing assured expertise, so as to quality assure diagnostic tests and support national laboratories. International/regional proficiency tests will be conducted.

### *Subcomponent 2.3. Regional epidemiology and laboratory networks*

The programme will establish or reinforce regional laboratory and epidemiology networks, and facilitate the designation of one RLL and one Regional Leading Epidemiology Centre (RLEC) in each of the nine regions/subregions. Exchanges between national laboratory and epidemiology staff in each region will be facilitated by regional network meetings.

## **Component 3: Measures supporting PPR eradication**

As set out in the PPR GCES, measures that support PPR eradication include vaccination, improved biosecurity, animal identification, movement control, quarantine and stamping out. These various tools are likely to be applied at different levels of intensity as a country moves towards PPR-free status.

### *Subcomponent 3.1. Vaccination and other PPR prevention and control measures*

The vaccines available currently (live attenuated forms of PPR virus) are highly effective, providing long-lasting protection. Thermostable PPR vaccines are soon expected to be available on a commercial scale. The PPR GEP will support implementation of quality standards for PPR vaccine production and delivery (best practice for storage, shipment and handling).

Some countries have not completed full epidemiological assessments for PPR (Stage 1) but are actively vaccinating nevertheless. Consultations will be conducted with these countries to review their vaccination methods and ensure that campaigns are properly planned and resourced, with the involvement of the communities concerned. Depending on the assessment and surveillance data, the vaccination should be time-limited with high coverage (aiming for 100 percent vaccination coverage to achieve the necessary herd immunity in high-risk areas) to achieve elimination of PPR. The goal is to avoid or move away from the low-coverage, annual vaccination campaigns often reported. The vaccination protocol will be based on vaccination every two years, following up on young animals (of four months to one year in age) within one year. A total of around 1.7 billion animals are to be vaccinated during the programme. After each round of vaccination, countries will be encouraged to conduct a Post-Vaccination Evaluation (PVE) and report findings to the FAO/OIE Secretariat.

### *Subcomponent 3.2. Demonstrating PPR-free status*

Around 79 countries historically free from PPR can get assistance with preparing to apply for OIE-certified PPR-free status, if they so wish, on a historical basis. For countries entering in Stage 4, their surveillance system should be able to provide evidence of the absence of PPRV infection and generate the data required to make this application to the OIE.

### *Subcomponent 3.3. Control of other small ruminant diseases in support of PPR eradication*

The PPR GCES advocates combining control strategies for PPR with efforts to combat other significant SR diseases, for cost-effectiveness. Where adequate epidemiological data are available, countries will be supported in formulating and implementing control plans for the SRD they wish to prioritize. The decision to combine PPR with other SRD must consider whether adequate epidemiological data are available for the prioritized diseases.

## **Component 4: Coordination and management**

The success of the PPR GEP requires effective global, regional and national coordination mechanisms.

#### *Subcomponent 4.1. Global level*

At a global level, the PPR Secretariat –under the authority of FAO and OIE management– is responsible for the overall oversight, facilitation, consensus-building and management of the programme and its implementation, assessment, refinement and reporting. The PPR Secretariat will work closely with regional organizations, reference laboratories/centres and technical and research institutions, and will promote broad partnerships with other relevant organizations. A PPR Advisory Committee will be established to advise the PPR Secretariat on the programme's ongoing relevance and achievements. A PPR Global Research and Expertise Network (PPR GREN) will be set up as a forum for scientific and technical consultation, debates and discussions about PPR, encouraging innovation.

#### *Subcomponent 4.2. Regional level*

The PPR Secretariat will partner with continental and regional organisations such as AU-IBAR and the African RECs, ASEAN, ECO, GCC and SAARC, together with other relevant institutions, and the FAO and OIE regional, subregional and country offices, to support PPR eradication efforts. Each region will nominate a Regional Advisory Group (RAG) to oversee the implementation of PPR controls. The RAG will be made up of three Chief Veterinary Officers, coordinator of the regional epidemiology network, coordinator of the regional laboratory network, the PPR secretariat, two representatives from regional/subregional FAO and OIE offices, and a representative from a regional and subregional organization.

#### *Subcomponent 4.3. National level*

The programme will support countries in establishing, within the ministry in charge of livestock, a PPR national committee to facilitate consultation and promote stakeholder engagement. A PPR national coordinator will be appointed by the relevant ministry to oversee the programme's implementation. Collaboration between neighbouring countries will be promoted to develop and implement a harmonized transboundary epizone approach to PPR eradication.

### **Programme costs**

The estimated budget for the five-year programme is: **US\$996.4 million**.





## INTRODUCTION

In April 2015, the International Conference for the Control and Eradication of *peste des petits ruminants* (PPR), held in Abidjan, approved the PPR Global Control and Eradication Strategy (PPR GCES). Developed by the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE), the aim of the PPR GCES is to eradicate the disease by 2030.

Following the recommendations of the 24<sup>th</sup> Session of the Committee on Agriculture (COAG), the 39<sup>th</sup> Session of the FAO Conference (2015) endorsed the PPR Global Eradication Programme (PPR GEP), to be implemented by FAO and the OIE in line with the PPR GCES.

The 84<sup>th</sup> General Session of the World Assembly of OIE delegates, meeting in May 2016, went on to adopt a Resolution on the Global Control and Eradication of PPR.

Meanwhile, on 24 April 2016, the G7 Ministers for Agriculture adopted the Niigata Declaration with the statement, “We encourage OIE and FAO efforts to eradicate major diseases such as PPR.”<sup>2</sup> And on 3 June 2016, in Xi’An (China), the G20 Agriculture Ministers adopted a declaration<sup>3</sup> underlining that smallholder farmers’ resilience and productivity are key for food security, nutrition, sustainable agricultural growth and rural development worldwide, in an innovative and inclusive world economy.

FAO and OIE established a Joint PPR Global Secretariat in early 2016 to design the PPR GEP and coordinate its implementation.

The PPR GEP (2017–2021) has been developed as a draft five-year programme by this joint FAO-OIE Secretariat, in a consultative process involving key stakeholders such as technical specialists, regional or national beneficiaries, and decision-makers.

- i. Since the Abidjan Conference in 2015, FAO and OIE have teamed up with several regional institutions to organize regional roadmap meetings that:
- ii. present the GCES and its tools in detail;
- iii. carry out a first self-assessment of each country’s PPR status and the capacity of its veterinary services to control the disease;
- iv. identify national and regional visions for PPR eradication;
- v. agree on other small ruminant priority diseases that could be controlled; and
- vi. set up a governance structure (Regional Advisory Group) to oversee the implementation of PPR control activities in the region.

In April 2016, the PPR Secretariat organized a brainstorming meeting in Nagarkot, Nepal where selected authorities on the disease discussed how to formulate the PPR GEP and agreed a detailed outline. A draft PPR global eradication programme was then developed by the PPR Secretariat with the contribution of several experts.<sup>4</sup>

2 [http://www.maff.go.jp/e/pdf/g7\\_declaration.pdf](http://www.maff.go.jp/e/pdf/g7_declaration.pdf)

3 <http://www.tarim.gov.tr/ABDGM/Belgeler/Uluslararası%20Kurulu%C5%9Flar/2016%20ch%C4%B1na%20G20%20Agriculture%20Ministers%20Meeting%20Communique.pdf>

4 S. Bandopadhyay, A. Diallo, A. Elidrissi, G. Ferrari, T. Kimani, N. Nwankpa, J. Mariner, P. Roeder, D. Sherman and H. Wamwayi.

The draft programme was presented and discussed during a peer review meeting held in Rome on 11–12 July 2016, and recommendations on improving and refining the document were made.

The first five-year programme highlights the technical and policy tools needed to lay the foundations for eradicating PPR by reducing its prevalence in currently infected countries. The programme will also develop the capacity for non-infected countries to demonstrate the absence of PPRV, as a basis for official OIE endorsement of their PPR-free status. The PPR GEP will strengthen national VS as key players in the programme's successful implementation. When appropriate, it will also support the targeting of other prioritized small ruminant diseases if it helps with implementing the PPR GEP.

The PPR GEP has four main parts:

- i. Rationale for eradicating PPR
- ii. Programme objectives and approaches
- iii. **Programme framework**
- iv. Funding, monitoring, evaluation and communication.

The **programme framework** has four integrated components:

- Promoting an enabling environment and reinforcing veterinary capacities;
- Supporting diagnostic and surveillance systems;
- Eradicating PPR; and
- Coordinating and managing the process.

These components are further divided into 13 subcomponents.

The PPR GEP will contribute to the 2030 Agenda for Sustainable Development. The wider PPR GCES will have a positive impact on major global challenges and many of the sustainable development goals. Both processes have the year 2030 as their target.

## PART 1 RATIONALE FOR THE ERADICATION OF PESTE DES PETITS RUMINANTS

### 1.1 Small ruminants and the impact of *peste des petits ruminants*

#### Importance of small ruminants

According to FAOSTAT, the global small ruminant count is currently around 2.1 billion head, of which 59.7 percent are in Asia and 33.8 percent in Africa. In sub-Saharan Africa, the majority of small ruminants are found in arid and semi-arid areas. Small ruminants are the primary livestock of many low-income, food-deficit households, and are better adapted to harsher, fragile environments where poverty is more pervasive. In particular, goats can browse and feed efficiently on more types of vegetation than cattle and even sheep.

Small ruminants are found in a variety of production systems including rangeland pastoralism, mixed farming, commercial, peri-urban and urban systems. In pastoral systems, goats and sheep often make up a mixed flock and households may totally depend on the animals for survival. Flocks might be divided amongst different family groups so as to exploit available pasture resources and to minimize the risk of disease. Often children and women play an important role in caring for sheep and goats.

In all production systems, small ruminants add value to land, labour, and assets:

- They produce milk, meat, wool, fibre and skins.
- They support the livelihoods of traders, processors, wholesalers, and retailers involved in the value chain.
- The trade of live animals, sheep and goat meat, and goat milk stretches from the local to national, regional and international markets.

Mixed farming is characterized by smaller herd sizes of sheep and goat. Small ruminants are integrated with crop production under different management systems, from daytime free grazing on communal lands to zero-grazing stall-feeding. Small ruminants add value by eating crop residues, and in return provide much-needed manure for soil enrichment.

The range of goods and services from small ruminant value chains are summarized in Table 1.

**Table 1: Summary of goods and services from small ruminant value chain actors**

Producers			Upstream and downstream actors
Production		Services and social institutions	
Products	By-products/services	Other benefits	Benefits
<ul style="list-style-type: none"> <li>• Meat</li> <li>• Milk</li> <li>• Skin</li> <li>• Fibre and wool</li> <li>• Live animals</li> </ul>	<ul style="list-style-type: none"> <li>• Manure and fertilizer</li> <li>• Fuel and biogas</li> <li>• Horns</li> <li>• Weed control</li> </ul>	<ul style="list-style-type: none"> <li>• Financial – flock value</li> <li>• Smoothing out cash flows</li> <li>• Risk reduction and diversification</li> <li>• Pathway out of poverty</li> <li>• Shock buffer and resilience</li> <li>• Food security</li> <li>• Increased social status</li> </ul>	<ul style="list-style-type: none"> <li>• Livelihoods</li> <li>• Incomes from value-added activities</li> </ul>

Part of the products and services are consumed or used at household level, while the rest are sold for household income.

In pastoral and agropastoral systems, income from sale of live animals and their products accounts for between 60 and 80 percent of total household income, used to purchase cereals and other household items, meet social and financial obligations, and to deal with school or doctors' fees. In most cultures, women are in control of SR operations and the associated income stream. This favours gender balance and an equitable allocation of earnings and animal-source foods within the household. Goats' milk is particularly valuable for children, the malnourished, pregnant mothers and the elderly.

By 2050, it is estimated that the world's human population will be 9.6 billion. Measured against 2010 consumption levels, major increases by 2050 are predicted to be: poultry meat up by 170 percent; dairy products<sup>5</sup> up by 80–100 percent; mutton<sup>6</sup> up by 80–100 percent; beef up by 80–100 percent; and pork up by 65–70 percent. Globally, between 2000 and 2030, it is estimated that annual mutton consumption will increase by over 7 million metric tonnes, with fastest growth expected in developing countries in South Asia and sub-Saharan Africa. Annual mutton and dairy product consumption is likely to increase by 1.7 million metric tonnes and 1.8 million metric tonnes per year respectively. Second only to poultry, this fast-growing demand for SR meat and milk represents an important growth area. This increase in demand will generate new opportunities for participants in the value chain.

Currently, those involved in the livestock value chain are limited in exploiting these opportunities because of numerous challenges, including the prevalence of high-impact animal diseases. Among these diseases, *peste des petits ruminants* (PPR) stands out as causing significant losses to small ruminants in many parts of the world. Eradicating the disease and reducing the burden of PPR, especially on poor livestock keepers, is a major commitment for FAO and OIE.

### ***Peste des petits ruminants, the disease and its impact***

PPR is a highly contagious disease of wild and domestic small ruminants first reported and described in 1942 in Côte d'Ivoire. It is caused by a virus belonging to the genus *Morbillivirus* in the family Paramyxoviridae. PPR occurs throughout Africa (apart from the most southern countries), the Middle East, Turkey, West and South Asia, and China. Some 5.4 billion people live in the areas affected by PPR. PPR has spread rapidly in the past two decades, mostly in Africa, Asia and the Middle East where some 80 percent of the world's small ruminants and a significant majority of the world's poor livestock keepers are found. PPR has a direct impact on over 300 million families who rely on small ruminants.

