WORLD ORGANISATION FOR ANIMAL HEALTH

Protecting animals, preserving our future

SEACFMD Roadmap

A strategic framework to control, prevent and eradicate foot and mouth disease in South-East Asia and China

2016
2020

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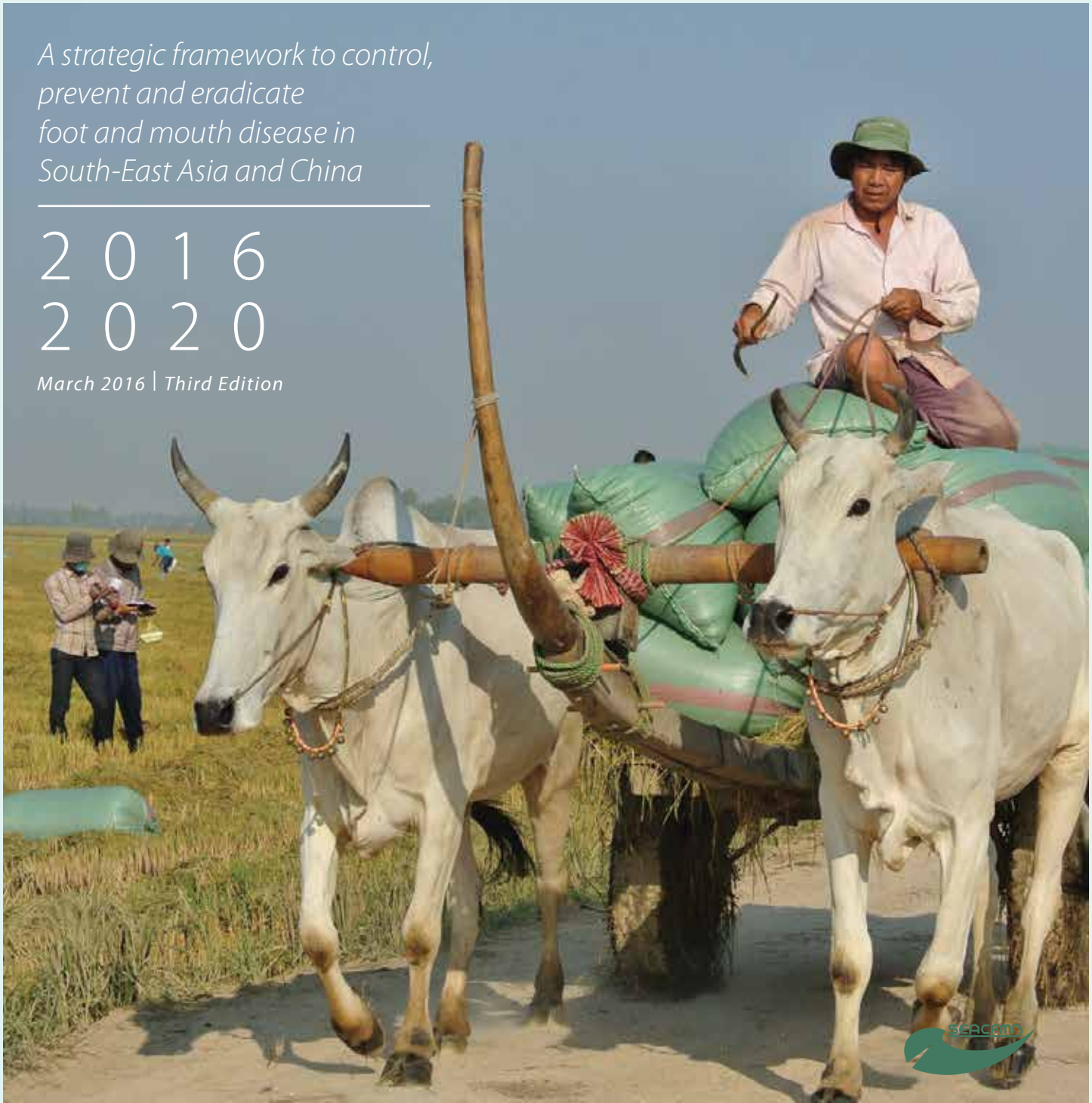

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OIE Sub-Regional Representation for South-East Asia c/o Department of Livestock Development, 69/1 Phaya Thai Road, Ratchathewi 10400 Bangkok, Thailand.

Cover: Delivering the harvest, Cambodia. © Cecilia Dy
Back Cover: Cattle cart, Myanmar. © Phil Widders

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PREFACE

It is my pleasure to introduce the 3rd Edition of the South-East Asia and China Foot and Mouth Disease (SEACFMD) Roadmap and give my full support for the strategies and approaches described in the Document. The development of this 3rd Edition considered the changing political and economic circumstances in South-East Asia and China, and the lessons from Phase 4 of the SEACFMD Campaign from 2012 to 2016. Further, it is consistent with the OIE-FAO Global FMD Strategy agreed in 2012. Political commitment and the allocation of adequate resources will be essential to support the ongoing success of the SEACFMD Campaign. In this regard, I would like thank and express my appreciation to Member Countries and partners for the support they have given to the SEACFMD Campaign. I also acknowledge those who have provided support since the inception of the Campaign, in particular the Kingdom of Thailand for hosting the OIE Sub-Regional Representation for South-East Asia in Bangkok, and Australia, whose past and current support have been critical to the achievements of the SEACFMD Campaign.

Monique Eloit
Director General
World Organisation for Animal Health (OIE)

FOREWORD

This 3rd Edition of the **SEACFMD Roadmap** is a guidance document consistent with the OIE/FAO Global FMD Control Strategy, that outlines the activities, resources and political commitment required to control, prevent and, eventually, eradicate FMD in South-East Asia and China. The document builds upon the successes of the previous four phases of the SEACFMD Campaign with the introduction of **Phase 5** (2016-2020), which provides strategic direction to achieve significant reductions in FMD in the region by 2020 while at the same time protecting free countries and zones.

The Roadmap recognises that the control and eradication of complex and highly infectious transboundary diseases such as FMD takes many years to achieve success, and requires political commitment and the provision of considerable resources. Given that 11 countries are directly involved in SEACFMD, strong and effective coordination, as provided by the OIE Sub-Regional Representation, is necessary to support information exchange and the development of agreed overarching disease control strategies. However, Members Countries have responsibility for managing and eradicating FMD nationally, or for preventing the entry of FMD. In this regard, and in the context of overall agreed SEACFMD approaches, they need to customise approaches to suit their particular national circumstances.

This document provides a background and context to the SEACFMD Strategy and summarises the strategic components of Phase 5 of the Campaign from 2016-2020. It includes an Annex comprising reports from each Member Country regarding current FMD status, approaches to control and prevention, and the goals, objectives and timeframes linked to the Roadmap. The Roadmap will be supported by manuals which will guide activities relevant to each of the Strategy Components: technical; coordination and advocacy; and governance and policy. Cross-cutting issues are identified, and will be addressed in these manuals. Manuals will be reviewed annually.

The Roadmap aims to:

1. Describe the nature and the achievements of the SEACFMD Campaign;
2. Introduce the SEACFMD 2016-2020 Strategic Framework and its links with the Global FMD Control Strategy;
3. Describe the activities to be undertaken in Phase 5 of the SEACFMD Campaign;
4. Provide support to Member Countries in their advancement along the Progressive Control Pathway;
5. Indicate technical assistance that can be provided by OIE SRR SEA and OIE HQ to facilitate future planning and investment strategies as well as the preparation of applications to OIE for national FMD control programmes;
6. Emphasise the importance of Veterinary Services for animal and human health and economic development;
7. Reiterate the critical importance of properly planned and developed vaccine programmes including vaccine matching and quality;
8. Promote the OIE's FMD Regional Vaccine bank concept;
9. Outline principles of governance, policy development, coordination and advocacy in relation to transboundary and emerging infectious diseases, and promote SEACFMD as a model for control of other animal and zoonotic diseases;
10. Provide a background document for Governments, donor organisations and stakeholders when considering resources support for the SEACFMD Campaign.

Gardner Murray
President
OIE Sub-Commission for FMD in
South-East Asia and China

1 INTRODUCTION

1.1 The burden of FMD

Foot and mouth disease (FMD) is one of the most contagious infectious diseases in animals and, due to its severe impact on trade in animals and animal products, is the most important transboundary animal disease (TAD). The global impact of FMD is significant, due to the number of animals affected and the costs of disease control in both endemic and free countries.

1.2 The annual economic impact of FMD

The annual economic impact in endemic regions, from production losses and vaccination costs alone, is estimated to be between US$6.5 billion and US$21 billion [1]. Incursions into FMD-free countries and zones cause annual losses of more than US$1.5 billion [1], while an outbreak in Australia could cost US$12.5 billion annually and up to US$39 billion over 10 years [2]. The economic importance of trade in animals and animal products means FMD is a disease of international concern, although the balance of this global impact is shared disproportionally. The cost from lost production falls mostly on the world's economically vulnerable communities, which are generally also most dependent upon the health of their livestock.

FMD tongue lesions

1.3 The consequences of an outbreak

FMD outbreaks cause devastating impacts on farmers and have adverse effects on livestock assets, production income, and food security. Particularly in countries where FMD is endemic, the disease is often under-reported and animal health services are often under-resourced. Farmers suffer economic losses through neonatal mortality, reduced milk yields, lowered fertility, loss of draught power and reduced or prohibited access to markets. Countries affected by FMD cannot trade live animals with FMD-free countries, and their disease status may negatively affect neighbours' and trading partner's ability to do so as well. Similarly, FMD-affected countries have limited access to international markets for animals and animal products. Socio-economic studies estimating the impact of FMD outbreaks on smallholders in Lao PDR, Myanmar, Vietnam, and Cambodia, found that substantial financial losses were incurred by affected farmers. In Lao PDR, the estimated cost of FMD per affected animal was US$55.65 if they were sold, and US$66.45 if they were kept and treated [3]. In Vietnam, the average economic loss for each affected farm was estimated to be US$84 for highland areas with low livestock density, and up to US$930 for lowland areas with high livestock density [4]. The financial impact of FMD on smallholder cattle farmers in southern Cambodia was estimated to range from US$216.32 to US$370.54 per animal, with an outbreak reducing annual household income by more than 11% [5]. The most recent socio-economic study commissioned by OIE SRR-SEA in northern Lao PDR [3] found that FMD had the most severe financial impact on poorer households in the country's northern upland and central lowland. The estimated financial losses were USD 436 in the "poor" and USD 949 in the "well off" household categories, representing 128% and 49% respectively of income from the sale of large ruminants. While well-off households experienced higher loses because they owned more large ruminants than other household classifications, the poor households – having fewer assets – are the most vulnerable to financial impacts from FMD outbreaks. Thus, combatting disease of livestock such as FMD can contribute significantly to reducing poverty.

1.4 Prosperity from livestock and the benefits of FMD control

The well-being of a developing country's livestock sector directly shapes its prospects for economic growth, poverty alleviation and food security. The livestock sector can account for up to 80% of the agricultural gross domestic product (GDP) of such countries [6]. Approximately two-thirds of the world's domestic animals are raised in developing countries, and over 90% of these are owned by rural smallholders [7]. More importantly, the livelihoods of 600 million low-income people in rural areas of the world rely heavily on livestock, primarily as a source of income, food, and input to other agricultural enterprises [8]. Two-thirds of the 600 million poor livestock keepers in the world are women [9]. Owning, controlling and benefiting from livestock production increases women's self-esteem and strengthens their role as producers and income generators within the household and in the community. Women's ability to manage their income is vital to the survival of many households [6].

Moving cattle to market, Cambodia

1.5 Role of livestock in poverty alleviation

In many developing countries, livestock production contributes significantly to socio-economic development, valorisation of natural resources, and food security. It plays an important role, therefore, in global poverty alleviation, and is an established priority for both governments and development partners.

Smallholders and mixed farming practices are considered the backbone of the Asian agriculture system. A large proportion of animals are still kept in traditional small and backyard settings. These smallholdings are characterized by a complex, integrated relationship among animals, crops and farming families. Animal ownership often represents a capital reserve for household expenses, thus reducing socio-economic risk. Diseases are among the most significant limiting factors for livestock production, and their impact can vary from reduced productivity and restricted market access,

to the loss of entire flocks or herds. Combating diseases of livestock, particularly in developing countries, can contribute significantly to poverty alleviation by generating employment, providing funds for health, education, starting a new economic activity, and fulfilling social obligations, as well as improving opportunities for trade in livestock and animal products, and supplying raw materials to industry.

International and domestic trade in livestock and livestock products presents an economically attractive opportunity, both for the commercial livestock industry and for rural smallholders. The demand in developing countries for meat products is projected to more than double in the next 20 years [9]. In South-East Asia, this demand will be spurred by population growth and the economic prosperity of countries such as China and Vietnam [10]. International trade in animals and animal products is dependent on FMD freedom. The presence of FMD prevents a country accessing higher value export markets for its meat and animal products. Importing countries, as part of their biosecurity protocols, generally prohibit the entry of livestock products from FMD-affected countries.

Preparing the ground, Cambodia. Cattle are an important source of draft power throughout the region.

Changing trends in production systems and trade within the Association of South-East Asian Nations (ASEAN) community create shifting disease dynamics. Analysing the FMD risk for different production systems helps guide effective disease control. Where FMD is efficiently controlled, the following benefits are likely to be shared across the entire community:

- improved availability and price-stability for consumers of livestock products
- fewer losses and greater market opportunities for livestock owners
- income stability for people working and running businesses in the livestock sector.

The mutual gains from increased trade in livestock enjoyed by countries sharing borders or trading systems can provide incentives to continuously invest in FMD eradication that will benefit current and future generations.

1.6 Status of FMD in other parts of the world

Some areas of the world, such as Central and North America, Australia-Oceania and the European Union, have succeeded in protecting their FMD-free status for decades. In others, most notably Europe, South America and some countries of South-East Asia, application of rigorous control and eradication programmes has significantly reduced FMD prevalence. However, FMD remains endemic in many countries of Africa, the Middle East and Asia, and FMD-free countries face greater risk of incursions due to increased global movement and trade of livestock and animal products. Outbreaks in the previously FMD-free countries of Japan (2010) and the Republic of Korea (2010, 2011) were eradicated, but with the direct costs alone estimated at US$550 million and US$2,780 million respectively, the total losses were significant [11]. New outbreaks that have affected China, Republic of Korea, Mongolia, Chinese Taipei and the Democratic People's Republic of Korea, in 2013, 2014, and continuing into 2015, indicate that the virus is actively circulating in the East and Central Asian region.