PPR affects livelihoods, food and nutritional security, women and youth employment. It increases poverty and malnutrition. Loss of livestock due to PPR causes pastoralists and rural farmers to migrate away from their lands and cultures in search of alternative livelihoods. It induces social and economic instability and conflict. Investing in PPR eradication contributes to food security and reduces poverty in the world's most vulnerable pastoral and rural communities, directly benefiting the livelihoods and stability of millions of pastoralists and livestock smallholders in affected countries.

<sup>5</sup> Including milk and related products from various livestock e.g. cattle, buffaloes and goats.

<sup>6</sup> Total of sheep and goat meat.

Morbidity and mortality rates from PPR are variable but can reach up to 100 percent and 80–90 percent respectively, indicating how dangerous and costly the disease can be for SR populations. Direct and indirect impacts of PPR morbidity and mortality include:

- depletion of a household's small ruminant asset base as a result of mortality and distress sales;
- reduced milk production in lactating does and ewes from infection and abortions;
- changes in flock structure because of abortions and deaths;
- forgone revenue by households and those participating in value-added activities post-production;
- food insecurity and shifts in food sources;
- increased poverty and vulnerability of households;
- destitution, and reduced demand for household goods and services from markets;
- shifts in income sources – often with negative impacts; and
- costs of control by private and public sectors.

Estimated 2014/15 losses in India due to PPR were 12.04 billion rupees or US\$180 million<sup>7</sup> (NIVEDI 2015). Data available from Kenya, the United Republic of Tanzania and Côte d'Ivoire on the impacts of PPR in various farming systems (mixed farming, pastoral, and agropastoral) show that mortality can directly deplete affected households' SR asset base by between 28 and 68 percent over a seven-month to two-year period after first encounter with the virus. The 2006–2008 epidemics in Kenya were responsible for the death of 1.2 million small ruminants with an estimated value of US\$23.6 million, and a drop in milk production of 2.1 million litres.

Depletion also results from culling or distress sales at reduced prices. In the United Republic of Tanzania, 64 661 animals were culled during the same period of epidemics from 2006 to 2008, while animals in Côte d'Ivoire were sold at half the normal market price.

In Kenya, the epidemic raised poverty levels by ten percent and resulted in food and income shifts. These included: increased reliance on markets for food; increased wild foods in diets; sale of goats and cattle by better-off households to purchase food; and sale of wild foods and bush products by poor households.

The direct benefit of eradicating PPR is the avoidance of animal deaths and associated losses. In a benefit-cost analysis of global PPR eradication, total discounted benefits of avoided mortality alone, based on a five percent discount rate and a 100-year time horizon, were estimated at US\$13.5 billion in the most likely scenario, US\$5.8 billion in the low mortality scenario, and US\$34.7 billion in the high mortality scenario (Mariner *et al*, 2016).<sup>8</sup> The annual global impacts of PPR have been estimated at between US\$1.4 billion and US\$2.1 billion.<sup>9</sup>

Where PPR is left unchecked, it represents a risk to food security and livelihoods, and makes it more difficult for producers to take advantage of the opportunities presented by the growing demand for mutton and milk. Unless we take action now, PPR will be one of the major obstacles to producing enough protein in arid and semi-arid areas suffering from climate change.

<sup>7</sup> 66.768 INR = 1 USD in 2015

<sup>8</sup> Jones, B.A., Rich, K.M., Mariner, J.C., Anderson, J., Jeggo, M., Thevasagayam, S., et al., 2016. *The economic impact of eradicating peste des petits ruminants: A benefit-cost analysis*. PLOS ONE 11 (2): e0149982. doi:10.1371/journal.pone.0149982 (available at <http://dx.doi.org/10.1371/journal.pone.0149982>). Accessed 7 October 2016.

<sup>9</sup> PPR GCES 2015

## 1.2 Justification and feasibility

### Justification for the PPR Global Eradication Programme

PPR has spread rapidly in the past two decades, mostly in Africa, Asia and the Middle East, home to some 80 percent of the world's 2.1 billion small ruminants. The elimination of PPR has been identified as a priority for decision-makers interested in making food value chains and animal movements less risky for the people involved and the consumers they supply.

The spread of PPR needs to be addressed and further losses of livestock prevented in order to:

- make the most of small ruminants' potential to reduce rural poverty;
- increase food and nutritional security and sustainability;
- promote the health and well-being of rural populations;
- ensure girls' education opportunities – often paid in petty cash by selling small ruminants;
- ensure sustainable productive employment for women and youths – who are often in charge of keeping small ruminants;
- improve the resilience, productivity and sustainability of smallholder farmers;
- position producers in Asia and Africa to make the most of the opportunities presented by growing mutton demand, through reduced losses from disease and lower control costs;
- reduce inequality among smallholders stemming from the uneven disease burden within and between countries;
- ensure sustainable small ruminant consumption and production patterns, especially in arid and semi-arid areas, because these animals are better adapted to harsher, fragile environments where poverty pervades.

The PPR GEP aims to work with partners to strengthen implementation, and revitalize and further elaborate the partnerships achieved by the Global Rinderpest Eradication Programme (GREP).

There are strong links between PPR eradication, food security, poverty alleviation and improved resilience. All are cornerstones for peacebuilding. See Box 1.

**Box 1: PPR eradication and sustainable development goals**

The 2030 Agenda for Sustainable Development includes interconnected objectives related to agriculture and food. It sets poverty eradication as an overarching aim and has the integration of economic, social and environmental dimensions of sustainable development at its core. The 17 sustainable development goals (SDGs) and 169 global targets of the Agenda set out areas to advance sustainable development.

Viewing the 2030 Agenda for Sustainable Development through the lens of the global strategy for control and eradication of PPR by 2030, prepared by FAO and OIE and presented to the international community in Abidjan in 2015, provides much food for thought. In light of how important sheep and goats are in the livelihood of the poor and marginal farmers in Africa, the Middle East and Asia, PPR can only be seen as a threat to food security, nutrition and poverty alleviation in these regions. Global eradication of PPR can contribute to achieving at least two of the sustainable development goals:

**SDG1:** End poverty in all its forms everywhere; and

**SDG2:** End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

PPR has spread at an alarming rate over the last 15 years, reaching regions previously not infected and putting hundreds of millions of additional small ruminants at risk. Left unchecked, it could spread even further, causing more devastating socio-economic losses and serious damage to the income and food security of the millions of small farmers and pastoralists who rely on sheep and goats for their livelihoods, potentially dragging the poor and most vulnerable even deeper into poverty. This suggests an urgent need to coordinate global efforts to prevent and control PPR, and strengthen the resilience of poor communities to protect their livelihoods and livestock assets against this devastating disease.

Rapid progress on the eradication of PPR is also seen as key to contributing directly or indirectly to the achievement of other SDGs such as:

**SDG 3:** Ensure healthy lives and promote well-being for all at all ages;

**SDG 5:** Achieve gender equality and empower all women and girls;

**SDG 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;

**SDG 12:** Ensure sustainable consumption and production patterns; and

**SDG 17:** Strengthen the means of implementation and revitalize the global partnership for sustainable development.

The PPR Global Control and Eradication Strategy, and the first five-year Global Eradication Programme for implementing it, will be a catalyst in helping to achieve the goals and targets set out in the 2030 Agenda for Sustainable Development, particularly in affected and at-risk countries. Unless PPR is effectively managed at global, regional and national levels, increased socio-economic losses and impacts will continue to undermine efforts to reduce food insecurity and malnutrition, alleviate poverty and achieve sustainable development.

### Feasibility of disease eradication

There are four major arguments that support the global PPR eradication programme:

- i. availability of effective prevention and control tools/measures;
- ii. scientific and technical feasibility of eradication over a 15-year period;
- iii. a benefit/cost ratio estimated at 33.8;<sup>10</sup> and
- iv. international consensus in favour of PPR eradication.

The characteristics of PPRV favour eradication: it has a short infectious period, there is no carrier status, and it is transmitted mainly by direct contact – it is not vector-borne and survives only a short time in the environment. Although it infects many wild animal species, there is no evidence so far to suggest that PPRV is maintained in wild populations but this needs further investigation. For prevention and control there is a very safe and effective live attenuated vaccine that confers long-term immunity, after a single injection, for all strains of PPRV. Diagnostic tests are also available and effective. In designing and implementing the global programme, key lessons can be learned from the FAO and OIE official declaration in 2011 of the global eradication of rinderpest. Furthermore, international standards on PPR have been established by OIE in the Terrestrial Animal Health Code and in the Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.

Vaccine producers are in the process of applying technology to produce thermostable PPR vaccine on a commercial scale. PPR research continues in other directions, including on the DIVA (differentiating infected from vaccinated animals) vaccine, on deployment models for these vaccines, on virology (characterization of host-susceptibility to infection and disease – within species, species-to-species and within wild animals), and on epidemiology in different contexts to improve predictive models for eradication strategies. As PPR virus belongs to the *Morbillivirus* genus, which also includes human measles virus, rinderpest and canine distemper virus, PPR research can benefit from what is already known of how these diseases are caused – and feed into future research on related viruses.

## 1.3 Lessons from the eradication of rinderpest and past work in relation to PPR

### Lessons learnt from GREP

The Global Rinderpest Eradication Programme (GREP) resulted in the recognition, in 2011, that rinderpest virus had ceased to exist in domesticated and wild animals. This remarkable achievement demonstrated that it was possible to eradicate an animal disease on a global scale – the first time this had been done. Fuelled to a great extent by this success there has been a burgeoning interest in disease eradication, and disease eradication scientists are keen to demonstrate that they have learnt lessons from the GREP to guide other initiatives.

Eradicating disease is not just about controlling epidemics. It must be clearly understood that certain combinations of husbandry and trade practices, such as social organization or remoteness from veterinary services, will lead to stable reservoirs of infection from which it is difficult, if not impossible, to remove the virus by standard disease control activities such as pulsed, mass-vaccination campaigns. The importance of epidemiological studies is paramount. These must focus on understanding sustained chains of virus transmission and how to interrupt them.

<sup>10</sup> Mariner, et al., 2016



Defining the reservoirs of infection and applying intensive, targeted vaccination to eliminate the virus where present and if needed was the focus of attention in the GREP. The first step here was to strengthen surveillance. In virus-free areas, confirming absence of infection was the priority. This required all vaccination activity to stop so that serological data, combined with participatory and other disease surveillance techniques, could provide a definitive understanding of disease status.

The main lesson from GREP is that understanding the epidemiology of the disease is crucial to its eradication. Although vaccination is a key tool for PPR control, experience dictates that caveats need to be placed on its use so as to focus action. It is also essential to understand that 'epidemiological studies' are an active process and not limited to the search for disease through serological surveys.

Epidemiological studies directly contribute to increased disease awareness and strengthened passive surveillance. Disease surveillance is critical in improving our epidemiological understanding. It takes many forms but for the purposes of eradication a combination of syndromic and participatory disease surveillance are the most informative disciplines.

Innovative delivery mechanisms involving the community of livestock owners were helpful in meeting the challenge of how to get surveillance and vaccination services to the remote, often marginalized areas under the GREP. PPR eradication will similarly need to find innovative solutions.

To address the issues mentioned here, rigorous training and retraining of veterinarians and ancillary staff is required to build the necessary expert veterinary services. Awareness-building among livestock owners must go hand-in-hand with this. Strong channels of communication between veterinary services and livestock owners, built on mutual respect, are essential.

One of the key conditions for the success of the global rinderpest eradication was the use of a highly efficacious vaccine protecting animals against all strains of the rinderpest virus.

Experiences from rinderpest eradication and, more recently, from attempts to control the highly pathogenic avian influenza (HPAI) have shown that a key outcome of concerted control efforts in high-risk areas was a significant improvement in VS capacity and related institutional arrangements. This leads to improved control for other diseases. Such externalities should not be neglected when assessing costs and benefits of global eradication initiatives.

### **Progress so far towards PPR control**

In almost all infected countries, through government or donor funding, capacities for disease surveillance, laboratory diagnosis, vaccine production and vaccination campaigns are being strengthened. Activities being undertaken in several countries, primarily areas affected by or at high risk from PPR, include: awareness-raising campaigns and disease recognition training for farmers and veterinary staff; sample collection under field conditions and laboratory analysis; and improvements in knowledge of legal and illegal movement of livestock and animal products.

The extent of these activities is limited because financial resources and appropriate strategies are lacking. Prevention and control of PPR as well as other diseases is currently based on vaccination campaigns. These are mostly conducted in response to disease outbreaks and so are focused around the outbreak area (i.e. ring vaccination). A few countries, such as Morocco and Somalia, have implemented mass vaccination combined with intensified surveillance or other control measures. These campaigns have shown quick success in greatly reducing –and

even nearly eliminating– the incidence of PPR, building the confidence that concerted area-wide action can lead to eradication.

Incomplete surveillance and reporting data make it difficult to fully understand the history of PPR. In the past, countries reported PPR outbreaks but it is not clear whether all these reports from historically free countries represent recent virus incursions. If a country reports more than one lineage of PPRV in the first year of PPR recognition, it is unlikely that their incursions occurred in the same period – some are likely to have taken place sometime before recognition. This scenario would suggest that there has at times been unnoticed incursion from infected countries, indicating that PPR-free countries (historically or after control measures) can be very vulnerable when there are numerous, repeated and mostly uncontrollable animal movements between countries. It highlights the importance of high vigilance and regional coordination of surveillance and control, with early detection of any outbreaks and a rapid response in at-risk and infected countries, followed by intensified surveillance combined with vaccination and other disease management measures.