Laboratory analysis

2

THE SEACFMD CAMPAIGN

2.1 OIE perspective and its application to the Strategic Framework

The OIE/FAO Global FMD Control Strategy was developed under the FAO/OIE Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), and launched in 2012. The Strategy aims to reduce the burden of FMD on animal production in developing countries, but also in FMD-free countries. The specific objective is to *'improve FMD control in regions where the disease is still endemic, thereby protecting the advanced animal disease control status in other regions of the world'*. The Strategy also aims to strengthen Veterinary Services, since control of FMD control and other animal diseases can be achieved only through sustained improvements in Veterinary Services.

The three components of the Global FMD Control Strategy are:

- Improving global FMD control
- Strengthening Veterinary Services
- Improving the prevention and control of other major diseases of livestock.

The tools to be used under the Global Strategy include:

- the FMD Progressive Control Pathway (PCP-FMD)
- the OIE Performance of the Veterinary Services (PVS) Pathway.

The Global FMD Control Strategy confirms that a regional approach is essential for disease control, and supports the development of regional roadmaps. This 3rd edition of the SEACFMD Roadmap is consistent with the Global FMD Control Strategy and is based on the relevant OIE Standards. The PCP-FMD also identifies activities required at the regional level for FMD control. As detailed elsewhere in this document, these elements are already in place from the previous four Phases of the SEACFMD Campaign.

The development and implementation of national FMD control plans will be guided by:

- relevant OIE Standards
- Guidelines and Manuals, including the *Terrestrial Animal Health Code* and the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*

2.2 Campaign concept

As with the Global FMD Control Strategy, the basic premise of the SEACFMD Campaign is that strengthened Veterinary Services, with animal health activities effectively coordinated within and between countries, are fundamental to the control of FMD in the region [12]. Member Countries remain responsible for their own disease management systems, but the modestly funded Regional Coordination Unit (RCU), under the OIE Sub-Regional Representation for South-East Asia based in Bangkok, provides support and regional coordination that is integral to success [13]. The Campaign against FMD will reduce the incidence of outbreaks, thereby minimising the debilitating impacts on communities and contributing to poverty alleviation. Control of FMD will improve trade and the growth of industry and the national economy. Veterinary Services will be strengthened by improved skills in disease surveillance, investigation, diagnosis and control, which can then be deployed to control other major animal and zoonotic diseases.

Gathering livestock for vaccination, Laos PDR

Regional control of FMD depends on effective risk analysis and strategic planning, combined with political and resource commitments at the national and regional levels. Coordination activities, and advocacy to promote producer, community and political support, are thus crucial to the success of the Campaign. Sound governance, coupled with transparent Campaign indicators and targets and an effective monitoring and evaluation regime, will underpin achievements and promote SEACFMD as an effective model for disease control in the region and a suitable focus for donor and other agency support.

Since vaccination is essential for FMD control [14], prevention and eradication, countries that present the highest risk for FMD in the region have the greatest need for financial support because of the significant costs involved. The World Bank has estimated that US$15 million on average is needed by each country at the lower stage of the PCP for vaccines alone during the initial five years of the Global FMD Control Strategy. However, even those countries that have successfully implemented vaccination campaigns, and those that have achieved FMD freedom, will also require ongoing support.

2.3 Applicability of SEACFMD to other disease control in the region

The SEACFMD Campaign has served as a model for two other regional priority diseases under GF-TADs, namely, highly pathogenic avian influenza (HPAI) and classical swine fever (CSF) [13][15].

The basis for all three programmes is that gains made in specific disease control (eg FMD) provide opportunities for control of other diseases. This is due in large part to enhanced capability in Veterinary Services, as outlined in the Global FMD Control Strategy, and the experience gained during development and implementation of the FMD response. Expertise and resources can also be directed to the control of zoonoses.

Through the SEACFMD Campaign, the region will control FMD through enhanced disease surveillance, diagnostic capacity and response procedures, and Member Countries can have a long-term impact on improving both animal and human health.

2.4 Campaign History

The South-East Asia Foot and Mouth Disease Campaign (SEAFMD) was formally established in 1997, following recognition by the OIE and regional Member Countries of the need to address FMD, collectively and strategically, as a priority animal health issue. The Campaign was expanded in 2010 to include China, renaming it the Southeast Asia and China Foot and Mouth Disease (SEACFMD) Campaign.

The SEACFMD Campaign spans 11 countries, which account for approximately 30 per cent [16] of the world's human population, over half the world's pig population [17], and a significant proportion of the global population of other FMD-susceptible animals including cattle, buffaloes, and small ruminants. The Campaign goal is to decrease FMD prevalence through vaccination and other control strategies by 2020, while at the same time maintaining FMD freedom in OIE-recognised FMD-free countries and zones.

The Regional Coordination Unit was established in Bangkok in 1997 to coordinate and manage the implementation of the SEACFMD Campaign [13]. The Government of Thailand, through the Department of Livestock Development (DLD), provides offices and in-kind support to the RCU. Since its inception, the SEACFMD Campaign has received major support from Australia. Others who have contributed or are continuing to contribute to the Campaign, directly or indirectly, are: OIE Member Countries, China, Japan, the Republic of Korea, New Zealand, France, Switzerland and the European Union.

Returning cattle from grazing, Cambodia

From a technical and operational perspective, the Campaign has followed the major principles involved in controlling TADs, including FMD. Activities and training have focused on:

1. Epidemiology, surveillance and diagnostics: understanding FMD occurrence, virus types and virus transmission pathways; conducting field surveillance; and improving diagnostic capacity.
2. Risk Analyses, production systems, socio-economic impacts, and planning: assessing animal movements, socio-economic factors and impacts of FMD in different production systems to support effective planning and development of control strategies, with an emphasis on targeting FMD at source and at critical points.
3. FMD control in target areas/zones: implementing control strategies in areas identified as high risk for outbreaks or for disease dissemination based on risk analysis, to support development and maintenance of control zones.
4. Information, communication and partnerships: fostering open communication with stakeholders; raising participation and biosecurity awareness amongst producers and stakeholders; investigating development of alternative funding sources, including public/private partnerships.
5. Strengthening Veterinary Services: assessing VS status, including resourcing, staffing (including gender issues), funding, chain of command and legislation.

2.5 Implementation Phases

The first three Phases of the Campaign have been completed, and Phase 4 is scheduled for completion in 2015. Phase 5 covers from 2016 to 2020, and this edition of the Roadmap provides details of the objectives and activities under this Phase of the Campaign.

> **Phase 1** (1997-2001) was the 'set-up' phase and established the basic groundwork for the future of the Campaign, including the creation of political, organizational and technical linkages across the region and with international agencies.

Phase 2 (2001-2005) refined the strategic directions and components of the Campaign, based on improved knowledge of FMD and animal health management in the region. Harmonisation of approaches across Member Countries, based on enhanced technical, surveillance and diagnostic capacity, was coordinated by the RCU.

Phase 3 (2006-2010) was designed as a 'development' phase to improve coordination and partnership efforts, engage in high-level consultations with government and industries, and consolidate national control and eradication programmes and direction. The SEACFMD Campaign approach was used as a model for the coordination of other TADs in the region.

Phase 4 (2011-2015) has built on the achievements and experience of the previous Phases, but has sharpened the focus of control strategies based on risk analysis and enhanced knowledge of regional epidemiology, animal movement and animal production systems. Targeted vaccination programmes have been completed in hot spots and high-risk areas. Technical coordination has also been enhanced.

2.6 Key achievements and lessons

The SEACFMD Campaign has expanded its coverage, progressively reduced FMD infected areas and recognized and maintained FMD free countries and zones. The Campaign's success stories include the Philippines and east Malaysia. The OIE progressively recognized zones in the Philippines as FMD-free without vaccination between 2002 and 2011, to the point where the whole country has now become FMD-free without vaccination. In 2015, the Philippines received OIE recognition of its FMD-free status for the whole country. The OIE recognized Sabah and Sarawak as FMD-free zones without vaccination in 2003. Brunei, Indonesia, and Singapore have maintained their status as FMD countries without vaccination. ASEAN ministers endorsed SEAFMD in 2004, marking a major political achievement for the Campaign.

The Campaign received additional support to strengthen regional diagnostic capacity through the establishment of the first OIE-accredited FMD Reference Laboratory in South-East Asia, based in Pak Chong, Thailand.

Working with individual countries within the context of the regional Campaign has been critical to its successes, and understanding the epidemiology of FMD has helped to better structure control strategies. Effective communication has proved vital, and the Campaign has created a platform for Member Countries to collaborate and share expertise. There is a need for additional funding to support countries in the Greater Mekong Sub-region, which is an area of significant epidemiological focus for the disease and contributes to the continuous circulation of the virus. More funding to these countries should be channelled not only to disease control but also to advocacy to solicit political and private sector commitment.

Other key achievements of Phase 4 include:

- √ Demonstration of an effective coordination mechanism, with the SEACFMD model being adopted into other disease control frameworks such as avian influenza and classical swine fever;
- √ The coordination mechanism has improved with the establishment of laboratory and epidemiology networks;

- √ Facilitation of important bilateral dialogues;
- √ Engagement of other donors (Japan, Republic of Korea and New Zealand) to support SEACFMD activities in South-East Asia;
- √ Support of pilot vaccination campaigns and the design, implementation and launch of a major FMD control programme in Lao PDR;
- √ Support of pilot vaccination campaigns and the design and implementation of a major FMD control programme in Myanmar;
- √ Development of National Control Plans for submission to OIE for endorsement;
- √ Strengthening Veterinary Services in disease control and prevention;
- √ Effective use of the OIE Regional Vaccine Bank for emergency and scheduled vaccination programmes.

2.7 Strengthening Veterinary Services

Veterinary Services are the core component of a system that protects animal and veterinary public health and safeguards animal production. To control FMD, it is imperative that Veterinary Services are strengthened sustainably. This, in turn, will create opportunities for control of other priority diseases. The OIE/FAO Global FMD Control Strategy specifically links the PCP-FMD to the OIE Performance of Veterinary Services (PVS) critical competencies: *'a country embarking on the PCP-FMD (Component 1) should acquire the appropriate capacity and capability of the VS to conduct activities aimed at the control or elimination of FMD (and other TADs).'*

Post vaccination monitoring, Myanmar

To work effectively, Veterinary Services require relevant infrastructure, an appropriate organisation and chain of command, trained and effective personnel, strong legislative and regulatory frameworks, and a sufficient budget. In developing countries, however, many of these elements may be suboptimal. The OIE PVS Pathway will be one of the major methods to support development and monitoring of VS. The OIE PVS Pathway takes a multi-phased approach, combining different tools (diagnostic, prescriptive and monitoring) and capacity building programmes (treatment phase: e.g. veterinary legislation support programme, twinning projects) aimed at strengthening the VS. The tool for the ***Evaluation of Performance of Veterinary Services*** (OIE PVS Tool) is used during the initial PVS Evaluation to assess the level of compliance of national VS with OIE Standards. PVS Evaluation follow-up missions aim to assess progress against recommendations from the PVS Evaluation. Although embarking on the OIE PVS Pathway is voluntary, Member Countries are encouraged to use this tool to provide the 'enabling environment' for the PCP-FMD. Member Countries should consider requesting PVS evaluation or follow-up missions and, where indicated, PVS Gap Analysis (PVS Costing Tool) and laboratory missions. The SEACFMD Campaign will continue to support such initiatives.

2.8 Zoning and investment in maintaining freedom

The ultimate goal for Member Countries is to achieve and maintain national FMD freedom. However, given the difficulty of achieving country freedom in a regionally endemic environment, Member Countries may choose to create subpopulations of livestock with defined health status within their territory as they progress to country freedom. Such subpopulations may be separated by natural or artificial geographical barriers (zoning) or, in certain situations, by the application of appropriate management practices (compartmentalisation). Both strategies are defined by OIE standards, and support disease control and international trade, but successful implementation depends on political commitment, effective biosecurity, and adequate resourcing. Controls on animal movement are integral to this approach. Eradication of FMD in the Philippines, for example, demonstrated that effective livestock movement controls are a prerequisite for effective zoning. Greater understanding of animal movement pathways in South-East Asia and China, gained from studies conducted in the first four Phases of the SEACFMD Campaign, provide a useful platform for development of livestock movement controls to support the establishment of FMD-free zones.

Since the cost of achieving zone or country freedom is high, it is critical that free areas are protected as an eradication programme evolves. As more zones approach and achieve the status of 'free with or without vaccination', the SEACFMD 2016-2020 strategy recognizes that extra support, including the possible use of regional FMD vaccine banks, may be required to help maintain that status. Improved knowledge gained from development of disease-free zones will assist in establishing and maintaining these zones.

2.9 Constraints and Opportunities

Although political commitment has been achieved at various levels, deficiencies in resourcing, administration and institutional support are a barrier to progress in some Member Countries. Collaboration between and within various line ministries requires further strengthening, as does political and financial commitment to address disease control. In addition, the decentralization of authority at the provincial level can limit the effectiveness of national strategies to control FMD and other significant infectious diseases. This is particularly important when considering the regional strategy, and it requires a level of flexibility and adaptability of both central and local government. Moreover, low-income countries have limited skilled resources and response capacity, both of which are essential for countrywide surveillance and managing disease incursions. Engagement

of the private sector to support national disease-control programs has been problematic in such countries, which often rely on donor support for activities related to animal and public health. While this situation has improved for some, there is marked variability in institutional capacity across the region to participate in FMD control. Substantial long-term investment is required to strengthen existing institutions, improve knowledge, modify behaviours and enhance collaboration between institutions and across sectors of the industry.

In terms of disease control, the predominance of smallholders and mixed farming practices in the Asian agriculture system creates specific problems. A large proportion of animals are kept in traditional small and backyard settings, often free ranging, and these small farms are characterized by substandard biosecurity and limited resources. Women farmers play an important role as livestock caretakers. However, women's poor access to markets, services, technologies, information, and credit decreases their ability to improve productivity and benefit from a growing livestock sector [9]. Productivity will be raised if their skills and talents are used more effectively.

Smallholder farm Vietnam

Regionally, controls on animal movement are either non-existent or not adequately enforced. Strong and effective movement controls are an integral part of an effective FMD prevention and eradication programme. However, control measures such as movement restrictions create hardships, particularly in smallholder-based systems. A recent analysis of the economic impacts of FMD [1] acknowledged the difficulties of achieving FMD control in smallholder systems, due to extensive between-farm contacts, frequent trading, and dependency on communal grazing, coupled with fewer visible incentives to control FMD and logistical difficulties in achieving high levels of vaccine coverage.

These constraints should not deter the attempt at FMD control but, rather, confirm that the approach taken must be collaborative, targeted, adaptive and persistent. The achievements of the SEACFMD Campaign to date have demonstrated its capacity to deliver significant gains, which will serve as a sound basis for eventual FMD control in the region.

3 REGIONAL CONTEXT

3.1 Socio-economic issues and changing market dynamics

There are several factors influencing developments in the agricultural sector in South-East Asia and China, including the establishment of the ASEAN Economic Community, accelerated globalisation and trade liberalisation, investments in transport infrastructure that facilitate cross-border trade, and increased demand for animal proteins associated with economic and population growth.

Globalisation presents significant opportunities for Member Countries in the region. Access to additional markets associated with trade liberalisation will result from the significant investments in transport infrastructure already completed, or proposed, for South-East Asia and China. Further development of ASEAN agreements such as the Mutual Recognition Agreement will be a major driver for these transport corridors to develop as economic corridors, with flow-on benefits accruing particularly to the agricultural sector. Producers will enjoy increased returns, via the higher prices and additional consumers available through access to international markets.

However, technical barriers to trade, such as animal diseases, must be overcome before the benefits of globalisation and improved infrastructure can be realised. Control of transboundary

Livestock market, Myanmar

animal diseases can open markets for agricultural produce that to date have been closed to the farmers of the region. The livestock producers of northern Laos PDR [18], for example, are as yet unable to benefit from a reduction in FMD prevalence and enhanced transport infrastructure, due to the impact on international trade associated with disease in neighbouring zones and countries.

Economic development in parts of the region have already seen increased urbanisation, with movement of people from the rural workforce to urban areas. This may lead to a reduction in the labour force in rural areas available to the agricultural industries, potentially driving increased commercialisation of the sector. Urban migration of men more than women has been observed, leaving women with increased responsibilities for livestock keeping. This should lead to an increased focus on animal health and biosecurity, with increasing demand from major industry stakeholders for regional control of transboundary and other major animal and zoonotic diseases.

Economic development in some countries in the region has also seen changes in consumer tastes, with increasing demand for livestock products, including both meat and dairy, associated with increased consumer affluence. Such market changes will influence prices, animal movement pathways, and demands for product quality, safety and food security.

The changing socio-economic situation in South-East Asia and China, particularly those related to increased animal production, transport and trade, will impact on the nature of risks associated with transboundary animal diseases, particularly FMD. These risks require ongoing evaluation, and implementation of risk mitigation strategies to prevent development of major problems which could impede trade and livestock production. These factors will place increasing pressure on policy makers, producers and stakeholders in the agricultural industries to work co-operatively to ensure that effective measures are in place for the control of animal and zoonotic diseases.

3.2 Animal movement pathways

Studies conducted during Phases 3 and 4 of the SEACFMD Campaign have improved understanding of the dynamics, extent and drivers of livestock movements in the region. Findings confirm that, to reduce disease incidence and spread, efforts are best focused at source and critical control points in production and supply chains. Enhanced risk assessment techniques will be required in future to identify critical control points more precisely. In Phase 4, animal movement studies have been used as the basis for risk assessment and for the design of control programmes, both nationally and regionally.

Aggregation point for cattle movements, Thailand

The rapid and evolving changes in livestock movement patterns based on market drivers emphasise the importance of managing disease within a socio-economic context. Recognition of this aspect has been a driving force in previous editions of the Roadmap and in the evolution of control strategies. The formation of the ASEAN Economic Community by the end of 2015 may also facilitate increased movements of goods and animals, which presents an opportunity for harmonizing approaches to the regulation of animal movement in the region.

Road and river interchange for livestock transport, China

Animal movement studies have provided better understanding of high-risk periods for FMD outbreaks, which should be considered when designing and timing preventive strategies. Some countries experience seasonal risks whereas, for others, cultural festivals create market drivers that influence movement patterns and the risk of outbreaks. In most part of the Greater Mekong sub-region, although movement management practices have improved, they are often ineffective for disease control. The key challenge continues to be disease pressures brought about by the movement of animals from infected areas.

3.3 FMD trends in the region

FMD remains endemic in most of South-East Asia and China. Only Brunei Darussalam, Singapore, Indonesia, the Philippines, and East Malaysia are free of the disease. FMD outbreaks have been reported in all of the mainland South-East Asian countries and China during the past five years, with the peak of infection in 2010 and 2011 [19] [20]. This peak may be due to several factors, including waning immunity from previous outbreaks and/or antigenic drift of the circulating FMD virus. Epidemiological studies have detected shifts in serotype dominance between Type O and Type A viruses in China, Thailand, and Vietnam. Early identification and analysis of regional trends are critical to confirm the sources and progression of infection, and the impact that different production systems and animal movement patterns have on disease spread.

4

PHASE 5: THE SEACFMD 2016-2020 STRATEGY

4.1 Introduction

Planning and activities under Phase 5 of the SEACFMD Campaign are geared towards achieving a sustainable approach to FMD control and prevention. Regional coordination is critical, given the extent of cross-border livestock movements. The strategy focuses on the science- and risk-based approach of the technical component, the harmonization of the SEACFMD Campaign strategy with the FAO/OIE Global FMD Control Strategy and OIE standards, the development of institutional capacity, and funding strategies of Member Countries to secure continuation of the Campaign and the strengthening of Veterinary Services.

Previous Phases of the SEACFMD Campaign have built up a significant regional knowledge base, through outbreak investigations, animal movement studies, and socio-economic analyses of animal production systems. Enhanced understanding of the epidemiology of FMD, and of risk pathways for disease dissemination, have been used in Phase 4 of the SEACFMD Campaign to undertake pilot vaccination projects in endemic areas. Analysis of the results of these studies, as well as ongoing outbreak investigations and animal movement studies, will be used through Phase 5 of the SEACFMD Campaign to expand these strategies, using a risk-based approach to identify key areas for intervention. These activities will continue to rely on vaccination, but will also investigate animal movement controls to seek to establish FMD free zones. The strategies are outlined in more detail in the technical Strategy Component described below.

4.2 Vision, Goals and Objectives

The SEACFMD Campaign **Vision** is that FMD and other major animal diseases in South-East Asia and China are controlled by strong national Veterinary Services that cooperate regionally.

The **Goals** for Phase 5 of the Campaign are aligned with the Global FMD Control Strategy and are, by the year 2020, to:

1. Decrease FMD prevalence in South-East Asia and China, expand disease-free zones, and maintain FMD freedom in countries and zones that have attained that status;
2. Strengthen national Veterinary Services;
3. Enhance regional cooperation in policy and capacity development.

To achieve these **Goals**, the **Objectives** for Phase 5 of the SEACFMD Campaign are to:

1. apply science- and risk-based strategies, including vaccination and animal movement controls, and promote progression of Member Countries in line with PCP-FMD, to reduce the prevalence of FMD and develop and maintain FMD-free zones and countries.
2. improve the performance of Member Countries' Veterinary Services, through progression along the OIE PVS Pathway and adherence to international animal health Standards.
3. promote regional cooperation in policy and capacity development by holding regular training and collaborative activities for the Veterinary Services of Member Countries.

Cattle-drawn transport, Cambodia

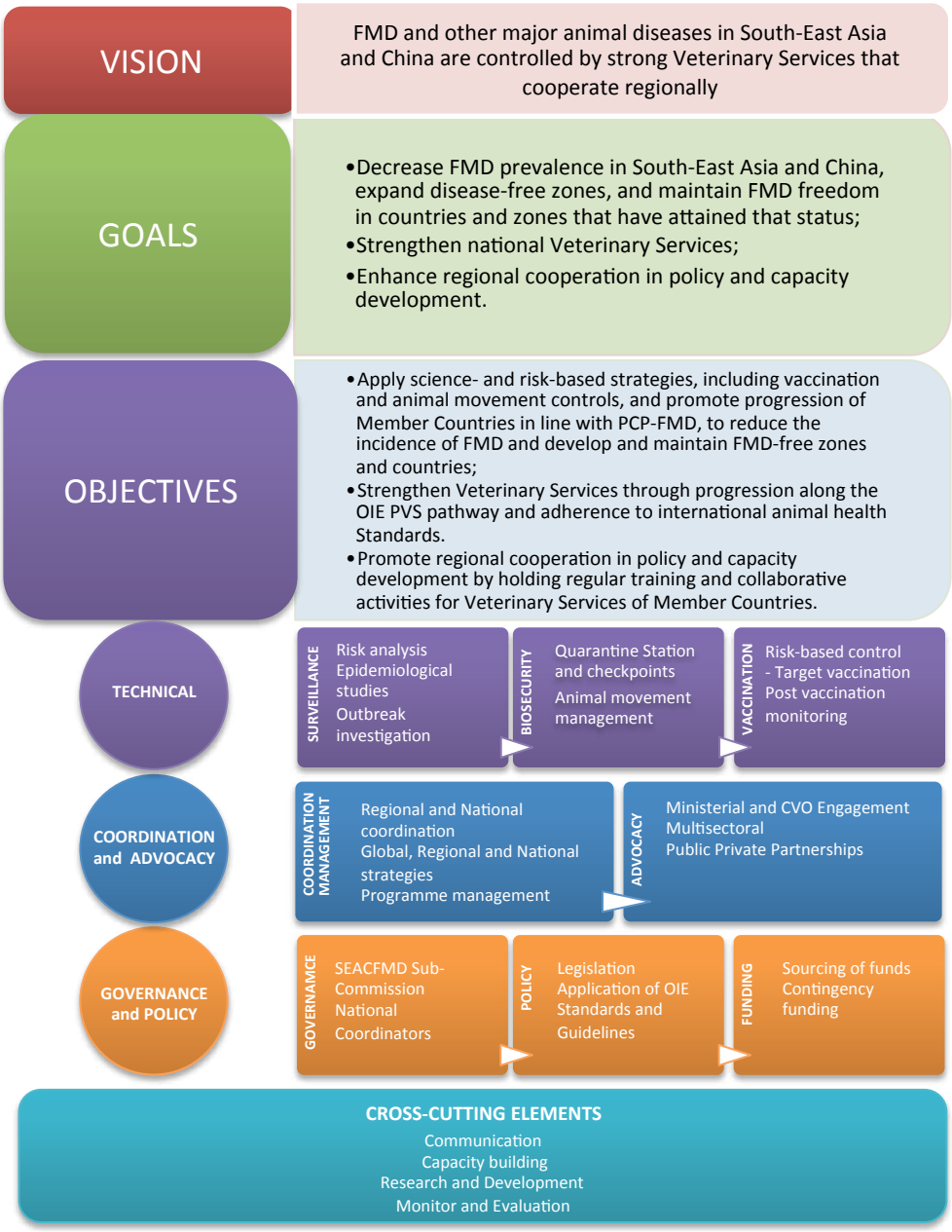

Figure 1. Phase 5, SEACFMD 2016-2020 Strategic Framework

The Strategy Components of the Roadmap are depicted in Figure 2, and are:

a. Technical;
b. Coordination and advocacy;
c. Governance and policy.

Cross-cutting elements, namely communication, capacity building, research and development, and monitoring and evaluation, impact on each of these Components.

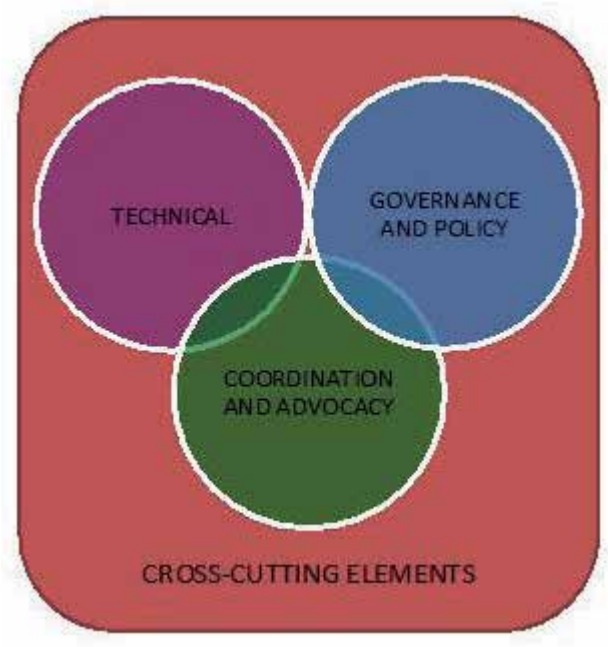

Figure 2. SEACFMD 2016 - 2020 Strategy Components

4.3 Guiding principles of the Strategic Framework

Control and prevention of FMD is an international public good and requires strong political and financial commitments at the national, regional, and global levels. A comprehensive regional approach to FMD control is critical, and should be based on a long-term vision with clear objectives supported by an effective monitoring and evaluation framework. Activities must depend on existing institutions and their mandates where appropriate, while strategies and operations must be refined in the light of experience as the Campaign progresses. Technical, social, political, policy and regulatory issues must be integrated into a multidisciplinary approach to FMD control.

The SEACFMD Strategic Framework and its Components are:

- Science- and risk-based;
- Aligned with the Global FMD Control Strategy and its Progressive Control Pathway, to support Member Countries' progression towards OIE recognition of FMD freedom;
- Focused both on national and regional approaches.

The PCP-FMD identifies activities required at the regional level to support Member Countries' progression towards FMD freedom. These elements are already in place from the previous four Phases of the SEACFMD Campaign, but in addition are addressed in the relevant Strategy Components of the current edition of the Roadmap. The regional activities under the PCP-FMD include:

- Coordination and harmonisation of National FMD control strategies, risk analysis methods and communication strategies;
- Providing (international) expertise if so requested;
- Development of sustainable epidemiology networks for regional surveillance;
- Development of laboratory networks, coordinated by a regional leading laboratory or a reference laboratory;
- Organisation of regional FMD roadmap meetings;
- Establishment of vaccine banks and independent vaccine quality control centres where appropriate.

The SEACFMD Strategic Framework and the Strategy Components cover all activities envisioned under this Roadmap. Each Member Country will develop their own set of goals, objectives and timeframes to link with the Roadmap, based on the current FMD situation, resources, constraints, and interests of each country. These elements are included as an Annex to the Strategic Framework.

4.4 Strategy Components

The Strategy Components of the Roadmap address the key elements of effective animal health management programmes:

- Adequate infrastructure, expertise and biosecurity at the national and local levels, and at borders;
- Timely and responsive animal and zoonotic disease surveillance;
- Up-to-date emergency preparedness and response plans, including access to high quality vaccines;
- Risk communication;
- Capacity to meet international agreements and standards;
- Effective governance and legislation;
- Adequate and sustainable laboratory capacity supported by external quality assurance systems;
- Monitoring and evaluation of Veterinary Services and disease management strategies;
- Legal and political frameworks, including involvement with the private sector;
- Linkages between national, regional and global animal health surveillance and reporting systems.

4.4.1 Strategy Component 1: Technical

Objectives:

1. Understand the epidemiology of the disease, particularly the endemic and sporadic nature of FMD in the region;
2. Identify risk factors for introduction and spread of the disease (FMD viral dynamics, animal movement, husbandry systems, market drivers, socio-economic issues);
3. Develop and apply effective control strategies;
4. Maintain disease freedom in zones and countries that have achieved such status.