### 1.4 Veterinary services

The OIE broadly defines national VS as including the government veterinary service and the private sector. The effective control and eradication of PPR in each country will require well-functioning and well-resourced national VS. This is because key components of the control and eradication effort such as risk analysis, disease surveillance, disease investigation, laboratory diagnosis, quality assurance of vaccines, effective vaccination campaigns and post-vaccination evaluation are primarily the responsibility of national VS. In order to successfully undertake these efforts, national VS will need appropriately-trained and qualified cadres of veterinarians and veterinary paraprofessionals, vehicles, fuel and equipment for conducting disease surveillance and investigation, well-functioning laboratories for reliable performance of diagnostic tests and for producing high-quality vaccines or evaluating commercial production, suitable infrastructure for maintaining the cold chain for effective vaccine administration in the field, sufficient human resources, and well-functioning communication and data management systems. Also required is a strong legal framework that authorizes the necessary disease control interventions, and established lines of communication that can engage stakeholders effectively in understanding and supporting PPR control and eradication efforts.

From the outset, it is essential for national, regional and international leaders of the PPR eradication effort, as well as donors asked to support it, to have a clear picture of the elements required for effective implementation of the PPR GEP, and to understand the corresponding capacities and constraints that exist at national level.

Ultimately, when countries apply for OIE official recognition of freedom from PPR, they will have to submit a dossier to OIE that documents the capacity of VS to ensure the disease is absent, and the robust surveillance measures in place to detect any possible recurrence. A standardized approach to evaluating national VS will allow improvements (or lack of them) to be monitored effectively over the course of the push for PPR eradication and will help to identify where resources are needed to correct deficiencies. Demonstrating progress in key areas such as laboratory capabilities, vaccine quality assurance and epidemiological capacity for meaningful disease surveillance and investigation is essential to ensure that the disease is actually being eradicated in the field.

The OIE performance of veterinary services (PVS) pathway provides a number of useful standardized tools and activities for assessing national VS capacities. Most notable is the PVS

evaluation. With this tool, an OIE expert team assesses national VS for 47 critical competencies (CCs) during an on-site mission and gives each CC a level from one (minimal compliance) to five (full compliance).

While the FAO/OIE PPR working group was developing the PPR GCES, it became clear that specific CCs assessed through the PVS evaluation were highly applicable. For example, 12 specific CCs are recognized as helping to assure the capacity to conduct the epidemiological assessments required in the initial assessment stage. An additional 15 CCs are relevant to assuring that VS can carry out the activities necessitated by stage two (control). Two further CCs are associated with stage three (eradication) activities, and four CCs relate to the post-eradication stage. All told, 33 of the 47 CCs included in the PVS evaluation were identified as useful in monitoring the progressive development of national VS, in support of the ultimate goal of achieving freedom from PPR.

As an illustration, the 15 critical competencies associated with stage two of the PPR GEP (control) are listed below.

**Box 2: OIE critical competencies (15) relevant to PPR GEP stage two (control)**

- Professional and technical staffing of the VS – veterinarians and other professionals (CC I.1.A)
- Professional and technical staffing of the VS – veterinary paraprofessionals and other technical staff (CC I.1.B)
- Competencies of veterinary paraprofessionals (CC I.2.B)
- Coordination capability of the VS – internal coordination (chain of command) (CC I.6.A)
- Coordination capability of the VS – external coordination (CC I.6.B)
- Physical resources (CC I.7)
- Operational funding (CC I.8)
- Management of resources and operations (CC I.11)
- Epidemiological surveillance and early detection – passive epidemiological surveillance (CC II.5.A)
- Disease prevention, control and eradication (CC II.7)
- Ante- and post-mortem inspection at abattoirs and associated premises (CC II.8.B)
- Communication (CC III.1)
- Participation of producers and other interested parties in joint programmes (CC III.6)
- Implementation of legislation and regulations, and compliance with these (CC IV.2)
- Zoning (CC IV.7)

As VS capacity-building is a dynamic process, often dependent on shifts in ministerial budgets and availability of funding from donors, the assessments made in initial PVS evaluations can become outdated. The OIE recommends that PVS evaluation follow-up missions should be conducted in countries where the original PVS evaluation was done five or more years previously.

PVS evaluations and PVS follow-up evaluations will serve as the framework for assessing national VS capacities as countries progress through the stages of the PPR global eradication effort. These will also be very helpful for countries at the end of the process when they apply to the OIE for official recognition of their PPR-free status.

## PART 2 PROGRAMME OBJECTIVES AND APPROACH

### 2.1. Programme objectives

The goal of the overarching global strategy is the eradication of *peste des petits ruminants* by 2030. For infected countries, this requires a progressive reduction of the virus' incidence and spread, leading to its final eradication. In non-infected countries, it means confirming and maintaining the officially recognized PPR-free status.

Strengthening VS to facilitate the eradication of PPR will at the same time help to control other SRD prioritized by stakeholders.

#### Box 3: Purpose of the PPR Global Eradication Programme

The purpose of the Global Eradication Programme is to enhance the contribution of the small ruminant sector to global food security and nutrition, human health and economic growth, particularly in less-developed countries – alleviating poverty, increasing resilience and income generation, and improving the livelihoods of smallholder farmers and general human well-being.

The **specific objectives** of the PPR GEP five-year programme are:

- For infected countries and countries with unknown PPR status (at-risk countries), to lay the foundations for and commence the eradication of PPR by:
  - i. developing capacity;
  - ii. understanding the epidemiological situation at national, regional and global levels; and
  - iii. defining appropriate implementation strategies at national level to reduce the prevalence of PPR and then eradicate the disease.
- For non-infected countries, to develop the capacity to demonstrate the absence of PPRV and move towards OIE official PPR-free status, and to maintain this status.

The five-year PPR GEP will also support countries in:

- improving the performance of national VS through enhanced compliance with the relevant OIE PVS critical competencies and successful implementation of the PPR GEP; and
- better control of other prioritized SRD.

As of September 2016, of 208 countries:

- 53 have official OIE-recognized disease-free status for PPR
- 79 never reported PPR and can move towards PPR-free status
- 62 report the presence of PPR.
- 14 are with unknown status and suspected of being infected or at risk.

The two last groups (76 countries in total) will be the major focus of the global eradication programme.

## 2.2. Programme approach

The overarching PPR Global Control and Eradication Strategy (PPR GCES) is based on four stages that determine how the five-year PPR GEP will operate within its framework. These four stages combine decreasing levels of epidemiological risk with increasing levels of prevention and control. At Stage 1 the epidemiological situation is assessed. At Stage 2, control activities including vaccination are implemented. PPR is eradicated at Stage 3. And at Stage 4 vaccination must be suspended; the country must provide evidence that no virus is circulating at zonal or national level and that it is ready to apply for official OIE PPR-free status.

The approach comprises a multi-stage, multi-country process involving assessment, control, eradication and maintenance of PPRV-free status. Implementation requires the concerted delivery of preparedness plans, capacity building, and stakeholder awareness and engagement, as well as establishing appropriate legal frameworks.

Regardless of the stage in which a country initially places itself, sufficient capacity should be achieved relative to five key elements so that the country can move with confidence to the next stage of control and eradication. These five technical elements are:

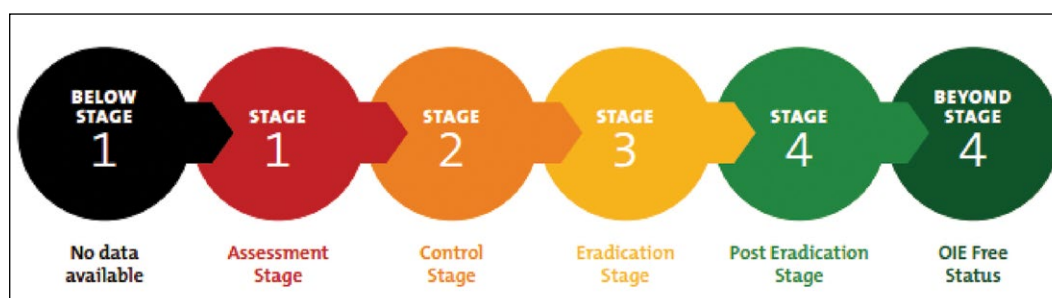
- PPR diagnosis system
- PPR surveillance system
- PPR prevention and control system
- Legal framework for PPR prevention and control system
- Stakeholders' involvement in PPR prevention and control.

During regional roadmap meetings in 2015–2016, countries were presented with a companion tool to the GCES, the PPR monitoring and assessment tool (PMAT), which helped them to find out through self-assessment what stage they were at. The PMAT is also used by countries that have begun prevention and control, using epidemiological and activities-based evidence to provide guidance and milestones. The tool measures activities and their impacts at each stage.

The PPR Secretariat will continue to hold annual regional coordination meetings to assess progress towards PPR eradication, in collaboration with regional economic communities (RECs) and organizations. Depending on national requests and outcomes from the regional roadmap meetings, activities relating to other SRDs diseases can be incorporated in the PPR GEP, as they may serve as an incentive to enhance PPR eradication activities.

Pastoralists, agropastoralists, smallholders (including women and youths who are often in charge of keeping small ruminants), traders and VS are all beneficiaries of the PPR GEP, through reduced livestock morbidity and mortality. Other beneficiaries include consumers, manufacturers, processors, distributors and retailers along the SR value chains.

Figure 1: **Progressive PPR control and eradication – the four stages of the PPR GCES**



The PPR GEP seeks to build on experience from, and to develop synergy and complementarity with, recent or existing programmes and projects that aim to support the livestock sector such as:

- Regional Sahel Pastoralism Support Project (PRAPS), West Africa
- Regional Pastoral Livelihoods Resilience Project (RPLRP)
- Vaccine Standards and Pilot Approach to PPR control in Africa (VSPA), West Africa
- Supporting Horn of Africa Resilience (SHARE), East Africa
- PPR control programme, India
- PPR progressive control of PPR, Pakistan
- Framework for progressive control of FMD and PPR, Afghanistan
- FAO technical cooperation programme (TCP) and donor-funded projects at the global, regional and national levels.

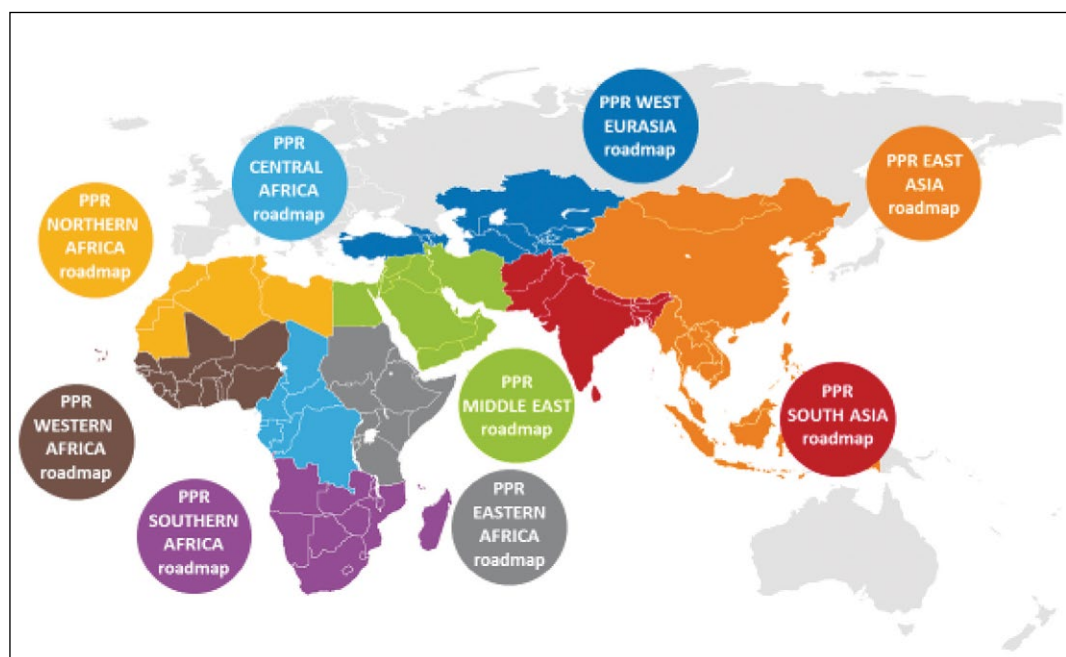
### 2.3 National self-assessment and epizone approach

The PPR GCES identified the need for simultaneous disease control and eradication efforts at the national, regional and global levels. Because of the transboundary nature of PPR, regional harmonization and coordination is particularly important for effective eradication.

The GCES identified nine regions for interventions (see Map 2).

As of June 2016, six regional roadmap meetings in Eastern, Central and Western Africa, the Middle East, South Asia and West Eurasia have been conducted. A key objective of these initial roadmap meetings was to provide countries in the region with the opportunity to conduct a self-assessment of their current PPR status, using the PMAT.

Map 2: **Nine regions identified in the PPR GCES**



Of the 59 countries that conducted the self-assessment:

- Two countries place themselves in “Stage 0,” as no systematic assessment of their PPR situation has been undertaken so far.
- 40 countries identify themselves as being in Stage 1; they are still in the process of accurately defining the PPR epidemiological situation in their country.
- 15 countries place themselves in the control phase (Stage 2) as active control efforts are underway, through vaccination, and the epidemiological situation of PPR in the country is well understood.
- One country identifies itself as being in the eradication phase (Stage 3), where the disease is believed to be under control and active surveillance is ongoing to detect any occurrences of disease.
- One other country reported a zonal approach, with part of the country in Stage 3 and part in Stage 2.

Notably, many countries placed themselves in the assessment stage even though PPR vaccination activities were reported. Some had undertaken vaccination for ten years or more without achieving eradication, underscoring the importance of conducting detailed epidemiological assessments to serve as the basis for an effective vaccination push. Under the PPR GEP, once countries have developed the capacity to carry out and complete thorough epidemiological assessments and have set up adequate surveillance systems, it is expected that targeted vaccination activities over two to four years should be enough to bring the country’s PPR situation under control and move toward eradication.

Establishing the nine regions has obvious benefits for promoting effective communication and collaboration between neighbouring countries. Through aligning with the RECs present in each region, there are clear opportunities for administrative and logistical support within regions that will further the PPR GEP. From an epidemiological point of view, though, the behaviour of the disease under field conditions does not always conveniently align with regional boundaries. Geographic and climatic considerations, patterns of pastoral movements, trade routes, the distributions of communities across national borders and other factors mean that the spread of disease may follow patterns that extend beyond the limits of these administratively defined regions. The notion of epizones needs to be introduced and understood.

Epizones combine regions/areas with similar epidemiology into zones and require concerted control and eradication efforts across regional borders. This implies information exchange and, in the future, the possibility of restructuring/evaluating the PPR GEP. The epizone approach allows flexibility for developing disease control and eradication efforts across regions, for example when two neighbouring countries belong to different regions but share epidemiological characteristics that require harmonization of the disease control and eradication efforts. Although epizones are considered, it is understood that nothing should stop countries from participating in regional roadmap meetings in their administrative zone. Through the PPR GEP, and in coordination with the PPR Global Research and Expertise Network (GREN) and regional PPR epidemiological networks, the main epizones will be identified and more carefully defined.



## PART 3 PROGRAMME FRAMEWORK

### 3.1. Components and activities

This chapter describes the activities planned for the next five years by component and by level of implementation (national, regional and global). The programme includes the following components and subcomponents:

#### **Component 1 - Promoting an enabling environment and reinforcing veterinary capacities**

- Subcomponent 1.1: PPR strategy and technical plans
- Subcomponent 1.2: Stakeholder awareness and engagement
- Subcomponent 1.3: Legal framework
- Subcomponent 1.4: Strengthening veterinary services

#### **Component 2 - Support to the diagnostic and surveillance systems**

- Subcomponent 2.1: Epidemiological assessment
- Subcomponent 2.2: Strengthening surveillance systems and laboratory capacities
- Subcomponent 2.3: Regional epidemiology and laboratory networks

#### **Component 3 - Measures supporting PPR eradication**

- Subcomponent 3.1: Vaccination and other PPR prevention and control measures
- Subcomponent 3.2: Demonstrating PPR-free status
- Subcomponent 3.3: Control of other small ruminant diseases in support of PPR eradication

#### **Component 4 - Coordination and management**

- Subcomponent 4.1: Global level
- Subcomponent 4.2: Regional level
- Subcomponent 4.3: National level.

#### **Component 1: Promoting an enabling environment and reinforcing veterinary capacities**

From the very beginning and at each stage of the stepwise approach, the eradication process will be launched and implemented in as favourable an environment as possible. SR owners and farmers are on the front line and key participants in the struggle against the disease. They are the first link in the epidemiological assessment and the surveillance system. Without their full support and involvement, vaccination is not possible. They are also the first beneficiaries of PPR eradication. For this reason it is essential to raise awareness and secure their engagement, first of all at field level.

Building an enabling environment for PPR GEP implementation also requires a logical and structured framework. The National Strategic Plan (NSP) and its annexes, the technical plans,



set out the picture in full. Two major issues will be addressed: adapting the legal framework to facilitate eradication; and strengthening VS, defined by the OIE as including public and private stakeholders.

All these elements are brought together in Component 1 and are detailed below.

### Subcomponent 1.1: PPR strategy and technical plans

Countries entering the PPR control and eradication stepwise approach are expected to develop a National Strategic Plan (NSP). The NSP will indicate objectives and activities to be undertaken in the next five years, together with the associated costs, with the overall objective of achieving PPR eradication for the country in the long run – to meet the 2030 global deadline for eradication worldwide.

In line with the PPR GCES, the NSP is an advocacy document that needs the technical plans listed below as annexes:

- **National Assessment Plan** (for countries entering Stage 1)
- **National Control Plan** (for countries entering Stage 2)
- **National Eradication Plan** (for countries entering Stage 3).

Each technical plan will have to be completed sequentially in accordance with whichever stage the country is progressing towards. As a final step towards eradication, countries will be expected to complete a dossier to apply for official OIE recognition of PPR-free status.

The PPR GEP will support countries in developing their NSP and technical plans for implementing the PPR GCES at each stage. This process will be closely integrated with the epidemiological assessment described in Component 2. Periodic review of these documents will ensure that they take into account the evolving needs of the country and the region's process for PPR eradication, and remain fit-for-purpose. The engagement and participation of different stakeholders in developing and reviewing the NSPs are key – enhancing ownership, buy-in and ongoing support for the strategy.

Similarly, each REC will be supported by the PPR GEP to develop its regional strategy (or strategic plan) using the template provided by the Secretariat. This regional strategy, tailored to the GCES, will enable these nine RECs to take ownership of leading the regional campaign.

### Main deliverables

- National Strategic Plan and technical plans:
  - National Assessment Plan
  - National Control Plan
  - National Eradication Plan.
- Regional strategic plan formulated in each of the nine regions.

### Main activities

Countries will be supported in developing their NSPs – and associated regional and subregional PPR eradication strategies – in alignment with the PPR GCES, through consultative and participatory processes involving a wide cross-section of stakeholders. For each stage, countries will be supported in developing their technical assessment, control and eradication plans. In Africa, the PPR Secretariat will work in close collaboration with AU-IBAR and the RECs

in supporting the development and review of national strategies, helping to ensure national ownership and implementation. Similar collaboration will be established in the Middle East with GCC and Asia with ASEAN, ECO and SAARC. Templates and guidelines will be developed, peer-reviewed and provided to countries to assist in NSP development.

Developing the PPR NSP and appended plans will require technical expertise. Implementing them will not be possible without securing the political will and financial support at a national level. Political endorsement and support are essential elements for successfully implementing the programme. Line ministries and stakeholders will jointly plan and undertake advocacy to key national decision-makers so as to enlist their commitment and support for making PPR eradication happen.

Support will be provided for formulating (or aligning) regional strategies and plans according to the PPR GCES and PPR GEP. In Africa, the AU-IBAR PPR control and eradication continental strategy has already been aligned with the PPR GCES. Out of the nine regions, six have already developed their strategic plan. The PPR GEP will support ASEAN in developing its plan, and IGAD and SADC in aligning their plan with the PPR GCES and GEP.

The PPR GEP will provide training on how to use the PMAT so that countries can make a complete assessment in the context of their NSPs. OIE staff at regional and subregional offices, and FAO staff at regional, subregional and national offices, will be trained to provide this technical support.

### **Subcomponent 1.2: Stakeholder awareness and engagement**

Stakeholder and participant awareness of various development challenges along the SR value chain is essential if they are to participate effectively in problem-solving. Currently, the extensive nature of SR production systems in many regions, and the multiple smallholders involved limits the access of stakeholders to information. At national level, participants in the PPR value chain are diverse and include (depending on the prevailing system):

- livestock keepers (male and female pastoralists, agropastoralists, smallholders)
- input suppliers
- government policy-makers and animal health services
- private sector animal health service providers
- producers and associations
- traders (primary, secondary, importers, exporters) and their associations
- transporters
- slaughterhouse operators
- butchers
- meat retailers and wholesalers.

Other stakeholders include regional and international organizations. It is essential to get them all fully involved in the PPR eradication. The nature and level of engagement should take into account the respective roles of stakeholders. On the one hand, producers would be interested in information about how to recognize PPR (and other diseases) in flocks; what control measures are available; how, when and where to access these measures and who to contact; costs involved and benefits that would accrue to control; and the roles they are expected to play in eradication. On the other hand, traders would be interested in how PPR impacts on trade,

how to recognize the disease, and what they are expected to do to minimize PPR-associated business losses.

Since it is difficult to involve all producers and traders at the individual level, their associations represent the best entry points for engagement. For pastoralist/agropastoralists, the approach will be to use existing traditional leadership and community structures to share information rather than setting up new structures. Currently, different livestock-keepers' associations exist at national level. They are not always fully involved in the planning and implementation of disease control programmes as the tendency is to deal with individual farmers during vaccinations. This has not been very effective, especially when programmes have multiple activities to implement.

As during the rinderpest eradication campaign, non-governmental organisations (NGOs) are expected to play a key role in supporting key activities including surveillance and vaccination. Appropriately trained community-based animal health workers (CAHWs), operating under veterinary supervision, will be promoted where needed.

For countries facing conflict or other major problems that might prevent them from following all elements of the five-year PPR GEP, special plans will be needed to ensure they are able to progress toward eradication in spite of serious constraints. These countries would focus on strengthening and supporting all the animal health service capacity available, through community organisations, CAHWs, NGOs, and so on, to deliver surveillance and disease control – the core activities for achieving absence of PPRV infection. From the gender perspective, the GEP should recognize and address the constraints and opportunities for women in accessing technology, from the national to the grassroots level.

There have been efforts to establish regional livestock associations. For example, the Northeast Africa Livestock Council (NEALCO) was established in 2015 with members drawn from IGAD, COMESA and EAC.

### **Main deliverables**

- Communication strategy available at all levels
- Communication materials made available to countries
- Awareness/sensitization campaigns involving all stakeholders
- SR producers' and traders' associations involved in PPR discussions and programmes
- Animal health workers' skills in sharing information with livestock keepers, community leaders and associations.

### **Main activities**

At national level, stakeholders' organizations and activities will be mapped. Advocacy, communication strategies (including radio/TV programmes) and materials will be developed and widely disseminated. The programme will support the creation of awareness among livestock keepers on how to recognize PPR and the need for early reporting.

Active partnerships will be promoted between public veterinary services and NGOs, private sector and civil society organizations.

The programme will encourage and facilitate using ICT (information and communication technology), social media, radio and TV programmes to reach relevant stakeholders.

At regional level, the programme will facilitate regular meetings of organizations in the SR value chain, and develop partnerships with relevant regional NGOs and private sector entities. The

programme will reinforce knowledge about cross-border animal movements and will promote coordination of vaccination operations between neighbouring countries. Farmers' organizations will be invited to attend regional coordination meetings.

Regular seminars and training workshops will reinforce links with farmers' organizations at national and regional levels.

At global level, international SR organisations/forums (such as the World Farmers' Organisation and International Goat Association) will be mapped and involved through partnerships on implementing the programme.

### **Subcomponent 1.3: Legal framework**

An adequate legal framework is a cornerstone that provides national and local VS, in particular, with the authority and capability to implement PPR eradication activities. It also constitutes an enabling environment for stakeholder involvement. For each stage toward eradication, the national legislation framework in place should authorize and guarantee the activities that need to be carried out.

Some countries may need to review and update existing legislation to ensure that their legal framework supports implementing the PPR NSP. The PPR Global Secretariat, together with regional and subregional partners, will provide technical support and advice to countries on appropriately updating their legal frameworks to provide for adequate measures to eradicate PPR.

Countries that have not already requested a veterinary legislation identification mission under the OIE Veterinary Legislation Support Programme (VLSP) will be encouraged to do so. This will assist countries modernizing their veterinary legislation to provide legal support to the country's commitments to prevent, control and eradicate PPR. Where necessary, the relevant national authorities will engage legal experts to guide national multidisciplinary task forces in revising legislation. This will include assisting countries that have already undertaken an OIE veterinary legislation identification mission prior to the PPR GCES launch to tailor the legislation towards supporting implementation. The second (Agreement) phase of the OIE VLSP provides technical-legal support for legislation drafting needs identified during the veterinary legislation identification mission.

The national ministries responsible for livestock will be encouraged to lobby relevant national institutions to accelerate processes for enacting and adopting the revised legislation in support of implementing plans for preventing, controlling and eradicating PPR.

A country's legal framework might need to be upgraded between stages to ensure that it supports efficient PPR prevention and control.

#### **Main deliverables**

- A timeframe for the evolution of the legal framework is in place.
- The veterinary authority has an effective chain of command and all the necessary powers to effectively implement disease control programmes such as entering premises, taking samples, examining records, imposing quarantine, restricting movements and seizing animals.
- In the national legislation, PPR is a notifiable disease in the domestic and wild animal populations.
- Where possible, an SR identification system is set up, to improve traceability and movement control.

- National legislation includes protective measures on live animal imports to mitigate the risk of introduction.
- There is regional harmonization of national legal frameworks for PPR eradication and in the field of animal health more generally.
- REC policies address specific issues such as cross-border movement of small ruminants (transhumance, trade), certification, or compensation schemes.

### **Main activities**

An assessment of the national animal health legal framework with a focus on PPR will be conducted to ensure that public VS are authorized to take the action required. Countries will be advised to request an OIE VLSP veterinary legislation identification mission. Their legal framework will be improved to support prevention and risk mitigation at population level – including the risk of PPR being introduced from abroad, and possibly to accommodate a compensation mechanism.

At national level, training sessions will be organized for civil servants and some key participants, in order to strengthen their knowledge and practice of the legal framework with the support of the OIE VLSP, the FAO Legal Development Service and other relevant regional organizations.

The programme will support the OIE veterinary legislation identification missions in target countries.

At regional level, progressive harmonization of legal frameworks among the countries and competencies of VS are essential to build a common framework. AU-IBAR and OIE, with FAO, have already jointly conducted five such seminars for African RECs on regional harmonization of veterinary legislation through the EC-funded VET-GOV programme, “Reinforcing Veterinary Governance in Africa”.

In collaboration with the RECs, the programme will facilitate regional seminars to harmonize veterinary strategy, including legislation, and promote information exchanges on animal health policies and strategies. Farmers’ organizations will be invited to participate in this process.