Vaccinating cattle, Lao PDR

Tools to be used to achieve these objectives include:

- OIE Standards (Code and Manual) and Guidelines relevant to FMD
- FMD Progressive Control Pathway (PCP-FMD)
- SEACFMD 2016-2020 Roadmap
- Risk analysis
- Surveillance and epidemiological analysis
- Vaccination and FMD Regional vaccine banks
- Laboratory-based diagnostic capacity
- Animal quarantine and animal movement management

Activities will include:

- Study FMD epidemiology, to model disease dynamics and simulate the impact of control strategies:
    - Outbreak investigations will identify the sources and the progression of infection, and serotype and strain prevalence and distribution;
    - Results will be mapped across Member Countries and the region.

- Conduct risk analyses by studying animal movement patterns and their drivers, and the effect on FMD prevalence and its consequences of socio-economic factors and different husbandry and production systems:
    - the pathways and drivers for animal movements within the region will be reviewed;
    - options for management and control of animal movements will be reviewed and developed with relevant stakeholders.

- Develop and implement risk–based strategies for control, targeting zones for vaccination supported by post-vaccination monitoring, movement controls and response plans:
    - Methodology for identification of high-risk areas for FMD outbreaks will be developed and used in targeted vaccination campaigns;
    - Standard methodology for evaluating vaccination programmes using laboratory-based post vaccination monitoring will be implemented regionally;
    - Animal movement controls and emergency response plans will be developed to support creation of FMD control zones.

Vaccinated dairy cattle, Myanmar

- Enhance diagnostic capability and its application at the national and regional level to support effective epidemiological analyses and vaccination programmes:
    - Laboratory support and involvement in outbreak investigations will be strengthened;
    - Coordination between laboratories and vaccination programmes will be enhanced through application of effective post vaccination monitoring;
    - Both quantitative (protective titres) and qualitative (virus strains) results from post vaccination monitoring will be used to emphasise vaccine quality.

- Conduct surveillance in the field, and plan and train for outbreak preparedness:
    - Active surveillance for disease identification and reporting, including laboratory support, will be strengthened;
    - Plans for disease response activities will be developed and staff trained in their application.

4.4.2 Strategy Component 2: Coordination and Advocacy

Objectives:

1. Coordinate the development and implementation of control strategies, training and communication;
2. Support the development and application of advocacy strategies to increase political commitment to FMD control;
3. Extend advocacy to the public and private sectors, to promote Campaign awareness and support.

Control of trans-boundary animal diseases, including FMD, relies on effective regional coordination. Strategies, surveillance data, study findings and the allocation of expertise and resources must all be coordinated and communicated to achieve and consolidate gains in disease control. Similarly, advocacy must extend beyond country borders to include ASEAN, intergovernmental agencies, industry and development partners and donors. This is an essential Strategy Component of the SEACFMD Roadmap Strategic Framework.

Activities will include:

- Promote regional cooperation by convening annual meetings of FMD National Coordinators;
- Develop and review national FMD plans for submission to OIE;
    - technical assistance will be provided to Member Countries for preparation of their submissions for recognition of national control plans;
    - OIE SRR SEA and OIE Headquarters will support regional country status recognition workshops to assist countries to better prepare their submissions for assessment by the ad hoc group and Scientific Commission for Animal Diseases;
    - control plans will focus on both immediate and future activities, including investment plans and measurement indicators;
- Commit expertise to epidemiological and surveillance programmes;
- Foster ASEAN support for the SEACFMD Campaign;

- Identify and pursue additional support and funding, including public/private partnerships, for regional animal disease control;
    - industry links will be explored to enhance the development and implementation of vaccination programmes and animal movement controls;
- Promote the use of national, regional and global animal health information systems;
    - Outbreak investigations and disease surveillance activities will be promoted and the findings reported via established systems;
- Apply regional FMD vaccine banks in consultation with OIE Headquarters;

Smallholder awareness meeting, Cambodia

- Coordinate effective regional communication and advocacy;
    - The outcomes of key activities conducted under the technical Strategy Component, including findings relating to epidemiology, risk analyses and the efficacy of control strategies, will be incorporated into communication and advocacy practices to maximise the gains from those activities;
- Link with complementary programmes in the region;
    - The Resource Map in the Strategic Framework will be updated regularly to identify opportunities for collaboration and coordination of activities involving agencies and donors active in the region.

4.4.3 Strategy Component 3: Governance and Policy

Objectives:

1. Provide governance at the national and regional levels;
2. Assist Member Countries in evaluating and strengthening their Veterinary Services;
3. Develop a regional policy framework, and support development of legislation in Member Countries for management of animal and zoonotic diseases in their territories;
4. Define funding needs and pursue opportunities for additional support.

Activities will include:

- Continued reliance on SEACFMD Sub-Commission and National Coordinator forums for development and promulgation of strategies;
- Support Member Countries' progression along the OIE PVS Pathway;
- Coordinate regional approaches to animal disease control by investigating policy options for controls on animal movement connected with establishment of disease-free zones;
    - The findings from activities undertaken under the technical Strategy Component, including the results of epidemiology, risk analysis, animal movement studies and vaccination programmes, will be presented at regional forums to inform development of appropriate strategies for FMD control;
    - Application of OIE Standards and Guidelines in disease control strategies will be promoted;
- Assist Member Countries in strengthening legislation for management of animal and zoonotic diseases as required;
- Assist Member Countries to identify funding gaps and options for their resolution.

Funding for national disease control programmes is mainly derived from government budgets and, in some cases, donor programmes. The Roadmap includes, as an Annex to the Strategic Framework, individual Member Country's plans and objectives, including resource requirements. Where funding gaps are identified that jeopardise regional progress on disease control, additional approaches for resourcing will need to be identified and pursued. These may include industry input in the form of public-private partnerships, and linking international agencies, donors, governments and industry in the interests of regional animal and zoonotic disease control.

4.4.4 Cross-cutting elements

Objectives:

1. Promote effective communication of SEACFMD Campaign objectives, activities and achievements;
2. Enhance technical, coordination and policy capability in national Veterinary Services;
3. Guide research and development in key areas;
4. Implement effective monitoring and evaluation of activities and achievements to support the sustainability of the SEACFMD Campaign to 2020 and beyond.

Communication, capacity building, research and development, and monitoring and evaluation are common, and critical, to each of the three Strategy Components. These cross-cutting elements will be addressed in each of the Strategy Components, with activities which will include:

- Develop and promote relevant methods for communication and advocacy of SEACFMD Campaign objectives and achievements to stakeholders, policy makers and donors;
    - The key findings and results from activities conducted under the technical Strategy Component, including in epidemiology, risk analysis, animal movement studies and vaccination programmes, will be integrated into and used to improve communication and advocacy materials to promote the effectiveness and value of the SEACFMD Campaign;
    - Communication and advocacy programmes will be coordinated regionally;

- Enhance capabilities in Veterinary Services in key scientific disciplines, in coordination and advocacy, and in policy development, to support Member Countries adopting roles currently filled by external agencies;
    - Effective communication with stakeholders by Veterinary Services, of programmes, strategies and achievements, will be promoted;

- Identify key research needs across all disciplines, and coordinate funding and integration of resources to address those needs;
    - The Resource Map in the Strategic Framework document will be reviewed regularly, and used as the basis for coordination and integration of activities;

- Continue to focus on effective monitoring and evaluation of progress against agreed SEACFMD Campaign objectives. This element is critical, both to ensure that donor and stakeholder expectations are met, but also to promote the SEACFMD Campaign as a sustainable model and partner for future investment.

4.5 Expected Outcomes

Completion of the activities described under each of the Strategy Components will support Member Countries advancing towards FMD freedom, from Stage 1 through to Stages 4 and 5 of the FMD Progressive Control Pathway (PCP-FMD) of the Global FMD Control Strategy. Stages 4 and 5 of the PCP-FMD require continued focus on the activities of Stage 3, with strengthened prevention and response measures. In Stage 4 of the PCP-FMD, Member Countries may prepare a dossier for submission to OIE for country recognition as FMD-free.

There will be an increase in the number of countries having a national FMD control plan endorsed by the OIE, as well as in the number of countries or zones recognized by OIE as free with or without vaccination. As a result, it will be possible to reduce the burden of FMD for countries where the disease is endemic, and considerably lower the risk for FMD-free countries, while achieving major improvements in the quality of Veterinary Services and in the control of animal and zoonotic diseases.

Vaccinated buffalo, Lao PDR

5

INSTITUTIONAL ARRANGEMENTS AND COLLABORATION

Institutional arrangements for the SEACFMD Campaign reflect the fact that it is an OIE programme funded by international donors, and works in close cooperation with Member Countries, ASEAN, international organisations and other donors to ensure progress against agreed objectives. The success of the SEACFMD Campaign is dependent on cooperation between its members, support from Thailand, funding from donors and Member Countries, and the quality of professional staff. Continued political commitment by Member Countries' governments, matched by resources, is critical.

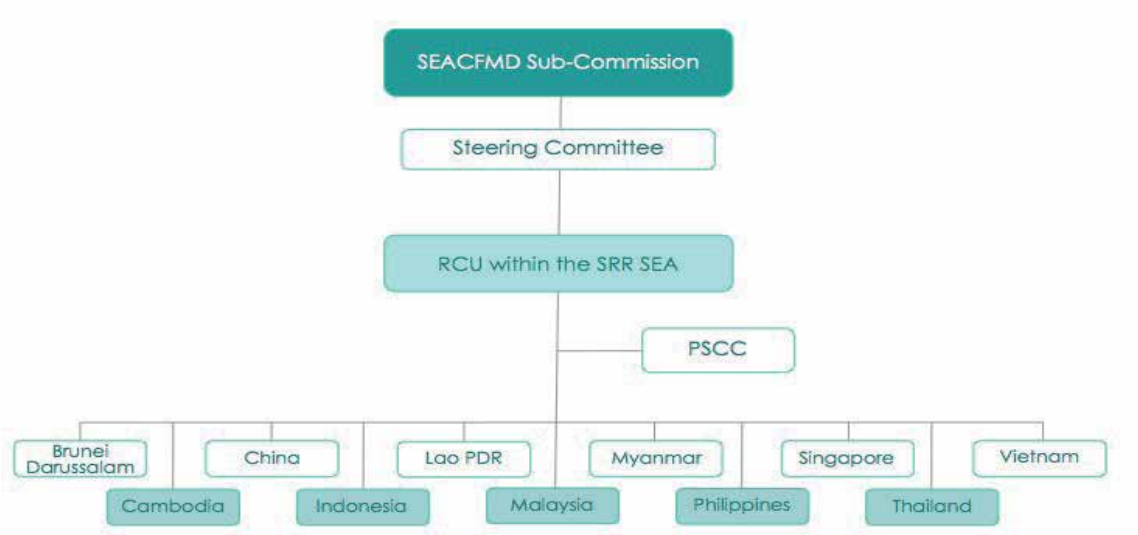

Figure 3. Diagram of the SEACFMD Campaign Institutional Arrangement

The OIE Sub-Commission for FMD in South-East Asia and China provides overall guidance to the SEACFMD Campaign for policy development and review. Membership of Sub-Commission includes OIE, Member Countries, ASEAN, FAO and major donors. A Steering Committee provides policy and programme guidance. The Sub-Commission meets annually on a rotating basis in Member Countries, and reports to the OIE General Assembly in May each year. Reports on the outcome of Sub-Commission meetings are provided to ASEAN for information and endorsement. Following the annual Sub-Commission meeting, Directors General of Member Countries and the OIE Director General or his/her representative meet to discuss a range of key regional and global animal health issues.

Sub-Commission Meeting, Philippines

© OIE SRR-SEA

The Sub-Commission is chaired by OIE, with the chair nominated by the OIE Director General. The OIE continues to play the lead role in ensuring the success of the SEACFMD Campaign, by providing scientific and policy input, and liaising with other regional FMD and TAD control programmes to help secure programme funding. The Sub-Commission has established a Private Sector Consultative Committee (PSCC), which recommends improvements to FMD control at the regional level and, to some extent, provides resources for the programme. The PSCC is chaired by industry.

A key objective of Phase 5 of the SEACFMD Campaign is to enhance ASEAN involvement, as a means of promoting Member Country ownership and thus the sustainability of the Campaign. During Phase 5, the SEACFMD Campaign will also move to increase engagement with countries in East Asia and South Asia to harmonise FMD control, prevention and eradication initiatives across the entire region.

The FAO will continue as an active member of the Sub-Commission and the Steering Committee, and will liaise with OIE for provision of technical support and mobilisation of resources. FAO will provide direct assistance to Member Countries for disease emergencies through its country offices.

Member Countries developed national FMD control plans under Phase 4 of the SEACFMD Campaign. These plans will be updated through Phase 5, in line with the Strategic Framework and consistent with each country's status on the PCP-FMD.

The Regional Coordination Unit (RCU) located within the OIE SRR-SEA remains the centre of all SEACFMD Campaign coordination, monitoring, and evaluation of regional progress. The RCU will continue to support Member Countries, particularly in coordination of disease control activities, and will serve as a reservoir of skills, knowledge and information for access by Member Countries.

The monitoring and evaluation framework for the RCU was enhanced in Phase 4 of the SEACFMD Campaign, to provide clear definitions of indicators and targets for SEACFMD activities. This framework is a key tool for recording achievements and progress against agreed objectives, and its continued application in Phase 5 will be critical to the sustainability of the SEACFMD Campaign.

6

RESOURCE MAPPING

A database of Projects supporting SEACFMD Campaign activities since 2011 has been developed and will be maintained by the RCU/OIE SRR-SEA. As of the end of Phase 4 of the SEACFMD Campaign, this database contained details of 11 implementing agencies and 85 projects across the 11 SEACFMD countries, covering seven major categories with focus on activities such as laboratory and field staff training, advocacy, policy development, vaccination, epidemiology and surveillance, risk management and biosecurity. The links between project categories and the strategies identified in Phase 5 of the SEACFMD Campaign supports analysis of progress in SEACFMD activities via these projects. Similarly, the relationships among projects, agencies, countries, activities can be analysed over time, to support mapping of project activities, identify gaps and monitor trends. OIE SRR-SEA will update the database regularly throughout Phase 5 of the SEACFMD Campaign.

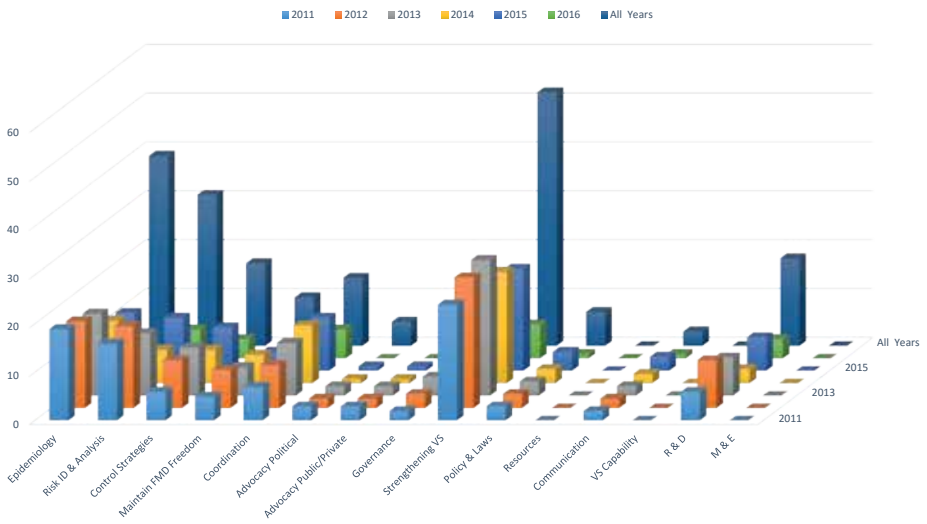

Figure 4. SEACFMD Projects from 2011 to 2016.
Strategy Objectives are identified on the horizontal axis. Since many projects address multiple Strategy Objectives, the vertical axis reflects the relative distribution of projects across those Objectives.

7

STRATEGY IMPLEMENTATION – Timeframe and plan of action

A regional Implementation Plan has been developed based on input from Member Countries. The Plan will be reviewed annually, including progression against PCP stages, to monitor progress against regional goals and objectives, and to identify areas where additional support may be required.

8

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9

ANNEX – Member Country Reports

SEACFMD National Coordinators have developed reports that describe, for each Member country, the current FMD status, and the approach to disease control and prevention, as well as goals, objectives and timeframe linked to the SEACFMD Roadmap and the Global FMD Control Strategy's Progressive Control Pathway for FMD. These reports are contained in this Annex. The reports will be reviewed annually, with updates integrated into the annual review of the Regional Implementation Plan.

Brunei Darussalam

I) Brunei Darussalam Veterinary Services (VS)

The Brunei Darussalam Veterinary Services is the Veterinary Authority located within the Livestock Industry Division, Department of Agriculture and Agrifood, Ministry of Industry and Primary Resources. The actual delivery of the VS is provided by a series of units under the Livestock Industry Division as shown. District-level activities are provided under the support of the District Development Division under the Department of Agriculture and Agrifood.

The Main Strategic Programs (Units) under the Brunei Veterinary Services within the Livestock Industry Division are listed and described below:

1. **Livestock Industry Development Unit** - Facilitating International Trade and Local Production based on national priorities
2. **Veterinary Public Health Unit** – Role in food safety by developing a comprehensive program, which will enable them to perform official controls at export and major slaughterhouses producing meat for distribution throughout the national market in line with international standards (OIE and Codex Alimentarius)
3. **Animal Feed and Food Nutrition Unit**
4. **Livestock Husbandry Unit** – Management of the national agriculture stations
5. **Animal Health and Disease Control Unit** – National Animal Health Programs (Animal Disease Surveillance and Monitoring)
6. **Veterinary Laboratory Services Unit** – The role of the Veterinary Laboratory Services is to support livestock production, animal health and food safety by delivering Veterinary diagnostic procedures (involves cross-cutting competencies).

II) FMD History and Current Risks

Brunei Darussalam historically has no record of any clinical outbreak of FMD and thus obtained freedom of disease status for FMD on the 30th of May 2008 from ***OIE***. Brunei Darussalam's geographic location in Borneo between the FMD-free areas of Sabah and Sarawak in the north-east and Kalimantan in the south-west, relatively buffers the sultanate. Risks for the introduction of FMD would be likely due to illegal smuggling or animal movement from infected areas. As of now Sabah and Sarawak (east Malaysia) have not recorded any case of FMD historically. It is crucial

for Brunei Darussalam to prevent the incursion of FMD and maintain its freedom from disease. For that reason stringent importation regulations of livestock are allowed only from FMD-free countries. Animal movement management is of an importance and for this reason improving traceability through animal identification has been a priority issue / activity under the national animal health program. A disease management index (infectious disease manual) has been introduced as an early warning system when a notifiable disease has been encountered.

III) Goals and Objectives for FMD prevention and preparedness

The main goal would be to maintain freedom from FMD status for Brunei Darussalam with recognition from international bodies such as OIE to encourage livestock trade. As part if this on-going serosurveillance and monitoring is conducted through periodic active sample collection and laboratory testing under the National Animal Health Program. The small size of the local standing livestock population creates a possible extensive sampling coverage. Preventive measures include use of integrated biosecurity measures at entry points and enforcement of a test and disposal in situ policy with improved infrastructure and capacity building of personnel. Stringent importation regulations through administrative policies and legislation enable enforcement for preventive technical activities.

IV) FMD Contingency Plan (for FMD free country)

Currently, Brunei Darussalam is preparing a preparedness plan for FMD through a Contingency Plan, currently in drafting stages. In the event of an incursion of FMD, Brunei Darussalam will practice 'stamping-out' using zoning, with a proposed compensation scheme to help rehabilitate the industry.

The current drafting of contingency plans for FMD takes into consideration the Free FMD status of Brunei Darussalam. However in the case of occurrence of FMD in the neighbouring areas in Borneo (Sabah, Sarawak or Kalimantan), the contingency plan may evolve and take into consideration other factors that affects all countries (animal movement, quarantine procedures, import requirements) within Borneo.

Kingdom of Cambodia

1. Veterinary Services

The Department of Animal Health and Production within the Ministry of Agriculture, Forestry and Fisheries is responsible for providing veterinary services to livestock producers in Cambodia. According to the recent PVS Gap Analysis undertaken by OIE, there are some 120 veterinary graduates within the DAHP and a further 180 in provincial and district offices, providing adequate human resources for Veterinary Services to deliver FMD control activities. Updates given by DAHP in 2015 indicate that there are now 219 veterinary graduates within DAHP (151 male; 68 female) and 431 veterinary graduates in provincial and district animal health offices (362 male; 69 female). In addition there are 213 assistants and paraprofessionals within these offices (180 male; 23 female) and 12,386 (11,402 male; 984 female) semi-skilled Village Animal Health Workers (VAHWs) who are located in each of the villages and are the "eyes and ears" of the DAHP for all livestock disease matters. However, there are insufficient operating budgets coming from head-office and provincial allocations to operationalize activities and activities are heavily dependent on donor funding. Many of the VAHWs have received basic training and rudimentary equipment from recent projects.

The Royal Government of Cambodia (RGC) has placed high priority on rehabilitation of the agricultural sector to ensure that minimum staple food requirements are met for all producers and to ensure a more equitable income for farmers given their risk and effort. To ensure this goal, the livestock sub-sector focus is on the following capacity building programs:

- Technical and management training and education;
- Livestock research;
- Targeted extension (technical message delivery);
- Animal Health Risk Management;
- Provision of Producer Services;
- Trade and Market Assurance Programs;
- Consumer Protection and Industry Regulation.

The objectives within the RGC's Animal Health Services (AHS) are to protect the national herds and flocks from intrusion of disease, protect consumer health and facilitate trade. The livestock

service sector in Cambodia is linked closely to and managed by Offices of Animal Health and Production (OAHP) within provinces and districts and the Department of Animal Health and Production (DAHP) at the central level. Its function is to limit animal health risks by the ready access of livestock owners to an adequately trained livestock service sector. The credibility of the AHS depends on the development of adequate and enforceable disease control legislation, animal disease surveillance and the implementation of strategic and transparent health programs.

The DAHP is still working on the veterinary law of Cambodia, with support from international agencies like the OIE and FAO. The current approach to disease risk management is to focus on animal health management at the village production level, thereby supporting the Animal Production Service to enhance sustainability of livestock production. To achieve this, it is necessary to strengthen national and international coordination and cooperation. For animal disease risk management, DAHP is seeking support in the form of human resource development in animal health risk management and development of veterinary law, disease control legislation and disease control programmes. Sufficient human resources exist in Cambodia, but there is a lack of funding to support these staff to undertake necessary animal health activities. At present, there is only the National Veterinary Research Institute to perform Epidemiology, animal disease outbreak investigation and laboratory diagnosis of animal disease in Cambodia.

2. Current Status of FMD (Distribution, risks, spread)

Foot-and-mouth disease is endemic in Cambodia. Outbreaks are reported yearly, mostly due to serotype O and to a lesser extent, serotype A as shown in Tables 1 and 2. Controlling the infection that has been endemic in numerous provinces and its lateral spread has been and continues to be a big challenge for this resource-limited country.

Table 1. Reported FMD outbreaks in Cambodia, 2000-2014

Year	Not Sampled	Not typed	Unknown	Type O	Genotype identified	Grand Total
2000	-	-	17	-	-	17
2001	-	-	3	-	-	3
2002	-	-	63	-	-	63
2003	-	-	32	-	-	32
2004	-	-	66	-	PanAsia	66
2005	-	-	54	-	-	54
2006	-	-	86	3	A/Asia, PanAsia	89
2007	-	-	4	-	-	4
2008	-	-	38	-	A/Asia, PanAsia	38
2009	-	-	41	-	-	41
2010	125	1	-	13	PanAsia	139
2011	92	-	-	-	-	92
2012	21	-	-	1	PanAsia	22
2013	30	-	17	25	PanAsia	72
2014	55	-	3	-	-	58
2015	06	-	-	-	-	06
Grand Total	330	1	424	42		636

Table 2. Reported FMD outbreaks in Cambodia, by province (2000-2014)

Provinces	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Grand Total
Banteay Meanchey		1		2			15				5	2	1	2			28
Battambang			6	8	1		11		2	5	9	4	1	4	2		53
Kampong Cham	1		36	3	5	11	2		1	6	14		1	1	11	1	79
Kampong Chhnang					4	1	5			1	7	3	1		2		24
Kampong Speu	2				34	3	6	2	7	5	18	18	2	20	7	4	128
Kampong Thom	1		5		2	4	1				3	4					20
Kampot	1		2	1			15		6		5	6	1	1	3		41
Kandal			1	1			14		7	2	13	5	2	7	8		60
Kep						1	2		1		1	2	3				6
Koh Kong	1			2	1				1				7		2		14
Kracheh	1		2	11	1	3	7		2	5	10	2	1	6	2		53
Krong Preah Sihanouk	4			1	2	3	1		1			1					13
Mondul Kiri								1									1
Otdar Meanchey					1					1	3	1					6
Pailin												2					2
Phnom Penh	1	1															2
Prah vihear											2	3					5
Prey Veng	3			1	3	12	2		4	1	15	12		7	9	1	70
Pursat										2	6			5	6		19
Rattanakiri											1	3					4
Siem Reap					3				1		7	3	2	1	1		18
Sihanouk Ville												1					1
Stoeung treng			1								2						3
Svay Rieng	1	1			3	10		1	2	6	8	8		9			49
Takeo	1		10	2	6	6	8		3	7	10	13		9	5		80
Grand Total	**17**	**3**	**63**	**32**	**66**	**54**	**89**	**4**	**38**	**41**	**139**	**92**	**22**	**72**	**58**	**9**	**779**

Note: For 2015, only from January to July 2015

3. Control of FMD

Control of the disease in the country suffers from several major setbacks. Well-recognized gaps in stakeholder support (farmers, traders, government) and disease control activities are just some of the many challenges that Cambodia is confronted with.

Most farmers in Cambodia lack an understanding of the concept and mechanisms of spread of infectious diseases; this in turn often contributes to gaps in their capacity to undertake control and prevention measures for FMD. The nature of FMDV infection, being highly infectious but only occasionally fatal, also contributes to the lack of interest, and thus engagement, of farmers in the control efforts of the country and the region.

Cambodia has also received relevant support in recent years, including (1) laboratory training and exchange program with Norwegian Veterinary Institute, (2) support from Japan International Cooperation (JICA) through staff training, and further support for fieldwork, laboratory equipment and reagents; (3) support in training VAHW through the European Union (EU) –funded Smallholder Livestock Production Project; (4) Food and Agriculture Organisation of the United Nations (FAO) training on sero-surveillance and surveys on knowledge, attitudes and practices (KAP survey); (5) studies on animal movement through support from ACIAR; (6) relevant support from Asian Development Bank (ADB)-FAO through a project on transboundary animal disease control for poverty reduction for GMS countries; (7) human and influenza control project through World Bank; (8) Animal Disease Control Project (ADC) Phase II supported by JICA; and (9) Support for veterinary services activities and strengthening through the EU-supported project *"Promotion of inclusive and sustainable growth in the Agricultural Sector: Fisheries and Livestock."* Cambodia continues to work with partners to mobilise support and implement disease control.

Control measures include improve reporting system, conduct surveillance and conduct disease outbreak investigation, enhance inspection supervision, strictly control animal movement, capacity building of veterinary laboratories and working staff, public awareness for relevant stakeholders.

International exchange and cooperation involves conducting bilateral and multilateral exchange and cooperation with international organizations such as OIE, FAO, FMD-ROK, ACIAR and with neighboring countries such as Vietnam, Laos and Thailand.

4. Goals and Objectives for a control programme, including rationale and approach for these

The **GOAL** of the FMD control for Cambodia is to reduce the incidence of foot-and-mouth disease in Cambodia in the next three years and move the country forward to the next level of the progressive control pathway.

The **PURPOSE** of the FMD control for Cambodia is to provide a clear guideline in combating FMD at the source and along critical control points for FMD control in Cambodia.

The **KEY OBJECTIVES** of the FMD control for Cambodia are to lay down priority actions for strengthening technical activities, intensifying communication and advocacy, and operationalizing coordination mechanisms for FMD control in Cambodia.

The National FMD Plan for Cambodia will provide guidance and directions for FMD control activities in the country following the overarching regional and global strategies as detailed in the SEACFMD Roadmap and the FAO/OIE Global FMD Control Strategy. Thus, specific national FMD control activities, identified and implemented by the Cambodian Veterinary Services based on this National FMD Plan, will serve as the foundational building blocks at the ground level that are accordingly streamlined and remain cohesive with the directions being taken at the Regional and Global levels.

5. Current PCP Status

The current FMD status in Cambodia is at PCP stage 1 and hopefully after completing of FMD-ROK Project, Cambodia will reach stage 2.

6. Targeted PCP Status by 2020

By 2020, the targeted FMD status in Cambodia will be at PCP Stage 4.