### **Subcomponent 1.4: Strengthening veterinary services**

Strengthening VS is one of the PPR GCES’ three principal components. The existing OIE performance of veterinary services (PVS) pathway serves the purpose of reviewing national VS capacity. By the beginning of 2015, over 130 OIE member countries had requested a PVS evaluation mission, to assess their own veterinary services by applying the OIE PVS tool. This includes 90 percent of the 76 countries targeted by the programme (countries reporting PPR outbreaks or with unknown status). Countries are already familiar and comfortable with the PVS evaluation process and many are working towards improving their veterinary services on the basis of their PVS evaluations and recommendations. This means that the PVS evaluation can serve very well as a frame of reference throughout the implementation of the GEP to ensure that technical and resource capacities are in place in each country, allowing them to move with confidence towards the goal of global PPR eradication. In addition, the OIE can make experts and institutional support available to countries involved in the GEP, through its PVS pathway additional tools such as PVS gap analysis, the veterinary legislation support programme (VLSP), laboratory twinning and veterinary education establishment twinning projects. For laboratory assessments, both the OIE PVS laboratory tool and the FAO laboratory mapping tool (LMT) can be used.

According to the OIE definition, national VS encompass public and private sectors, including veterinary paraprofessionals, and in some countries this would include CAHWs. If that is the case, their legal status must be considered and recurrent training should be incorporated.

### **Main deliverables**

- Reviews of OIE PVS evaluation and PVS evaluation follow-up mission reports in PPR-infected and at-risk countries to identify national VS requirements for strengthening and capacity building in support of the GEP.
- Priorities established for capacity building activities and resource allocations based on PVS evaluation and PVS evaluation follow-up mission report reviews in consultation with the relevant authorities and policy-makers at national and regional levels.

### **Main activities**

The programme will assist countries that already have a PVS evaluation, to review the findings and recommendations with relevant authorities and policy-makers in the context of implementing the PPR GEP in order to identify key areas that require strengthening and adequate funding. Countries that have not had a PVS evaluation or whose PVS evaluation is more than five years old will be encouraged to request a PVS evaluation or a PVS evaluation follow-up.

The PPR GEP will encourage countries to strengthen their VS using OIE tools and programmes including laboratory twinning, veterinary education establishment twinning, veterinary statutory body twinning, veterinary legislation agreements, PVS laboratory missions and PVS gap analysis.

At regional level, the programme will support OIE to conduct regional training of national VS staff on a case-by case basis, on the use of the OIE PVS tool to assist them in taking ownership of their PVS report findings as well as for self-assessments of VS performance. Regional analysis of the PVS evaluation and PVS gap analysis reports will be conducted in collaboration with OIE regional and subregional representations in coordination with the relevant RECs in order to better define needs.

## **Component 2: Support to the diagnostic and surveillance systems**

The purpose of this component is to undertake and support efforts for a better understanding of the presence (or possibly the absence) of PPR in a country or region, its distribution among the different farming systems and, ultimately, its impact on these systems. This requires an assessment of the epidemiological situation and the establishment of a good surveillance system. Field surveillance activities that include participatory disease search tools and collection of samples are designed and implemented by epidemiologists, while sample analysis is carried out in the veterinary diagnostic laboratories. At the national level, permanent dialogue, trust and institutionalized collaboration should be established between epidemiologists and laboratory diagnosticians to successfully implement the PPR eradication programme.

Because of the transboundary nature of PPR, the efficient eradication of this disease is not the task of a single country but of all countries, whether infected or at-risk, in a given region. In consideration of that fact, the PPR GCES included a regional approach, with regular coordination meetings and exchanges of information between stakeholders of different countries. Networks are the best forums for such close collaborations. This is one of the lessons learnt from the success of the GREP, in which functional rinderpest diagnostic laboratory networks were fostered and coordinated by the Joint FAO/IAEA Division of Nuclear Techniques in Food and

Agriculture – which is not only the FAO laboratory but is also an OIE collaborating centre. In the PPR GEP, it is foreseen that the joint FAO/IAEA division, in close collaboration with FAO/OIE PPR reference laboratories, will play a coordinating role in organizing laboratories into PPR regional and global networks, strengthening veterinary diagnostic laboratories involved in the programme and ensuring the transfer of new technologies to those laboratories.

Through the programme, a collection of baseline impact data will be undertaken to facilitate the economic analysis of the outcome of the programme.

Component 2 includes three subcomponents:

- Epidemiological assessment
- Strengthening surveillance systems and laboratory capacities; and
- Regional epidemiology and laboratory networks.

### **Subcomponent 2.1. Epidemiological assessment**

National assessment will elucidate where there are reservoirs of PPR infection, and what the transmission patterns and critical control populations are, to enable optimal use of resources and efficient eradication within the regional PPR epidemiological systems. Epidemiological assessment will be an ongoing process, repeated annually, and the results will be reported during regional coordination meetings using the PMAT tool to inform regional assessments. As surveillance systems are established and field assessments of specific populations are completed, the quality of national and regional assessments will improve.

In order for this subcomponent to be fully achieved, a functional surveillance system that provides sensitive and realistic information on the distribution of PPR is needed. It should, at a minimum, incorporate disease reporting, active and passive surveillance, active syndromic surveillance that includes participatory methods, outbreak investigation, and wildlife surveillance. Few countries currently meet this requirement.

Although no evidence of PPR persisting in wildlife or camels has been reported to date, continuing to assess the evidence of infection in wildlife and camels is a due diligence activity that should not be neglected. In addition, the absence of seroconversion in national wildlife (and cattle populations) can be used as supporting evidence for the absence of virus circulation or infection in its main hosts.

The epidemiological assessment will be conducted by a national team of experts with specific guidance and training on assessment procedures and the participation of external expert consultants where necessary. The assessment will be a dynamic undertaking that is *updated continuously* in light of new information and changes in the epidemiological profile of the country and region. Disease investigation and participatory disease surveillance skills will be invaluable in this process, but more is needed. Those responsible for producing assessments will need training in qualitative risk analysis and mapping concepts, as well as a solid foundation in the principles of infectious disease epidemiology. Finally, capacity-building for assessments will need to provide guidance on how to pull together this diverse information into a coherent targeting and eradication plan.

In many regions of the world, production systems and animal contact networks span international borders because of pastoral and trade patterns of movement. Regional analysis is needed to identify and understand regional epidemiological systems in order to build coordinated and targeted eradication plans that efficiently eliminate infection. Geographical areas that share

virus flows or the clear risk of shared virus flows must be identified. In some cases, regional epidemiological systems will involve more than one REC, so the epizone approach will need to be considered.

Regional and national assessments are interrelated and mutually informative. As national assessments are completed, these should contribute to update regional analysis. Regional assessments are dynamic undertakings that will be *updated annually* during the regional coordination meetings in light of new information and changes in the epidemiological profile of countries and regions.

### **Main deliverables**

- Accurate information on domestic and wildlife host populations, movements and linkages.
- Timely intelligence on distribution and maintenance of PPR (populations and number of animals responsible for maintenance of virus, and means of transmission within and between populations of small ruminants).
- Social and economic drivers of PPR maintenance and eradication opportunities.
- Draft plans for livestock and wildlife surveillance and targeted elimination that include performance targets to measure progress.
- An analysis and map of regional production systems and contact patterns as well as the underlying socio-economic drivers of shared regional epidemiological systems.
- An analysis and map of regional PPRV risk and probable virus flows.
- A plan for regional coordinated surveillance and targeted eradication.
- A strategic framework that contributes to the context for national epidemiological assessments.

### **Main activities**

At national level, PPR status will be updated annually using the PMAT. This will also help to determine progress toward final eradication. A team will be built in each country to carry out the epidemiological assessment. This will require all available literature, reports, databases for livestock and wildlife hosts, and output of PPR surveillance activities to be reviewed. With guidelines provided by the PPR Secretariat, each country will use the PMAT to formulate a national assessment plan based on principal data gaps to be filled or hypotheses to be tested. Field assessments will be undertaken to identify risk hotspots and transmission pathways by analysis of epidemiological systems including value chains and risk analysis.

Regional assessments for PPR maintenance will be carried out as follows:

- Synthesize literature review, field assessment results and information from molecular epidemiology.
- Identify risk hotspots and transmission pathways by analysing epidemiological zones including value chains and risk analysis.
- Review and integrate national analysis with regional epidemiological systems analysis.
- Propose an overall epidemiological monitoring/surveillance system for the region (with its active and passive components) based on national and regional analysis to guide national planning.
- Propose a time-limited eradication plan using different scenarios according to the national/ regional epidemiological situations.



## Subcomponent 2.2. Strengthening surveillance systems and laboratory capacities

Surveillance is critical to the success of the programme. Surveillance will provide essential information in ongoing epidemiological assessments for strategy setting, targeting vaccination efforts and collecting viral isolates for molecular epidemiology. Surveillance will also help to measure progress and cumulatively contribute to the evidence base for validating eradication.

At the outset of the programme, the purpose of surveillance will be to inform strategy development and enable eradication. Surveillance should focus on identifying patterns of transmission rather than attempting to make estimates of incidence. The objective is to identify populations that are critical in maintaining the virus so as to develop the appropriate vaccination strategy and vaccination planning.

Right from the earliest stages, developing the epidemiological skills required to conduct PPR surveillance is of critical importance. Disease investigation, disease confirmation by testing, and participatory disease surveillance need to complement each other. The required skills encompass disease recognition, epidemiology, pathology, disease searching and disease investigation, leading up to diagnostic confirmation and disease tracing. This is required to formulate strategy and focus action for eliminating the virus.

During GREP, efforts were initially put into the agar gel immunodiffusion test (AGIDT) and counter-immunoelectrophoresis (CIEP) before ELISA was fully validated and transferred to nearly all laboratories involved in the programme. The advent of biotechnologies, bioinformatics and electronic devices has revolutionized disease diagnosis and reporting tools, facilitating the highly specific, highly sensitive and rapid identification of pathogens, and enabling early and effective responses. Assays deriving from these new technologies are constantly improving and this implies continuous capacity building efforts in veterinary laboratories, in terms of training staff and providing appropriate equipment and reagents. Veterinary diagnostic laboratories in countries where PPR is endemic are at variable levels of capacity for running these new assays; some of them are able to perform only classical assays because of very limited funding support.

The PPR GEP will mitigate those weaknesses by deploying efforts to strengthen animal disease diagnostic capacities. Support will be tailored to the level of each laboratory, bearing in mind that it will be financially impossible to bring all those laboratories to high standards. The support should be provided in such a way as to enable the full diagnosis of PPR within the region: from ELISA to virus isolation and genotyping with the collaboration of the OIE/FAO PPR reference laboratories and the joint FAO/IAEA division. At first, the diagnostic requirement consists of the ability to confirm infection and there are a number of diagnostic techniques available. The most appropriate are virus antigen and genetic detection tests. Fortunately, today a point-of-care (POC) test – a lateral flow chromatographic strip test or “the rapid test” – is available and gives a result in minutes. The test has a high sensitivity and is relatively cheap. In many national laboratories the basic confirmatory tests used are immune-capture ELISA (ICE) and PCR-based tests that require laboratory equipment and expertise, especially the PCR-based tests.

The most appropriate way to do diagnostic testing at national level for suspicious cases is to use the rapid test (POC test) in the field and to confirm results in the laboratory using ICE or RT-PCR before sending positive representative samples to a reference laboratory for further viral characterization studies.

It is expected that the support of the OIE twinning programme and the joint FAO/IAEA division veterinary laboratory support activities will enable at least one or two laboratories in each region

and network to be promoted to a standard sufficient for successfully implementing modern techniques for the full identification and characterization of PPR virus (PPRV).

PPR diagnosis during the eradication programme can be grouped into six main categories:

1. POC tests for diagnosis in the field by specialized and non-specialized laboratory diagnosticians.
2. Serological-based test (ELISA) either for antibody detection or virus detection by immunocapture.
3. PPRV identification by classical nucleic acid amplification (RT-PCR).
4. PPRV identification by quantitative RT-PCR.
5. Serological-based or molecular-based assays for diagnosis of other SRD considered in the PPR eradication programme and assays for differential diagnosis of other SRD with similar clinical signs to PPR.
6. Virus isolation and genotyping at the regional leading laboratory, or at the OIE/FAO reference laboratories or the joint FAO/IAEA laboratory.

In the PPR GCES, disease diagnosis and vaccination monitoring are intended to be implemented at four levels of competency. For the PPR GEP, assays categories 5 and above have been added. ELISA is now a basic laboratory platform and the classical PCR test is approaching the same level. All laboratories that will be involved in the PPR eradication programme at national and provincial levels should be able to implement assays of categories 1 to 3. National laboratories should extend their capacity to be in a position to implement all assays up to category 5. Virus sequencing and sequence analysis could also be conducted by a number of countries to confirm circulating serotype and carry out molecular epidemiology studies. Virus isolated in the regional PPR-leading laboratories should be made available to the OIE/FAO reference laboratories and the joint FAO/IAEA laboratory.

Ideally what is needed is a hierarchical structure or network of global, regional and national laboratories to provide support, continuing technical development and dissemination of information through regional meetings of regional and national laboratory diagnosticians and epidemiologists. A PPR-specific module of the FAO laboratory mapping tool (LMT) could be developed and applied in laboratories to score their capacities in performing the tests for PPR in the six categories listed above. This module could serve as a descriptive tool for PPR testing capacities and also as a monitoring and evaluation (M&E) tool. The LMT data could also include proficiency testing data. These data from the LMT PPR module can be complemented with existing data from the core LMT describing general functionalities of diagnostic laboratories. The LMT mobile app, global LMT database facilities and national portals could be utilized to manage the data obtained from the LMT PPR module.

### **Main deliverables**

- National training programme tailored to a country's needs in epidemiology, surveillance, laboratory diagnostics and other aspects of disease management.
- Targeted regional training of trainers (ToT) programmes.
- Qualified staff at all levels to implement the PPR GEP.
- Implementation of a coordinated monitoring/surveillance system (with its active and passive components) including:
  - An active, syndromic surveillance system based on a pneumo-enteritis syndrome (PES) definition that uses participatory methods and PPR testing results.

- An outbreak investigation system that investigates and samples all reports of PPR or PES.
- Strengthened disease reporting systems for PPR and PES (on weekly and monthly basis).
- Information flow in surveillance system.
- Diagnostic services or access to diagnostics capable of confirming PPR or making differential diagnosis and molecular analysis of PPRV isolates.
- Documentation of virus flows using different sources of information including molecular epidemiology.
- Virus transmission characteristics and virus elimination threshold better understood.

### Main activities

At national level, the programme will provide a series of training courses for professionals and paraprofessionals in:

- i. outbreak investigations;
- ii. participatory epidemiology (PE) and participatory disease surveillance including syndromic approaches (PDS), and epidemiology and risk assessment; as well as on
- iii. PMAT;
- iv. PVE; and
- v. hygiene.

The programme will support the development of the FAO-led field epidemiology training programme for veterinarians (FETPVs) focusing on PPR at national/regional level, and having a component for formal postgraduate training (MSc/PhD programmes).

Each country will prepare a surveillance plan (using FAO/OIE guidelines to be developed) to carry out syndromic surveillance and outbreak investigation activities, and participatory disease searches in locations where surveillance is weak or the epidemiological picture is unclear. The programme will introduce or strengthen digital systems for disease reporting. Human and infrastructure resources to properly carry out surveillance activities and field assessment will be improved.

Ideally, a cascade of information should be established at national level in which trainers would be trained to conduct training workshops at national and intra-country regional level. Those trained in this way would then be responsible for the virus surveillance and disease search programme. The higher echelon of trainers would themselves require continuous professional development to an advanced level; the most efficient way of achieving this is to set up regional (national group) training workshops which initially require inputs from international experts using expertise from GEP countries that have made progress in setting up their own programmes. Trainers and practitioners would need to be supported by providing an equipment package for disease investigation through access to a centralized disease occurrence database, for example using SMS-based telephone reporting.

Training is not a one-off activity and repeated refresher training at all levels is required to build and maintain expertise. A ToT manual in syndromic surveillance and participatory disease surveillance is required to assist trainers. A manual of this sort should be well-illustrated and provide information in local languages on defining the disease syndrome under investigation (the pneumo-enteritis syndrome); clinical and epidemiological characteristics of the diseases within the syndrome; syndrome case definition; sampling and use of diagnostic tests; reporting; and techniques used in village interviews and other participatory investigations.

Capacities for laboratory diagnostics and testing (including sample handling), differential diagnosis of PPR and characterization of field virus isolates will also be strengthened. Training and on-site assistance for laboratory quality assurance systems and for PPR test accreditation will be provided. The aim is to have one or more national laboratories accredited for PPR testing (ELISA, and possibly PCR). The programme will support the validation and technology transfer of the multiplex PCR test recently developed by IAEA to identify four small ruminant respiratory disease pathogens.

At national level, laboratory diagnostic capacities will be assessed with the support of the joint FAO/IAEA division and a detailed laboratory inventory will be prepared. Samples will be collected and analysed, as recommended by the GCES, to assess disease distribution. The current PPR isolates will be analysed as part of field assessments.

The programme will make sure that there are adequate stocks of reagents, laboratory devices and equipment in the main laboratories involved in diagnosing PPR.

At regional level, the nine regional leading laboratories (RLL) will be helped to develop assured expertise, to practice quality assurance of diagnostic tests and support national laboratories in performing a standard package of laboratory tests, to provide reference diagnostic services, and to themselves transfer viruses to OIE/FAO reference laboratories/centres for advanced characterization. National and regional laboratories need to operate ring-testing exercises for diagnostic testing, especially for serosurveillance, to ensure that laboratories are competent.

International/regional proficiency tests (PTs) for PPR (ring trials), led by either an OIE/FAO reference laboratory or a RLL within the regional network, will be conducted every year and the results discussed during the regional laboratory and epidemiology network meetings. Assistance will be provided to countries to request and receive twinning projects when needed.

At regional level, the programme will provide regional ToT for epidemiology and surveillance as well as diagnostic methods and quality assurance. A series of FAO/OIE PPR control and management manuals<sup>11</sup> (in print: 5–15 pages; and video: 3–4 minutes; for consumption as distance learning and webinars) will be developed.

### Subcomponent 2.3. Regional epidemiology and laboratory networks

Regional epidemiology and laboratory networks were instrumental during the implementation of the pan-African rinderpest campaign (PARC) leading to the final eradication of rinderpest. FAO supported the establishment of regional laboratory/epidemiological networks in several regions. The PPR GEP will establish or reinforce regional laboratory and epidemiology networks and facilitate the designation of one RLL and one regional leading epidemiology centre (RLEC) in each of the nine regions/subregions. One regional meeting will be organised every year for exchanges between national laboratory and epidemiology staff in each region.

#### Main deliverables

- RLL designated and supporting the other laboratories
- RLEC designated
- Annual regional laboratory and epidemiology network meetings held
- Existing networks for TADs or emerging infectious diseases in the region built or reinforced
- Twinning laboratories and epidemiology units.

<sup>11</sup> PPR recognition; Disease investigation; Syndromic surveillance; Small ruminant welfare: Handling, transport, good practices; Taking samples for diagnostic; Good laboratory practices; etc.

## Main activities

The programme, in collaboration with the RECs, will facilitate information sharing and coordination between the countries. One annual regional network meeting involving the laboratory and epidemiology focal points will be organised every year back-to-back with the coordination meetings.

## Component 3: Measures supporting PPR eradication

As indicated in the PPR GCES, measures supporting PPR eradication are a combination of different tools, which can include vaccination, improved biosecurity, animal identification, movement control, quarantine and stamping out. These individual tools are likely to be applied at different levels of intensity while an individual country is moving along the pathway. The PPR GEP will support countries in applying the appropriate tools, taking into consideration their epidemiological situation.

The programme will also support countries that have never reported PPR to be recognised as PPR-free.

As an incentive, to facilitate implementation of the GEP and to exploit economies of scale, the programme will support the control of other small ruminant priority diseases.

This component is divided into three subcomponents:

- Subcomponent 3.1: Vaccination and other measures to prevent and control PPR
- Subcomponent 3.2: Demonstration of freedom from PPR
- Subcomponent 3.3: Control of other small ruminant diseases in support of PPR eradication.

### Subcomponent 3.1. Vaccination and other PPR prevention and control measures

This subcomponent focuses on five main area of work:

- vaccination
- post-vaccination evaluation
- improved biosecurity
- contingency plans
- other prevention and control measures.

#### 3.1.1 Vaccines

The currently available vaccines are live-attenuated forms of PPRV. These vaccines are highly effective, providing long-lasting protection. There is only one serotype of PPRV, and any vaccine strain appears to be able to protect against any naturally occurring strain of the virus. One of the major limitations of the vaccines currently available on the market is their limited thermotolerance. This issue has now been addressed by many laboratories, and the technologies that have been developed to improve PPR vaccine thermotolerance have to be transferred to vaccine manufacturers. The second drawback of the PPR vaccines currently in use is that they do not enable differentiation between infected and vaccinated animals (DIVA). A DIVA vaccine would be useful at stages of the campaign where disease surveillance is being implemented at the same time as vaccination, especially if it were inexpensive, accurate and based on POC diagnostics.

### Main deliverables

- Certified PPR vaccines available
- Harmonized regulation relating to vaccine registration at regional level.

### Main activities

Implementing vaccine quality control helps to ensure that laboratories producing good quality vaccines are supported to achieve a high standard of performance. There will be a need to harmonize activities, especially vaccine production, quality control of vaccines and disease control. The programme will support the implementation of quality standards for PPR vaccines through:

- training courses on vaccine production and quality control for technical staff;
- implementation of a quality management system in all vaccine-producing laboratories;
- inter-laboratory testing to build capacity for internal quality control of vaccines produced.

There may be an additional need to support the implementation of good practice in storage, shipment and handling of vaccines for vaccine quality control and vaccine delivery. Support will also be provided for monitoring vaccination in the field.

All conditions for ensuring the certification of PPR vaccines produced or imported to Africa are present at AU-PANVAC but this capacity is also needed elsewhere.

At the regional level, in order to ensure that good quality vaccines are produced and all vaccines certified, training courses will be held to harmonize laboratory biosafety and quality assurance systems, and laboratory networks will be established to share expertise; harmonize techniques, training and the development of scientific and technical exchanges; and resolve major problems associated with vaccine production.

Most countries have different regulations for vaccine quality standards and registration. There is a need to harmonize vaccine quality standards with chapter 14.7 of the OIE manual, along with all regulation relating to vaccine registration. A regionally harmonized registration scheme will allow licenses to be issued through mutual recognition procedures and this will result in the more rapid introduction of good quality vaccines into regions.

At the global level, research is required and is currently being done to develop and validate DIVA vaccine and multivalent vaccine for the control of at least one small ruminant priority disease alongside PPR eradication activity. The programme may also investigate the need to have an OIE certification procedure for vaccine producers such as PPR, SP/GP and Brucellosis.

### 3.1.2. Vaccination

The GCES suggests that effective vaccination needs to be implemented in Stage 2 during two successive years followed by the vaccination of young animals during one or two successive years. Three major production systems have been identified: rangeland pastoralism; mixed farming; and commercial, periurban and urban systems. The number of rounds (one or two per year) of vaccination campaigns may differ from one production system to another. An expert consultation meeting held in October 2015 in Rome recommended that the emphasis at Stage 2 should be vaccinating for virus elimination, in order to progress directly to Stage 4 – aiming at reducing the time frame for PPR eradication at national level. It is recognized that some countries might not be able to proceed at this speed, for whatever reason, which is why the strategy and budget includes a vaccination contingency component.

The regional roadmap meetings showed that many countries placed themselves in the assessment phase (Stage 1) even though they reported PPR vaccination activities. Some had been conducting vaccination for ten years or more but reaching only an average of 15–30 percent of the stock, underscoring the importance of conducting detailed epidemiologic assessments to serve as the basis for an effective vaccination push. For countries already implementing ongoing vaccination and vaccination to contain spread, rapid review of current national control activities and the risk of spread to new areas will be undertaken. An important early action will consist of consultations with countries in Stage 1 where vaccination is ongoing, to agree on a transition to surveillance only. Preliminary recommendations may also identify critical areas where vaccinations may be needed to stop spread of disease to currently free areas. The GEP will support the review of vaccination methods to ensure that campaigns are properly planned with the concerned communities, are well-resourced, include adequate information-sharing to ensure participation, and utilise thermostable vaccine if required.

Depending on the assessment and surveillance data, the vaccination should be time-bound with high coverage (aiming for 100% vaccination coverage to achieve necessary stock immunity in high-risk areas) to achieve elimination, rather than ongoing, low-coverage, annual vaccination campaigns. The vaccination protocol will be based on a two-year vaccination (in Stage 2 - years two and three of the programme) with one year follow-up farm visit to vaccinate young animals (of four-months to one year in age) that may take place when countries reach Stage 3. If this is not possible because of logistical problems, countries can decide to carry out the follow-up on all animals (i.e. adult, juvenile and young). As already mentioned, specific country vaccination plans will be guided by the initial epidemiological assessment and subsequent surveillance. The total estimated SR population in the 76 focus countries is 1.67 billion and the population to target for vaccination in high-risk areas is estimated at around 1.3 billion. The follow up round of vaccination for young stock or contingency is estimated at 200 million (around 15 percent of the target population in high-risk areas). The total number of animals to be vaccinated during the five-year programme is estimated at around 1.5 billion.

### **Main activities**

At national level, field vaccination procedures will be elaborated, certified vaccines procured by AU-PANVAC and other relevant institutes, and vaccines submitted for external quality certification. The GEP will support refresher training to update knowledge on how to apply PPR vaccination in the field, and standard operation procedures (SOPs) for proper cold chain management of vaccine storage from the vaccine producer, until the inoculation is developed.

A mapping of ongoing PPR projects and nationally-funded activities will be conducted to identify vaccine doses provided by these projects, compared with the estimated vaccine doses in the GEP, to calculate the gaps in vaccine production.

At regional level, the needs of certified PPR vaccines will be assessed annually by regional organizations in collaboration with the PPR Secretariat. Harmonization of vaccination calendars between neighbouring countries will be supported.

At global level, taking into account the experience of AU-PANVAC, a similar approach will be explored for other regions to establish an independent quality control centre for animal disease vaccines to support the PPR GEP. The programme will also support the use of OIE regional PPR vaccine banks that are able to facilitate the delivery of high quality vaccines in countries on demand while mitigating storage challenges, reducing the complexity of procurement procedures and possibly reducing cost through economies of scale. Even in countries where



certified vaccine is being produced, the regional vaccine banks can serve a complementary function, providing rapid access to additional vaccine when surges in demand require it.

### 3.1.3. Post-vaccination evaluation (PVE)

At the completion of each round of vaccination, countries will be encouraged to conduct a PVE by collecting data to evaluate the results of the vaccination programme (immune response, population immunity at a given point in time, and its trend – if implemented over a sequence of vaccination campaigns) and monitor the whole vaccination chain accordingly. PVE activities are not limited to evaluating the immune response in animals that have received vaccine. They also include active disease search and passive outbreak reporting, as well as implementing a monitoring system to check that the cold chain is maintained all along the vaccine delivery system and that there are no failures that could affect the efficacy and effectiveness of the vaccination campaign.