7. Proposed plan to achieve this targeted status

Law on animal health and production will be finalized and endorsed by National Assembly during 2016-2017. Department of Animal Health and Production of the Ministry of Agriculture, Forestry and Fisheries will submit National FMD Control Plan for Cambodia to OIE for recognition. Animal identification system is implemented strictly and all animals that move between Provinces must wear ear tags to realize disease traceability. FMD detection capacity and veterinary laboratory are improved constantly, and FMD control knowledge is disseminated and publicized so as to improve farmers' biosecurity management in their villages. Strictly control animal movement and conduct routine biosecurity in the farms and communes. Conduct animal disease surveillance, investigation and response in the whole country. Plan to conduct the vaccination campaign in targeted provinces. Plan to conduct refreshment training for relevant stakeholders on outbreak investigation and control activities.

People's Republic of China

1. Veterinary Services

The system of animal epidemic prevention laws and regulations related to FMD prevention and control in P.R. China has been enacted, and includes the "Law of People's Republic of China on Animal Health" and "Regulation on Emergency Response to Major Animal Diseases". Also promulgated are the Contingency Plan on FMD and Technical Regulation and Standards on FMD Prevention and Control. In 2012, "National Medium and Long-Term Plan for Animal Disease Control (2012—2020)" which clarified the FMD prevention and control objectives and strategy was promulgated by the State Council. At the national level, the system of veterinary administration, animal health supervision and law enforcement, and technical support for animal disease prevention and control have been developed, and include provisions on compulsory vaccination, surveillance and early warning, emergency response, compartmentalization. The capacity for development and production of FMD diagnostic reagents and vaccines with high quality has been established and, at all levels, FMD serological and pathological surveillance can be conducted. International exchanges and cooperation with international organizations and other countries and regions is carried out proactively in veterinary laboratory network. Lanzhou Veterinary Institute has been approved as an OIE FMD Reference Laboratory.

2. Current Status of FMD (Distribution, risks, spread)

In 2014 in China, 7 FMD outbreaks were reported, including 2 Type O and 5 Type A. From January to June of 2015, 3 FMD outbreaks were reported, and all were Type A. No Asia-I Type FMD clinical case have been found for 5 years in P.R. China, the dominated Strain of Type A was Strain Sea97-G2 and the dominated Strain of Type O was Strain Mya 98.

3. Control of FMD

Compulsory vaccination: in 2014, pig, cattle and goats/sheep were vaccinated compulsorily as usual, and the vaccination coverage reached nearly 100%. Vaccine cost of 3720 million yuan RMB was paid by the national finance. Surveillance to support the possible withdrawal of vaccination for Asia-I Type has been initiated.

Surveillance: China formulate and issues National FMD Surveillance Plan annually, and veterinary laboratories at almost all levels conduct FMD serological and pathological surveillance with a large amount of samples every year. In 2014, 880,000 samples were tested for FMD pathological surveillance and 3,830,000 samples were tested for FMD serological surveillance, with 20 positive in pathological surveillance.

FMD disease free zone: After establishing Hainan Island and Yongji county in Jilin province as FMD disease free zones (DFZ) with vaccination, it is proposed to establish the whole North-east of the country as an FMD DFZ.

Other measures: further enhance inspection supervision, animal disease emergency response, capacity building of veterinary laboratories and working staff, advocate of FMD knowledge. Implement completely issuing electronic certificate for animal origin inspection and trace veterinary drugs including FMD vaccines with two dimension code.

International exchange and cooperation: conduct bilateral and multilateral exchange and cooperation with international organizations such as OIE and FAO and with some countries such as Singapore, Vietnam, Laos, Myanmar, Russia and Mongolia.

4. Goals and Objectives for a control programme, including rationale and approach for these

By 2020, the target is for the entire country to be Type A FMD free with vaccination; Type Asia I FMD free without vaccination in the entire country; Type O FMD free without vaccination in Hainan Island, Liaodong Peninsula and Jiaodong Peninsula, Type O FMD free with vaccination in Beijing, Tianjin, Liaoning (excluding Liaodong Peninsula), Jilin, Heilongjiang, and Shanghai, and Type O FMD controlled status standard in the other regions in China.

5. Current PCP Status

The current FMD status is at PCP Stage 3 in most areas and at PCP Stage 4 in some areas of P.R China.

6. Targeted PCP Status by 2020

By 2020, the targeted FMD status will be at PCP Stage 4 in Beijing, Tianjin, Liaoning (excluding Liaodong Peninsula), Jilin, Heilongjiang, and Shanghai, at PCP Stage 5 in Hainan Island, Liaodong Peninsula and Jiaodong Peninsula, and at Stage 3 in some areas of P.R China.

7. Proposed plan to achieve this targeted status

"National Medium and Long-Term Plan for Animal Disease Control (2012—2020)" has clarified the objectives of FMD prevention and control by 2020, and the National FMD Prevention and Control Plan has proposed the roadmap and strategy to achieve this targeted FMD status. The principles are to prevent first, control based on FMD types, manage according to the local conditions, and prevent and control by divided zones. The comprehensive strategies are to promote combination of vaccination and prevention, surveillance, movement supervision, emergency response and biosafety disposal, and inspection supervision.

For FMD Type A, the same control strategy is carried out in the entire country, and for Type O FMD, control strategies in different stages and different areas are carried out.

Compulsory vaccination is implemented to all pigs, cattle and goats/sheep which should be vaccinated. Animal disease control institutions at all levels conduct serological and pathological surveillance on all cloven-hoofed animals in breeding animal premises, large scale animal premises, free ranging animal holdings, live animal markets, slaughterhouses, and so on. Zoning management is promoted and DFZs are enlarged. Animal identification system is implemented strictly and all animals of interprovincial movement must wear ear tags to realize disease traceability. Veterinary laboratories diagnostic capacity on FMD are improved constantly at all levels, and FMD control knowledge is disseminated and publicized so as to improve farmers' biosafety management level. In case of new FMD outbreak, based on requirements of the related contingency plan and technical specifications, disease response is conducted promptly, and for each new outbreak, epidemiological investigation is conducted in a timely manner, and the origin of the disease is traced back to support control activities.

Indonesia

A. Veterinary Services

Indonesia has 34 Provinces that consist of 514 districts/municipalities. Veterinary Services (VS) in Indonesia cover Veterinary Services at the national, Provincial, and District levels, and includes the Quarantine Agency and Laboratories. Veterinary Services at Central level are Directorate of Animal Health as the institution in charge of animal disease control and eradication while the Directorate of Public Health and Post Harvest is the institution in charge of public health and post harvest. Both are under the Directorate General Livestock and Animal Health Services (DGLAHS), Ministry of Agriculture. Quarantine agency is a board that has a direct line structure under the Ministry of Agriculture. VS related with animal health and or animal public health Laboratories under DGLAHS are 8 regional Diagnostic Laboratories (Diseases Investigation Center/BV-BBV) and 1 National Veterinary Drugs Assay Laboratory (NVDAL), 1 of Center for Veterinary Biological Product (CVBP/Pusvetma) as FMD Lab Reference, 1 of Quality Control Laboratory for Livestock Products (QCLVP/BPMSOH), 1 of Feed Quality Control Laboratory (FQCL). Indonesia also has 1 VS laboratory that comes under direct line of the Ministry of Agriculture, that is the Indonesian Center Research that includes veterinary research (ICRVS/ BBalitvet).

Veterinary Services at Provincial level is under Province Livestock and Animal Health Services and almost all Provinces have a Province Animal Health Laboratory. Veterinary services at District level is under District Livestock and Animal Health Services. Some District Livestock and Animal Health Services have a District Laboratory that have capacity for simple laboratory testing, and all Districts have many Field VS namely Animal Health Centers (AHC) that have 1-3 sub-district working area as a grass roots structure in detection, prevention, control and eradication of animal diseases. There are a total of 1229 AHCs throughout Indonesia.

B. History

Since 1986, based on general surveillance, there was no FMD cases in Indonesia so Indonesia on that year self-declared as a FMD country free. In 1990, OIE recognised Indonesia as an FMD-free country without vaccination, and since that time Indonesia has maintained its free status. FMD freedom was achieved step by step through implementation of progressive control measures such as mass vaccination, strict movement control, culling and disinfection, increasing public

awareness and community participation, and implementing zoning. Indonesia's success proved that eradication of FMD can be achieved through strong commitment of Government and stake holders, application of one line command from central Government to district level on a disease control and eradication programme, community participation and close collaboration with country and international donors for improving capacity building of human resources including field and laboratory staff. Also important was improved research and development that followed production of FMD vaccine from local virus. These activities were supported by Australian experts and assistance from the Pirbright Laboratory, UK, to improve surveillance throughout Indonesia.

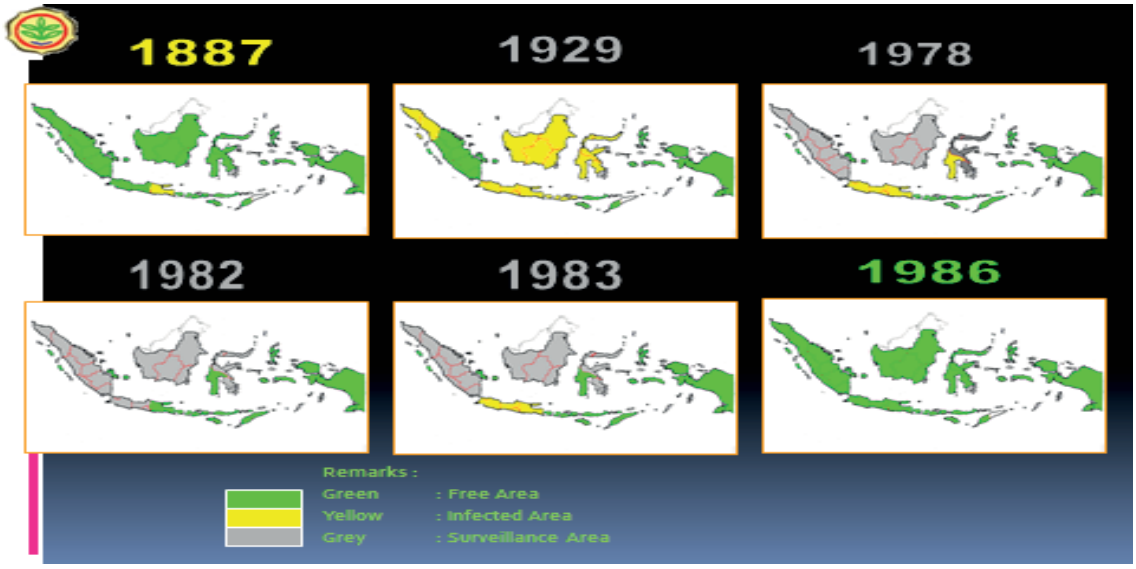
The history of FMD eradication in Indonesia is as follows:

In 1887, FMD entered Indonesia in east Java (Malang), during the Dutch colonial era through importation of dairy cattle to produce milk and cheese. FMD spread very quickly throughout Java to other islands including Sumatra, Sulawesi, Kalimantan, Bali and west and east Nusa Tenggara.

In 1929, outbreaks occurred in the whole of Java, Kalimantan, Sulawesi and north Sumatera Islands. In 1962, FMD outbreaks re-occurred in Bali. The source of this outbreak was illegal animal traffic from East Java. T. In 1973, new outbreaks occurred in Java and some other islands. From 1974, a progressive control and eradication programme was initiated. In 1976, surveillance was conducted in Sumatera, Kalimantan, north & west and south east of Sulawesi Island and others islands across Indonesia, and at the same time an eradication programme was started zone by zone. Bali achieved freedom from FMD in 1978, followed by east Java in 1982. Surveillance conducted in 1982 in Sumatera, Kalimantan and east & west Sulawesi and central Java confirmed freedom for Sulawesi, Java, and Nusa Tenggara Island.

In 1983, new outbreaks occurred in Central Java and East Java. Within two weeks, the whole of Java was infected with FMD virus. The spread of disease occurred from east to west through livestock movements and trade of livestock feed. While control and eradication programmes were implemented, surveillance was also maintained. At that time, vaccination coverage was more than 95% in susceptible animals. The last FMD vaccination was conducted in Indonesia in 1985.

In 1986, surveillance throughout Indonesia confirmed that no clinical cases were found anymore. In 1986, Indonesia bravely declared as an FMD-free country through the Decree Minister of Agriculture No. 260, 1986. Then in 1990, the OIE recognised Indonesia's status through OIE Resolution No. XI, 1990.



Current Risk of FMD:

- As an archipelago country, Indonesia has a total of 18,306 Islands, with coastline length of 95,181 Km and land borders with 3 neighbouring countries. Based on this geography, Indonesia has many potential illegal entry points which represent a risk to Indonesia through smuggling of animals and animal products from infected countries.
- One of the consequences of globalization is the incredible tourism development based on the ease of transportation and hospitality. This situation increases human traffic, that increases risk due to animal product that possibly carried by the tourist as well as increase airport waste/swill that could be used for feeding of susceptible animals (swine). If such waste were contaminated with pathogens and enters Indonesia, the pathogen could infect livestock and spread in Indonesia.
- Traffic of susceptible animals (animal wild life) as side effect of development of international cooperation in zoos and conservation. Strict animal health requirements are implemented in Indonesia based on risk analysis.
- Lack of public/farmer awareness related with high impact of the disease on social, economic and cultural levels. A socio-economic study of FMD should be conducted, to support advocacy with farmers and high level policy-makers.

C. Prevention of FMD

To prevent FMD incursion in Indonesia, a lot of effort is conducted such as:

- Establish Government Regulation of Disease control and preparedness and also produce SOPs of diseases control actions. Indonesia regulates the prevention of animal diseases, including exotic diseases, through Law no.18/2009 juncto Law no. 41 year 2014, Government Regulation no 47/2014 for Control and Eradication Animal Diseases, and SOP for Prevention FMD Incursion that is Kiatvetindo (Indovetplan).
- Strengthening of passive surveillance systems (syndromic surveillance) conducted by Province and District Livestock Services, Animal Health Center, Quarantine officer and cadre of animal health to strengthening Early Warning System.
- Implement strictly Animal Health Requirement and Import risk analysis for trading facilitation of animal, animal products and animal by product.
- Strengthening quarantine by increasing recruitment of quarantine officers, and placing them in all quarantine stations throughout Indonesia. Training to improve competency for diagnosis of clinical disease is also enhanced.

- Strengthening the Emergency Alert System (Emergency Management System) by strengthening collaboration, coordination and cooperation with other ministries and stakeholders.
- Strengthening of Public Private Partnerships.
- Increased regional and international cooperation.
- Increased knowledge about FMD through public awareness programmes and technical advisory and simulation exercise to increase alertness of public, farmers and Government officers.