The programme will develop protocols for serological surveys (taking into consideration the principles detailed in the PPR GCES) and support countries in carrying out PVE activities.

#### Main deliverables

- Establish PVE in countries with vaccination programmes.

#### Main activities

- Design protocols for PVE
- Implement PVE activities.

### 3.1.4. Improved biosecurity

The GEP will support national veterinary authorities in exploring ways of working with communities and other services involved (notably police, customs, abattoir owners and border control inspectors) to implement movement controls. This will include developing and disseminating awareness materials and organizing sensitization meetings. Standard operating procedures for a response mechanism in case of a suspected/confirmed outbreak will be formulated and implemented. The programme will also support countries to implement movement permit systems using livestock identification and traceability systems (LITS) where necessary.

### 3.1.5. PPR contingency plans and other prevention and control measures

Support will be provided to countries in developing their contingency plan and regularly testing its application through desk or/and field simulation exercises. Considering that around five percent of the eligible population of small ruminants could be vaccinated, provision for contingency vaccines will be provided.

When infected herds are few in number and relatively easy to identify, countries will be encouraged to consider developing procedures to compensate farmers (or to establish insurance schemes) where stamping out is needed in the early stages of new outbreaks. An appropriate legal framework and unit cost for compensation should be defined for each country.

## Subcomponent 3.2. Demonstrating PPR-free status

Under this subcomponent, countries historically free from PPR and/or countries entering at Stage 4 will be assisted in applying for the OIE official recognition of PPR-free status.



In line with the official OIE procedure for recognizing freedom from PPR, countries that have never reported PPR, or where the disease or infection has ceased to occur for at least 25 years, or where PPR eradication has been achieved may be recognized as infection-free without applying a pathogen-specific surveillance programme. As of 2016, there are 79 countries in this category.

Entry at Stage 4 means that a country will be ready to start implementing a full set of activities that should lead to it being recognized as officially free from PPR. In Stage 4, vaccination is prohibited. Eradication and prevention measures are based on early detection, immediate reporting of any new suspected case, emergency response and contingency planning.

Any such country needs to provide the following evidence: no reports of PPR outbreaks in the past 24 months; no PPRV infection; and no vaccination carried out against PPR. In addition, imports of domestic ruminants and their semen, oocytes or embryos must have been carried out in accordance with the OIE terrestrial animal health code. PPR should be notifiable throughout the country/territory, and all clinical signs suggestive of PPR should be subjected to appropriate field and laboratory investigations. An awareness programme needs to be in place to encourage reporting of all cases that suggest PPR. An appropriate surveillance programme capable of detecting the presence of infection, even in the absence of clinical signs, also needs to be in place.

Once countries are recognized as PPR-free by the OIE, it is urged that the programme learn from the rinderpest experience and have a plan for PPRV destruction and sequestration. They should not wait until 2030 to begin this process. Efforts currently underway on PPR (diagnostic services under VS authority, veterinary faculties, pathology labs, research facilities, vaccine producers) can assist ongoing efforts relating to rinderpest, as the current PPR and historical rinderpest geographic footprints greatly overlap.

### **Main activities**

The GEP will assist the 79 countries that have never experienced PPR infection to prepare their dossiers to apply for OIE PPR-free status on a historical basis (OIE terrestrial animal health code, chapter 14.7). For previously infected countries that have stopped vaccinating, the programme will support the establishment of a surveillance system capable of providing evidence for the absence of PPRV infection and generating data to prepare a dossier to apply for OIE PPR-free status. Field veterinarians and veterinary paraprofessionals should be provided with refresher training on syndromic surveillance. The outcomes of the surveillance need to be consolidated into a dossier and submitted to the OIE.

Although applying for OIE-certified PPR-free status is carried out at a national level, the region and the PPR Secretariat will play an important role in supporting and harmonizing each country's activities.

### **Subcomponent 3.3. Control of other small ruminant diseases in support of PPR eradication**

The PPR GCES advocates combining PPR with strategies to control other significant diseases of small ruminants, for better cost-effectiveness and optimum use of available funds and veterinary services. While the PPR GEP considers the focus on PPR eradication to be imperative, the value in incorporating control of other small ruminant diseases into the programme should not be overlooked – as it will encourage farmer support for PPR procedures. For example, syndromic and participatory surveillance for pneumo-enteritis syndrome can provide information that helps formulate control strategies for other diseases. Surveillance can help national authorities to recognise other diseases that impact on production and welfare, and add a degree of control to

PPR eradication activities. There are a number of other diseases of sheep and goats prevalent in the nine regions/subregions identified for PPR control in GCES. Some of these diseases are common across the regions while some are unique to specific countries or ecozones within a region.

Any proposal for a combined programme will require a feasibility study to address associated issues, such as epidemiology of the diseases and, when vaccination is a possibility, the nature and efficacy of available vaccines, and an estimate of the value added.

A reasonably clear understanding of the epidemiology of these other diseases, which should include issues such as prevalence, seasonality, and the involvement of vectors, will have to be reached. A participatory rapid appraisal could be carried out in defined regions/communities in the country for prioritization. A clear understanding of the existing control measures applied as a regular or emergency response, including availability of vaccines should be considered during regional roadmap meetings or during the implementation of country programmes.

#### **Main deliverables**

- Epidemiological data on prioritized small ruminant diseases
- Control plan for selected prioritized small ruminant diseases.

#### **Main activities**

Countries will be supported to formulate/design, validate and implement appropriate control plans for the prioritized small ruminant diseases (SRD). Appropriate template and guidelines will be developed for each of the prioritized SRD to assist countries to formulate their national strategic plan. Regarding the list of diseases that could be combined with PPR without compromising the integrity of the PPR eradication effort, several exercises have already been carried out. Some viral and bacterial diseases are good candidates, such as sheep and goat pox, pasteurellosis and brucellosis. The programme will also support countries to explore the possibility of including other diseases such as Rift valley fever (RVF) and contagious caprine pleuropneumonia (CCPP) in Africa, FMD in Central Asia, and also internal and external parasites, enterotoxaemia or anthrax.

The decision to combine with other SRD should explore whether adequate epidemiological data are available for the prioritized diseases, including spatial, temporal and seasonal distribution, species or breeds involved, prevalence, vectors involvement, local festivals and other important social issues. Samples collected for PPR will be tested against other small ruminant priority diseases when appropriate. Progress made and challenges encountered in implementing SRD control activities will be discussed during the regional PPR coordination meetings.

### **Component 4: Coordination and management**

The success of the PPR GEP requires the establishment of functional coordination mechanisms at global, regional and national levels.

#### **Subcomponent 4.1. Global level**

At global level, the PPR Secretariat is responsible for overall coherence and facilitating the collaboration of partners in the GEP, and monitoring its implementation, assessment, refinement and reporting. The PPR Secretariat will work closely with regional organizations, reference laboratories/centres, and technical and research institutions. The PPR Secretariat, under FAO

and OIE authority, will report to the GF-TADs Management Committee for coordination with other GF-TADs initiatives and guidance.

A PPR Advisory Committee will be established to conduct annual programme reviews and advise the PPR Secretariat on aspects of innovation, strategic guidance, recommendations and suggestions. It will review the annual work plan and monitor its technical implementation. The Advisory Committee will also consider progress against specific programme goals and targets and make strategic inputs for improvement or needed research.

A PPR Global Research and Expertise Network (PPR GREN) will be established to promote and initiate an integrated, comprehensive research and expertise network that capitalizes on synergies that can contribute to eliminating the threat posed by SRD (with a special focus on PPR). The PPR GREN will serve as a forum for scientific and technical consultations to foster a science-based and innovative debate on PPR. Some research areas that may be considered include:

- Traditional practices, movement patterns, social interactions/networks.
- Predictive models to evaluate possible eradication strategies at national/regional level.
- Vaccines: improving existing tools, developing new reagents and rationalizing implementation in the field.
- Diagnostics: raising awareness, developing capacity and training, implementing new tools and modernizing surveillance.
- Virology and epidemiology: widening knowledge of host-susceptibility, transmission biology, environmental stability and trade.
- Socio-economic research: defining and publicizing the impact of PPR.
- Other SRD: examining co-morbidities as targets for control, identifying obstacles and opportunities for coordinating vaccination and other control efforts with PPR.
- Extensive use of new ICTs.

#### **Main deliverables**

- Efficient PPR Secretariat in place to oversee the programme implementation under GF-TADs Management Committee and Steering Committee.
- PPR Advisory Committee is in place and meets twice a year (one face-to-face meeting).
- PPR GREN established with regular meetings (face-to-face or electronic).

#### **Main activities**

The PPR Secretariat will ensure the overall oversight, facilitation, consensus building and management of the GEP and report, when appropriate, to FAO and OIE governing bodies, PPR Advisory Committee, donors, countries and regional organizations. The PPR Secretariat will also report to FAO and OIE Management through GF-TADs Management Committee and Steering Committee. Actions will be taken to (i) organize annual meetings of the PPR Advisory Committee; (ii) support the PPR – GREN to gather expertise in research and in the definition and implementation of control programmes; (iii) establish the PPR International Laboratory Network; and (iv) establish a roster of PPR experts to support programme implementation.

### Subcomponent 4.2. Regional level

In Africa, the PPR Secretariat will partner with AU-IBAR and the African RECs to support the PPR efforts. In the other regions, it will work with ASEAN, ECO, GCC, SAARC, and other relevant institutions.

Regional PPR coordination meetings provide a forum for information sharing, updates on progress, coordinating activities and future planning. They provide countries with a common long-term vision and create incentives for them to develop and embark on national risk-reduction strategies with similar progress pathways, milestones and timelines that are supportive of the regional efforts. Each region will nominate a Regional Advisory Group (RAG) composed by 3 CVOs and the Coordinators of the Regional Epidemiology Network and the Regional Laboratory Network (voting members) and representatives from the REC, the PPR Secretariat, FAO and OIE (non-voting members). The RAG oversees the implementation of PPR control activities within the region and is therefore responsible for the following: review the self- and external assessments of the PPR stages; assist with the preparation of the PPR regional roadmap meeting recommendations and ensure their implementation; coordinate and keep regular contact with the countries over the course of the year; guide PPR training and capacity development activities to support regional and national strategies; and advise on issues or factors preventing effective progress of the PPR roadmap.

#### Main deliverables

- Functional regional PPR committees established for all participating countries
- PPR regional coordination annual meetings.

#### Main activities

At regional level, the GEP will support at least one PPR regional coordination meeting per year during the two first years of the programme to bring together Chief Veterinary Officers, laboratory and epidemiology national focal persons and other stakeholders. These meetings will provide the opportunity to:

- i. review progress and stage-by-stage progression toward final eradication;
- ii. harmonize animal health and trade (animal identification, certification, quarantine) policies and strategies that impact on the small ruminant value chains; and
- iii. facilitate discussion between the RAG and countries' representatives. External country assessments will be conducted for selected countries.

### Subcomponent 4.3 National level

The programme will support countries to establish, within the Ministry in charge of Livestock, a PPR national committee to serve as a forum for information sharing, planning, and reporting on progress made and challenges encountered.

#### Main deliverables

- Functional national PPR committees established in all participating countries.

#### Main activities

Each country will establish a national PPR committee to facilitate consultation and promote stakeholder engagement. A PPR national coordinator will be appointed by the relevant ministry to oversee the programme implementation at national level. The programme will support coordination meetings between central and decentralized VS, including farmers, private

partners, civil society and others. National representatives will be invited to participate in regional epidemiology and laboratory networks. Collaboration between neighbouring countries to develop and implement a harmonized transboundary epizone approach to PPR eradication will be promoted.

### 3.2. Sustainability

The GEP will benefit from a favourable environment, based on the following:

- The international community's strong **political commitment** in favour of PPR eradication as an important tool to address other global challenges like nutrition and food security, poverty alleviation, resilience, women's empowerment and climate change. The PPR global strategy is in line with, and has the same time frame as, the UN Sustainable Development Goals, and facilitates their achievement.
- An **involvement of the membership** of international organizations, *i.e.* FAO and OIE, through their governing bodies. The FAO Conference and the OIE General Assembly, supreme governing bodies, adopted binding resolutions, respectively, in 2015 and 2016, which support the PPR GCS adopted in Abidjan in April 2015, and promote the PPR GEP. The management of these organizations began to implement these resolutions by establishing, in April 2016, the Joint FAO-OIE Secretariat for PPR Global Eradication.
- **Support from the farmers' community.** On 22 May 2016, the President of the World Farmers' Organization (WFO), underlined that: "peste des petits ruminants is nominated as the next animal disease to be eradicated from the world, it still occurs in most African countries, the Middle East and central Asia to South and South-East Asia. WFO calls national and international governmental organizations to invest more in novel tools for the eradication of all these devastating diseases".
- A strong **link with innovation and research.** The implementation of PPR GEP will boost the research in the fields of vaccines (such as quality assessment, quality control, thermostability, DIVA vaccines, multivalent vaccines), rapid diagnostic tests, specific diagnostic assays, laboratory reagents, laboratory techniques, technology transfer, good laboratory practice, animal identification and traceability, epidemiology, socio-economic impact, and so on. It will be the occasion to launch or reinvigorate public-private partnerships. Research in fundamental virology will also benefit from the PPR GEP and the PPR GREN.
- The availability of **pertinent tools for the follow-up** of the PPR GEP.

### 3.3. Risks and assumptions

#### Risks

See Table 2 for details of risks.

#### Assumptions

- Lasting commitment of international community through FAO and OIE involvement (Joint PPR Secretariat), supported by donor mobilization to finance the PPR GEP including national or complementary funds from national or private resources.
- Regional coordination through RECs, regional roadmaps and RAGs.
- Vaccine production is adequate in quantity and quality.

**Table 2: Risks**

No	Risk statement	Impact	Likelihood*	Mitigating action
<b>NATIONAL</b>				
1	Political instability, security problems or conflicts	Field operations are difficult or impossible Reporting and operational lines between field and central levels are weak or absent. Control efforts prolonged.	MH	Targeting operations in secure and stable geographical zones.
2	Lack of transparency from national authority regarding the PPR situation	Epidemiological information is not valid and control / eradication measures cannot be organized and implemented in a coherent way.	MH	Advocating from global level (FAO, OIE, Joint Secretariat...) and REC level to national leaders and managers, for the best quality of sanitary information.
3	Weak political support for PPR eradication	PPR issue is not taken into consideration when developing the legal framework and the annual budget, which jeopardizes the programme in the country.	MH	High-level global and regional consultations, including through FAO and OIE regional governing bodies, could support involvement of national political leaders.
4	Weak or non-existent national policy for PPR Eradication	National mobilization is low or absent.	MH	Drafting and endorsement of National Strategic Plan and Technical annexes.
5	Weak or non-existent national budget for PPR Eradication	Means to implement the National Strategic Plan are not sufficient. Without national contribution, donor mobilization could be low.	MH	Advocating and outreach from global level (FAO, OIE, Joint Secretariat...) and regional economic communities to ministry of finance and budget underlining the benefit / cost ration of vaccination.
6	Weak support from farmers and pastoralists for PPR eradication	Animals are difficult to reach for vaccination. Surveillance is weak.	ML	Communication and awareness raising at national level.
7	Legal framework for PPR control and eradication is absent or very limited	Veterinary services do not have the tools and powers they need to combat the disease.	MH	Legislation review and progressive upgrading of the legal framework.
8	Human resources VS are inadequate in number and skills	Some key elements of the programme, like epidemio-surveillance and vaccination, are weak.	ML	Recruitment, training and capacity building.

\* Estimate of likelihood: High (H), Middle-High (MH), Middle-Low (ML) or Low (L)

(cont.)

No	Risk statement	Impact	Likelihood*	Mitigating action
<b>NATIONAL</b>				
9	Veterinary infrastructures are not suitable (including diagnostic national laboratory)	Functioning of the diagnostic chain (sample collection, transport to the laboratories, diagnostic techniques implementation, date interpretation) is not satisfactory.	MH	Strengthening infrastructure and modernization of laboratory equipment.
10	No national laboratory for vaccine production or poor quality of the vaccine (at national level)	The number of vaccine doses is not sufficient to reach the vaccination targets of the National Strategic Plan.	MH	Strengthening human resources, infrastructure and equipment of national or regional laboratories. Access to OIE vaccine banks. Facilitate access to laboratories in other regions.
11	Basic facilities of the vaccination chain are not in place (vehicles, cold chain, syringes, other small equipment)	Functioning of the vaccination chain is not satisfactory.	MH	Support countries in getting all the basic equipment and train them in its use.
12	Limited vaccine storage capacity	Delay the vaccination campaign.	MH	Assess the real need in vaccine storage and support countries to get adequate equipment and facilities.
13	Institutionalized vaccination is in place for years without any positive results	Waste of money and time. Demobilization of farmers and VS.	MH	Progressive switch to PPR GCES approach to vaccination.
14	Combine PPR eradication efforts with control measures for other SRD	Dilute the focus on PPR eradication.	MH	Regular follow-up, evaluation and implementation of correcting measures, by FAO and OIE management, under GF-TADs.
15	Farmers organizations don't exist or are ineffective	Difficulties to reach the farmers community for training, communication, and organization of vaccination campaign and surveillance.	ML	Promoting establishment of farmers unions and associations.
16	PVS report is not current, not available or absent	Information on VS is outdated.	ML	Updating through new PVS evaluation follow-up missions.
17	Some SRD are not considered priorities for control	The third component of PPR GCES is not implemented.	ML	Integrating other SRD in the NSP, according to PPR GCES.
<b>REGIONAL</b>				
18	Political instability, security problems or conflicts	An infected country under crisis constitutes a permanent threat to neighbouring countries.	MH	Targeting operations in secure and stable geographical zones.

(cont.)

No	Risk statement	Impact	Likelihood*	Mitigating action
<b>REGIONAL</b>				
19	Long land borders	TADs incursion, particularly with countries at risk.	MH	Promoting regional meetings and concertation dedicated to regional epidemiological situation of the disease and regional surveillance.
20	No regional Laboratory or Epidemiology Networks	Epidemio-surveillance at regional level is weak.	ML	Supporting the establishment of regional Laboratory or Epidemiology Networks.
21	The regional laboratories cannot cover the vaccine demand	The number of vaccine doses is not sufficient to reach the vaccination targets at regional level. Vaccination operations and contingency plans cannot be entirely completed.	H	Strengthening infrastructures and modernization of laboratory equipment. Training staff. Access OIE vaccine banks.
22	No regional laboratory for vaccine control and certification	Uncertainty on vaccine quality and vaccination effectiveness.	MH	Supporting the establishment of a regional laboratory for vaccine control and certification. In the meantime, facilitate assessment of vaccines at PANVAC.
23	Involvement of the Regional Economic Community is weak or not sufficient	Regional commitment is weak.	ML	Advocating and promoting REC involvement.
24	Animal movements are not known or insufficiently documented	Epidemio-surveillance at regional level is not sufficient and risk of transboundary infection increases.	ML	Promoting regional meetings and cooperation dedicated to describing animal movements and transhumances.
25	Regional roadmap and epidemiologic situation are not updated	Situation of the disease is outdated.	ML	Updating Regional roadmaps through annual meetings.
<b>GLOBAL</b>				
26	Global coordination, including the relations between PPR Secretariat, PPR Advisory Committee, GREN and FAO – OIE Managements is bureaucratic	Global coordination is inefficient.	ML	Regular follow-up, evaluation and implementation of correcting measures, by FAO and OIE management, under GF-TADs.
27	PPR Advisory Committee or GREN are not operational	Advice support function and scientific and technical inputs are inefficient.	ML	Regular follow-up, evaluation and implementation of correcting measures, by the PPR Secretariat and management of FAO and OIE.



## PART 4 FUNDING, MONITORING AND EVALUATION, AND COMMUNICATION

### 4.1. Funding

The estimated budget for the five-year programme is: **US\$996.4 million**.

The total budget per year and components is as follows:

#### Total budget per year (all sources of financing)

In '000 US\$						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Component 1:	4 905	6 081	4 746	3 192	2 703	21 627
Component 2:	12 196	15 865	8 820	4 263	2 626	43 769
Component 3:	-	380 170	380 145	123 054	798	884 167
Component 4:	13 434	19 674	18 274	18 236	18 161	67 669
Total	30 535	421 789	411 984	148 745	24 288	1 017 232

#### Total budget per source of financing

In '000 US\$									
	Pledge PPR Programme		Governments		Ongoing programmes		Other?		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount
Component 1:	21 627	100%	-	0%		0%		0%	21 627
Component 2:	43 769	100%	-	0%		0%		0%	43 769
Component 3:	879 617	99%	4 550	1%		0%		0%	884 167
Component 4:	51 397	76%	16 272	24%		0%		0%	67 669
Total	996 410	98%	20 822	2%		0%		0%	1 017 232

### 4.2. Monitoring and evaluation

A robust monitoring system is a fundamental requirement for ensuring delivery of programme activities, services, products and their impact to enable performance measurements and corrective feedback.

Programme-level performance will be monitored on a regular basis based on the GEP objectives and results, as outlined in the programme level results matrix (PRM). Necessary adjustments will be made to fine-tune the PRM to ensure that objectives are on track with the goals and are ultimately met. The main value of the programme-level performance monitoring system lies in fostering programmatic coherence among different programme components and in helping to harmonize the programme performance appraisals.

A dedicated staff (accountable to the PPR Secretariat), will be responsible for monitoring the achievement of the results at different levels, as well as the assumptions. Monitoring and evaluation (M&E) data will be collected according to the plan to be developed, and reported together with programme-related reporting on a semi-annual basis for the output-level indicators and annually for the outcome-level indicators. M&E reports will generate information to be used by key stakeholders in assessing project progress and in making the necessary adjustments for continuous improvement.

Periodic progress reviews will be carried out in close consultation with donors, OIE regional and subregional offices, FAO national, subregional and regional offices, in order to adjust work plans to respond to real needs and circumstances.

Considering the scope and the breadth of the programme, evaluating its impact will be based on the evaluation questionnaires (to be determined) and relying on the M&E system set out here.

The FAO Office of Evaluation and the designated evaluation service at the OIE will together be responsible for organizing the final evaluation in consultation with project stakeholders.

### **4.3. Communication and advocacy**

The programme will be supported by strong advocacy and communication coordinated between FAO and OIE to increase the visibility of the PPR GEP achievements and ensure an effective communication of its activities, results and goals with target beneficiaries, partners and key national and international stakeholders. This will help generate long-term commitment, drive implementation of the programme, and foster local partnership and ownership.

The PPR Secretariat will ensure the preparation of the necessary documentation and publications demonstrating the PPR GEP's progress and achievement, reaching out to funding partners and to policy-makers and stakeholders within countries.

FAO and OIE will liaise with donors contributing funds to the project to determine the news value of documents and publications and to discuss appropriateness of press releases.

The Secretariat will ensure full visibility of the programme through cobranding (Government, FAO, OIE and donors') logos, boards, stickers and publications, and national and international media.

## ANNEX 1

### Logical framework

Results chain	Indicators	Means of verification (MOV)	Assumptions
<b>Impact</b>  Adverse impacts on smallholder livelihoods, trade and animal health reduced	Reduction in economic losses  Or  Increases in flock productivity  Or  Improvements in incomes from small ruminant husbandry systems		
<u>Example:</u>  Reduced poverty and enhanced food security and nutrition	- Average supply of proteins of animal origin, gr/caput/day (Food security – supply)  - Prevalence of under nourishment, % (Food security – accessibility)*  - Poverty rate (poverty headcount ratio at national poverty line)	FAO statistics on food security  Household income and expenditure survey (HIES)  World Bank or UNDP statistics	
<b>Outcome</b>  Disease prevalence reduced in 76 infected countries and OIE disease free status obtained by 40 non-infected countries and incidence	Decrease in disease prevalence and incidence rates	EMPRES	Collaboration with governments continues to be supported and remains effective
of other priority small ruminant diseases significantly reduced	Proportion of countries progressed to the OIE free status	WAHIS	The political situation in target countries remains stable to be able to access field sites

\* This indicator is related to CPF and CPF indicators.

(cont.)

Results chain	Indicators	Means of verification (MOV)	Assumptions
Output 1  Capacities to prevent and control PPR increased	Cumulative number of beneficiary trainees who report that they have acquired proficiency in selected skill/knowledge areas, disaggregated by training topics	Pre-post training questionnaires	Appropriate technical staff are assigned for training by the government
Output 2  Awareness and engagement of key stakeholders improved	Number of stakeholders reached or sensitized  Number of information and awareness materials made available and disseminated	Participants lists  Information and awareness materials	
Output 3  Laboratory and surveillance capacity improved to understand the presence of PPR and its distribution, and identify high-risk areas responsible for maintaining PPR infection	Proportion of GEP supported laboratories with ability to safely and accurately diagnose PPR and other priority small ruminant diseases  High-risk areas identified and control strategies developed based on this information	Frontline source laboratory reports  PVS Reports  Laboratory Mapping Tool (LMT) assessments	Laboratory capacity is adequate to be able to carry out all the required diagnostic tests  Government allows access to field sites and national data
Output 4  PPR National, Strategic and Technical plans for assessment, control and eradication developed or updated	Proportion of country strategies and plans that are endorsed at national level  Proportion of regional strategies that are endorsed at regional level	Evidence of endorsement of strategies and plans	Governments remain committed to endorsing the recommended strategies and plans
Output 5  Preventative and control measures strengthened and implemented	Vaccination conducted in high-risk areas  Number of animals vaccinated with quality assured vaccine  Number of contingency plans updated and tested  Proportion of countries with vaccination calendars harmonized	Vaccination logs/reports/records  Records of testing of contingency plans (reports, etc)  Vaccination calendars	Government allow access to vaccination sites  Governments are willing to collaborate with neighbouring countries on implementing preventative and control measures

(cont.)

Results chain	Indicators	Means of verification (MOV)	Assumptions
Output 6 Legal framework reinforced	VLSP missions to identify gaps in law followed by VLSP agreements to draft required laws	VLSP mission reports identify gaps and weaknesses in country legislation  New legislation drafted to address gaps	Governments are willing to enact legislation changes
Output 7 Interventions for strengthening national VS are identified	PVS evaluation missions and PVS evaluation follow up missions are conducted to assess performance of the country's national VS	PVS evaluation and PVS evaluation follow up mission reports are reviewed and gaps in national VS relative to PPR eradication are identified	Governments are prepared and able to correct gaps identified
Output 8 Other small ruminant diseases are prioritized and their incidence reduced	Proportion of agreed/ approved control plans for the prioritized SR diseases which are under implementation	<i>Need more detail to be able to determine a data source</i>	Governments continue to consider other small ruminant diseases as a priority
Output 9 Functional PPR coordination mechanism established at all levels	PPR GREN, Advisory Committee established  Functional national/ regional PPR committees established  PPR regional coordination annual meetings organized  PPR Secretariat is in place and functioning  Need to discuss what are the main expected results of the improved collaboration and reflect that through the TBD indicator		Donors and member nations continue to support the PPR Secretariat and GEP

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