D. Goal and Objective of the FMD prevention and preparedness programme

The goal and objective of the prevention and preparedness programme are:

- To maintain Indonesia's FMD free status and to protect farmer from high economic losses and avoid decreasing livestock population due to FMD.
- To maintain or increase exports of livestock and livestock products. When the prevention and preparedness programme is successful, then the decrease in livestock productivity (meat and calves) can be avoided. This will have a positive impact on improving farmer's welfare and reduce poverty.
- To maintain Indonesia's culture and hobbies (cattle racing, cultural celebration events etc). If an outbreak were to happen, control of livestock movement should be implemented strictly, under Indonesia Law. Livestock exhibition, cattle racing and other activities that cause contact among cattle would be prohibited.
- To prevent the extinction of Indonesia plasm nuftah or native animals.
- To increase awareness among farmers to the emergence of FMD and report it as soon as possible and prepare all Government officers involved in disease control based on the necessary duties and functions.

E. The approach of the preparedness program:

- Strengthen disease reporting system (from the field to central Government). Indonesia has established Integrated National Animal Health Information Systems (I-SIKHNAS). This information system is a system that describes the incidence of the disease in the field in real time so if it is identified as a dangerous infectious animal disease, it can be immediately known and control and eradication activities can be implemented as quickly as possible, or less than 24 hours. This system will reduce economic losses of farmers due to the entry and spread of infectious animal diseases that can affect the productivity of Indonesia's livestock industry.
- Build strong emergency preparedness system by strengthening networking and cooperation among the private sector, cross-sector institutions and Ministries for appropriate disease control based on each competence, responsibility and function. Coordination meetings and sharing technical standard operation procedures are important for building networking and understanding each responsibility.
- Establish legislation as umbrella to action in emergency situation.
- Advocacy to the high level related with the impact of FMD on social, economic, and cultural criteria in Indonesia, and to prepare the budget to control disease in the event of an outbreak.
- Preparing national and international diagnostic laboratory networking for building human resources capacity and standardization of FMD testing among national laboratories or determine standard test for FMD, kind of samples and transport media used. Improving lab reference staff competency through application for lab diagnostic training to OIE.

- Form a Rapid Response Unit (RRU) in Central, Provincial and District levels under central and local regulation. The RRU must have the competency and preparedness to control any outbreak of infectious animal diseases. The team of RRU includes Vet and Paravet in Animal Health Center (allocated in sub District and Province). They must be trained to detect diseases and implement disease control activities in order to respond quickly, efficiently and effectively. The capability should be based on vaccination procedures including maintenance of cold chain, outbreak investigation, sample collection and submission.
- Prepare other resources for supporting rapid disease control and implement appropriate methods to stop the spread of the disease.
- Strengthen public awareness programme and strategies to improve public participation in disease detection and reporting.

F. Contingency Plan

Contingency plan would be implemented based on FMD contingency guideline namely KIATVETINDO or Indonesian Veterinarian Emergency preparedness guideline. Contingency guideline is produced to control and eradicate animal diseases quickly, so as to minimise economic losses. To achieve good results, the guideline should be understood and well-known by stakeholders to support effective actions. “Who does what” and each responsibility should be clear and communicated to all stakeholders, to improve readiness in disease emergency. Step by step of all disease control and eradication action that should be taken by stakeholders should be clearly communicated.

The Director of Animal Health as Chief Vet Officer (CVO) will lead disease control activities, and has responsibility to send immediate report to OIE. CVO has authority to instruct National Lab reference to send virus isolate to OIE lab reference Pakchong, Thailand. CVO will request to OIE to have access to vaccine bank to get FMD vaccine and improve international cooperation for disease control. CVO will command and determine diseases control policy collaboration with local government and other stakeholders. Regarding to the matter above, socialization, technical advisory, training and refresher training should be conducted continuously and the effectiveness of the system will be tested every year through simulation exercise which apply to all disease control measures. Whenever weakness in the system are detected, guidelines should be revised.

Lao People's Democratic Republic

1. Veterinary Services

The veterinary services in Lao People's Democratic Republic are provided by three sectors: (1) public sector veterinary services of the veterinary administration, (2) private sector veterinary services, and (3) stakeholder institutions and organizations.

The public sector veterinary services are part of the Department of Livestock and Fisheries (DLF) within the Ministry of Agriculture and Forestry. The DLF has six management divisions and four operational centers but the divisions and centers involved in veterinary services include: (1) Division of Veterinary Services, (2) Division of Livestock and Veterinary Legislation and Sanitary, (3) the National Animal Health Laboratory (NAHL), (4) the Vaccine Production Centre (VPC), (5) the National Aquaculture Development Centre (NADC) and (6) the National Animal Feed Laboratory (NAFL).

The Division of Veterinary Services contains the 4 units of veterinary services management: veterinary services, animal products standard management, epidemiology and disease control and veterinary check point management, while the Division of Livestock and Veterinary Legislation is responsible over all livestock and veterinary related legislation. NAHL, VPC, NADC and NAFL are each responsible for technical matters in their specific fields. Extension services are entrusted to an independent pluri-disciplinary extension service (NAFES), coping with agricultural, livestock, fisheries and forestry issues.

As Laos has adopted a decentralized political and administrative system, most responsibilities of the public veterinary services reside within the 17 Provincial Livestock and Fisheries Offices (PLFO) and Vientiane Capital. These offices receive technical advice from the DLF, but are otherwise independent, as they are funded by provincial budget allocations. These provincial bodies in turn, are not entirely in control of activities within their provinces, because several tasks of the veterinary services are entrusted to the District-level Livestock and Fisheries Offices (DLFOs), administered and funded by the District. The 17 PLFOs are subdivided into the three sub-divisions of: 1) veterinary services (which include public veterinary surgeries, pharmacies, laboratories, meat inspection and international border check points); 2) Livestock services and; 3) Fisheries services. The 145 DLFOs are also subdivided into the same three sub-divisions.

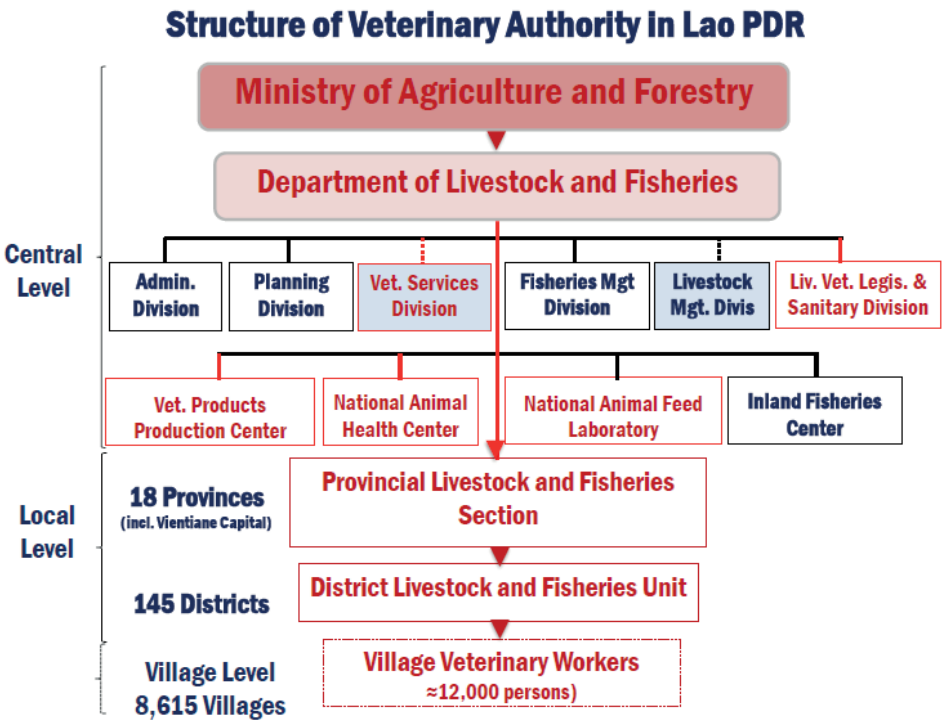
The staff numbers across the three layers (national, provincial and district-levels) and for the three sectors (livestock, fisheries and veterinary services) are 1,469 permanent staff and 457 contract staff (2010). Of the 1,469 permanent staff, 41 persons work at Headquarter Office of DLF and 81 persons work at technical centers (NAHL, VPC, NADC and NAFL), 361 persons work at provincial level (PLFO) and 986 persons work at district level (DLFO). The qualifications of these staff are shown in table 1.

Table 1. Qualifications of veterinary permanent staff in Lao PDR (as of 2010)

Qualifications	Persons	Share
Medium diploma holders and others	1,154	78.6
Higher diploma	205	14.0
Bachelor degree (BSc)	67	4.6
Master Degree (MSc)	35	2.4
PhD	8	0.5
Total	1,469	100.0

Private veterinary service providers include private veterinary surgeries, pharmacies, sellers of veterinary drugs and biological subjects relevant to veterinary, private animal feed retail shops and private veterinary village workers (VVWs). As the end-users of veterinary services, the stakeholders include small scale livestock farmers in 8,615 villages nation-wide, model smallholders (estimated 2,000), the pig farmers' association, livestock and fisheries enterprises (commercial farms) and consumers. The structure of veterinary authority in Lao PDR is shown in Figure 1.

Figure 1. The structure of veterinary authority in Lao PDR



2. Current status of FMD

FMD remains endemic in Lao PDR and causes sporadic disease outbreaks in its susceptible livestock population, in particular cattle and buffaloes. The following epidemiological aspects from 2008 to July 2015 is summarized below.

2.1 Temporal and Spatial Distribution

From January 2008 to July 2015, a total of 179 FMD outbreaks within 543 villages were reported in 62 districts throughout the country. The summary of FMD outbreaks in each province is shown in table 2 and the geographical distribution of FMD outbreaks between 2008 and 2013 is shown in Figure 2-A, and from January 2014 to July 2015 is shown in Figure 2-B.

Table 2. Summary of FMD outbreaks occurred in each province of Lao PDR (2008-July 2015)

No.	Province	2008		2009		2010		2011		2012		2013		2014		2015		Total	
		OB	VL	OB	VL	OB	VL	OB	VL	OB	VL	OB	VL	OB	VL	OB	VL	OB	VL
1	Attapeu	-	-	-	-	-	-	2	10	-	-	-	-	2	5	1	5	5	20
2	Bokeo	1	1	-	-	-	-	1	1	1	2	1	1	-	-	-	-	4	5
3	Bolikhamxay	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
4	Champasak	1	1	4	4	6	61	4	54	1	2	5	5	9	13	-	-	29	140
5	Huaphanh	-	-	-	-	2	16	11	55	-	-	-	-	-	-	-	-	13	71
6	Khammouane	-	-	1	2	2	6	1	6	-	-	1	4	-	-	-	-	5	18
7	Luangnamtha	2	2	1	1	-	-	-	-	2	11	2	6	-	-	-	-	7	20
8	Luangprabang	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	2
9	Oudomxay	-	-	1	5	-	-	1	1	-	-	-	-	-	-	-	-	2	6
10	Phongsaly	-	-	-	-	-	-	7	17	3	3	1	1	-	-	-	-	11	21
11	Saravan	-	-	-	-	3	6	6	29	-	-	-	-	-	-	-	-	9	35
12	Savannakhet	-	-	-	-	3	4	-	-	-	-	-	-	1	7	-	-	4	11
13	Sekong	-	-	-	-	-	-	4	5	-	-	-	-	-	-	-	-	4	5
14	Vientiane Capital	24	44	-	-	6	10	20	44	2	2	-	-	-	-	1	3	53	103
15	Vientiane Province	-	-	-	-	1	1	1	4	-	-	-	-	-	-	-	-	2	5
16	Xayabury	2	4	1	4	5	20	8	25	7	11	2	4	-	-	-	-	25	68
17	Xiengkhuang	-	-	2	2	2	10	-	-	-	-	-	-	-	-	-	-	4	12
	Grand Total	31	53	10	18	30	134	67	253	16	31	12	21			166	510	179	543

OB, Outbreak; VL, Village

Sources:

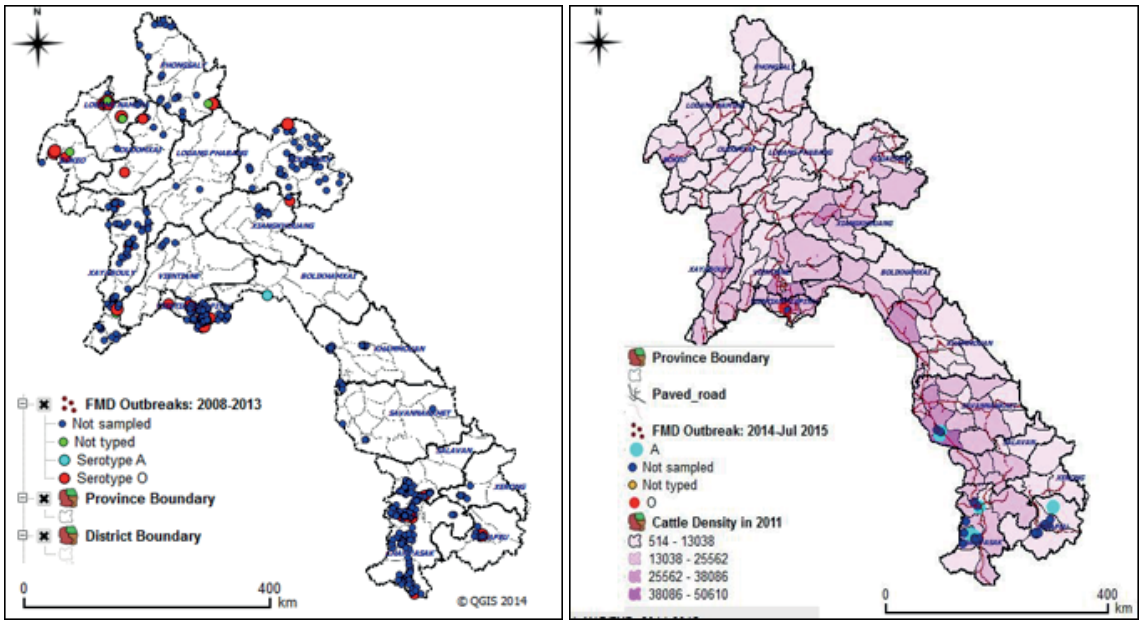
- *FMD outbreaks form 2008-2009 and 2012-July 2015 were obtained from ARAHIS.*
- *Data in 2010 and 2011 were obtained from Epidemiology Unit of DLF.*

Between 2008 and 2013, a total of 32,377 animals were affected by FMD (11,574 buffaloes, 18,513 cattle, 2,034 pigs and 256 goats) while 257,514 animals were at risk (66,547 buffaloes, 122,456 cattle, 59,966 pigs and 8,545 goats) and 2,594 animals died from the disease (931 buffaloes, 1,347 cattle, 231 pigs and 25 goats). Among affected animals, cattle was the highest proportion, accounting for 57%, while buffaloes, pig and goat were 36%, 6% and 1%, respectively.

There was no systematic FMD surveillance in Lao PDR between 2007 and 2013 due to the transition of responsible person and limitation of financial supports. However, the previous study conducted by ***Blackshell et al (2008***) from 1996 to 2005 revealed that the sero-positive for cattle

and buffalo of structured surveillance varied by province and ranged from 65.7% in Vientiane Capital to 3% in Huaphan Province. Figures for other provinces were as Champasak 44.4%, Bolikhamxay 37.3%, Savanakhet 26.2-28.8%, Luang Prabang 22.1-23.2% and Khammouan 12.3%. The sero-prevalence in pigs was low compared to cattle and buffalo, from 2.8% in Vientiane Capital to 0% in Khammouan and Savanakhet Provinces. The overall average for the presence of antibodies against FMD virus was 18.7% with the highest (50.8%) in Vientiane Province and lowes (1%) in Phongsaly. Rates in the provinces of Khammouan, Savanakhet, Vientiane Capital, Champasak, Lungnamtha and Xiengkhouang were 29%, 27.7%, 23.2% and 11.1%, 11.1% and 10.1%, respectively and other provinces were less than 10%. The results from these studies indicate that there is a need to re-estimate the prevalence of FMD in Lao PDR since vaccination campaigns have been applied from 2011 in different geographical regions.

Figure 2. Geographical distribution of FMD outbreaks in Lao PDR (A, between 2008 and 2013 & B, 2014-July 2015)

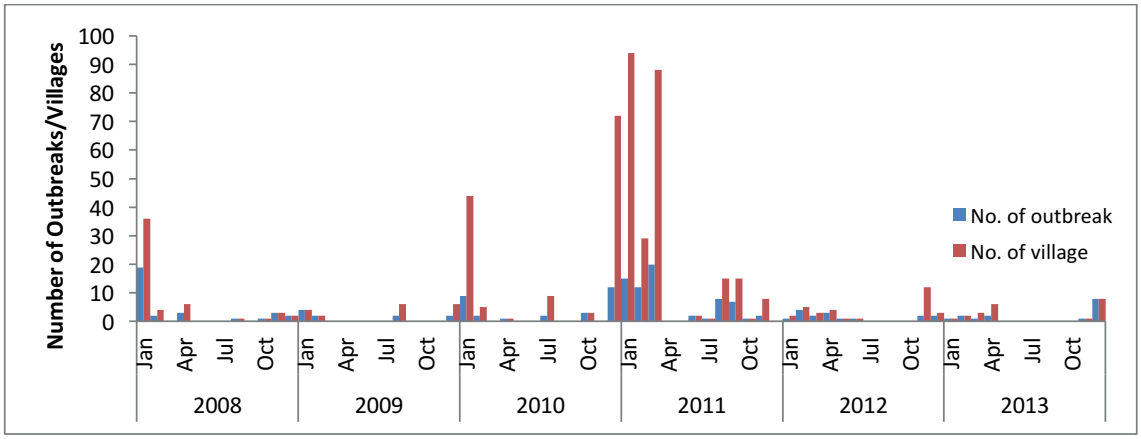


A **B**

The majority of outbreaks from 2008 to 2013 occurred in Vientiane Capital (n=52; 31.3%), then Xayabury Province accounted for 15.1% (n=25) and Champasack Province accounted for 12.7% (n=21) while each of other provinces were less than 8%. In contrast, Champasack Province was the highest number of affected village (n=127) and accounted for 24.9% while Vientiane Capital was the second and accounted for 19.6% (n=100), Huaphan Province was the third and accounted for 13.9% (n=71), Xayabury Province was the fourth and accounted for 13.3% (n=68) and each of other provinces were less than 7%.

Between 2008 and 2013, the outbreak in 2011 was the biggest FMD outbreak and accounted for 40.3% of total outbreaks (or 49.6% of affected villages) while the outbreaks in 2008 and 2010 had similar number of outbreaks that accounted for 18.6% and 18.0%, respectively. The outbreaks in 2009, 2012 and 2013 accounted for 6.0%, 9.6% and 7.2%, respectively. The majority of the outbreaks occurred after rice harvest season (or dry season) that started from late October to late April and the highest peak was in January of 2011. The temporal distribution of FMD outbreaks from 2008 to 2013 is shown in Figure 3.

Figure 3. Temporal distribution of FMD outbreaks in Lao PDR from 2008 to 2013



2.2 Sample submission and test results

Between 2008 and 2013, only 26 out of 166 FMD outbreaks (15.7%) in 20 districts within 11 Provinces were sampled and tested. Further communication and data collection from former National Animal Health Centre (now call National Animal Health Laboratory, NAHL) of the Department of Livestock and Fisheries from 2010 to 2013 revealed that a total of 150 epithelium samples were collected from 27 districts within 14 affected provinces (including Vientiane Capital). Among samples, only 48% were from reported outbreaks (n=72) within 12 districts of 8 provinces (Attapeu, Bokeo, Champasak, Huaphanh, Luangnamtha, Phongsaly, Vientiane Capital and Xayabury) while 52% (n=78) of samples were not linked to the reported outbreaks. Further analysis revealed that 62 out of 150 samples (41.3%) were positive for FMD as confirmed by LPB ELISA at NAHL. The highest number of sample submission was from Xiengkhouang Province in the year 2010 and accounted for 22% (n=33), then Vientiane Capital and Phongsaly had the same number (16.7%; n=25) while the number of samples from each of the other provinces were less than 9% (below 14 samples). The provinces of Vientiane, khammouan and Sekong did not collect FMD samples and submit to NAHL for confirmation. This may be due to the lack of sample collection tools and transport media or the delay of reporting. All positive samples were serotype O as typed by LPB-ELISA. However, further analysis from the data obtained from ARAHIS and previous study (***Khounsy et al, 2009***) revealed that the serotype A was reported in Bokeo Province in 2003, Vientiane Capital in 2006 and in Bolikhamxay Province in 2008 and the serotype Asia 1 was reported in 1996 (source unknown) and 1998 (Vientiane Capital). The summary of sample submission from 2010 to 2013 is shown in table 3.

Table 3. Summary of sample submission (2010 to 2013) and internal test results (2008-2013)

Year	Province/AP	SD/AD(%)	SOB/TOB(%)	NS/Pos(%)	Result
2008	Bokeo	Huaysay	1	NA	O
	Bolikhamxay	Parksan	1	NA	A
	Champasack	Bachiang	1	NA	O
	Luangnamtha	Sing	1	NA	O
	Vientiane Capital	Xaythany	2	NA	O
		Sikhottabong	1	NA	O
		Xaysettha	1	NA	Not typed
	Xayabury	Botaen	1	NA	O
Sub-total	5/6	8/11	9/31(29.0)		O & A
2009	Champasack	Phonethong	1	NA	O
		Pakse	2	NA	O
	Xiengkhouang	Thathom	1	NA	O
	Oudomxay	Namor	1	NA	O
Sub-total	3/6	4/9	5/10(50.0)		O
2010	Bolikhamxay	Paksan	NL	3 (1)	O
	Champasack	Moonlapamoke	NL	1(1)	O
		Pakse	1	1(1)	O
	Luangprabang	Chomphet	NL	5(0)	NA
	Savanakhet	Songkhone	NL	1(1)	O
	Vientiane Capital	Sikhottabong	NL	10(0)	NA
	Xiengkhouang	Paek	NL	33(10)	O
Sub-Total	6/9	6/24	1/30(3.3)	54(14)	O
2011	Attapeu	Sayettha	1	3(0)	-
	Champasack	Khong	NL	1(0)	O
		Moonlapamoke	NL	1(1)	O
		Sanasomboun	NL	2(2)	O
		Paksong	NL	1(1)	O
	Houaphan	Aet	1	10(6)	O
	Luangprabang	Xiengngeun	NL	3(2)	O
	Oudomxay	Laa	NL	1(1)	O
		Namor	NL	2(0)	O
	Phongsaly	Mai	1	25(2)	O
	Saravan	Saravan	NL	2(0)	O
		Vapee	NL	2(1)	O
	Vientiane Capital	Hatsayfong	1	2(1)	O
		Nasaythong	1	6(4)	O
		Sikhottabong	NL	5(5)	O
Sub-Total	8/13	13/37	5/67(7.5)	65(25)	O
2012	Bokeo	Huaysay	1	2(1)	O
	Luangnamtha	Sing	1	10(7)	O
	Vientiane Capital	Xaythany	NL	2(2)	O
	Xayabury	Phieng	1	1(1)	O
		Xayabury	NL	3(3)	O
Sub total	4/6	5/9	2/16(12.5)	18(14)	O
2013	Bokeo	Huaysay	1	1(0)	NA
	Luangnamtha	Luangnamtha	1	2(1)	O
	Xayabury	Parklay	2	9(7)	O
Sub Total	3/6	3/8	4/12(33.3)	12(8)	O
Total	11/17 (64.8%)	20/60 (33.3)	26/166(15.7)	150/62(41.3)	O, A

AD, Affected District; SD, Sampling District; AP, Affected Province; SOB, Sampled Outbreak; TOB, Total Outbreak; NS, Number of Sample; Pos, Positive by LPB-ELISA; NA, Not Available
NL, Not link to outbreaks reported to the Department of Livestock and Fisheries

2.3 Molecular epidemiology of FMD in Lao PDR

The molecular epidemiology of FMD viruses in Lao PDR has been described by Khounsy et al. In summary, the dominant serotype causing FMD outbreaks in Lao PDR between 1998 and 2006 was type O and molecular analysis of VP1 gene revealed that type O viruses were divided into two topotypes: South East Asia (SEA) and the Middle East –South Asia (ME-SA). Further analysis revealed that FMD viruses causing outbreaks in Attapeu and Champasak Provinces in 1998 and 1999 were closely related to Cam-94 strain of SEA topotype while FMDV isolated in Xiengkhouang Province in 1998 belonged to Mya-98 linage of SEA topotype. The FMD viruses responsible for outbreaks in the provinces of Savanakhet (1999), Sayabury (2000), Bokeo (2003), Bolikhamxay (2003) and Luangprabang (2004) were closely related to Pan-Asia strain of ME-SA topotype while FMD viruses isolated in Luangnamtha Province (2001 and 2003) and Vientiane Capital in 2003 belonged to both SEA/Mya-98 and ME-SA/Pan-Asia linage.

In order to achieve a better understanding of molecular epidemiology of type O FMD viruses in Lao PDR, the remaining samples from 1998 to 2006 and samples between 2007 and 2009 stored at NAHL with a total of 37 samples (table 4) were sent to Australian Animal Health Laboratory for sequencing (unpublished data). The sequences were then sent to WRLFMD for alignment and construction of a phylogenetic tree. The results also confirmed that there were three distinct groups of FMD viruses responsible for the outbreaks in Lao PDR between 1998 and 2009 (Figure 4). The FMD viruses belonging to the SEA/Cam-94 were only responsible for the outbreaks in Attapeu and Champasak Provinces between 1998 and 1999 and have not been reported since then. The viruses closely related to the strain Pan-Asia of ME-SA topotype were responsible for the outbreaks in Lao PDR between 1999 and 2004. However, the data obtained from WRLFMD revealed that FMD viruses closely related to strain Pan-Asia reoccurred and were responsible for the outbreaks in Lao PDR between 2010 and 2012, and the strains closely related to Mya-98 re-occurred again in 2013. In order to get a better understanding of molecular epidemiology of FMD circulating in different regions of Lao PDR between 2011 and 2013, it is necessary to send the remaining samples stored at RRLFMD to WRLFMD for sequencing and analysis. The details of samples submitted to RRLFMD and AAHL for genotyping and molecular analysis between 1998 and 2013 is shown in table 6.

Phylogenetic analysis of FMD type A occurring in Lao PDR in 2003 and 2006 revealed that the isolates in Bokeo in 2003 was a member of ASIA topotype and was most closely related to Malaysian A/MAY/4/2003 isolate. A subsequent large outbreak of FMD type A virus in Vientiane Capital occurred in 2006 was identical to FMD virus occurred in Bokeo in 2003.

Two isolates of type Asia 1 in Lao PDR in 1996 and 1998 were examined by Khounsy et al, 2009. and the results showed that type Asia 1 were most closely to strain Asia 1/TAI/1/98.

Table 6. Summary of samples submitted to RRLFMD and AAHL for genotyping between 1998 and 2013.

Ref. no	Month/Year	Province	District	Species	Type	Topotype/Strain	Reference
005	October 1998	Attapeu	Sanamxay	Cattle	O	SEA/Cam-94	Unpublished
006	September 1998	Attapeu	Sanamxay	Cattle	O	SEA/Cam-94	Unpublished
015	September 1999	Savanakhet	Champhon	Buffalo	O	ME-SA/PanAsia	Unpublished
017	December 1999	Savanakhet	Champhon	Buffalo	O	ME-SA/PanAsia	Unpublished
022	July 2000	Vientiane Capital	Xaythany	Cattle	O	ME-SA/PanAsia	Unpublished
023	November 2000	Vientiane Capital	Xaythany	Cattle	O	ME-SA/PanAsia	Unpublished
026	June 2000	Savanakhet	Songkhone	Porcine	O	ME-SA/PanAsia	Unpublished
027	January 2000	Vientiane	Tulakhom	Cattle	O	ME-SA/PanAsia	Unpublished data
028	February 2000	Vientiane Capital	Sikhottabong	Cattle	O	ME-SA/PanAsia	Unpublished data
029	June 2000	Khammoune	Hinboon	Buffalo	O	ME-SA/PanAsia	Unpublished data
031	June 2000	Vientiane Capital	Sysadtanak	Porcine	O	ME-SA/PanAsia	Unpublished data
042	March 2003	Louangprabang	Louangprabang	Cattle	O	ME-SA/PanAsia	Unpublished data
043	September 2003	Khammoune	Nongbok	Cattle	O	ME-SA/PanAsia	Unpublished data
DQ164916	September 2003	Bolikhamxay	-	Cattle	O	ME-SA/PanAsia	Knowles el al, 2005[1]
DQ164917	October 2003	Bolikhamxay	-	Porcine	O	ME-SA/PanAsia	Knowles el al, 2005
047	January 2004	Vientiane Capital	Sangthong	Cattle	O	ME-SA/PanAsia	Unpublished data
048	February 2004	Borikhamxai	Thaprabath	Cattle	O	ME-SA/PanAsia	Unpublished data
EU667452	March 2004	Luangprabang	-	Cattle	O	ME-SA/PanAsia	Khounsy et al 2009
062	December 2007	Vientiane Capital	Pakngeum	Buffalo	O	SEA/Mya-98	Unpublished data
067	December 2007	Xayabuary	Phieng	Buffalo	O	SEA/Mya-98	Unpublished data
068	March 2008	Vientiane Capital	Xaythany	Cattle	O	SEA/Mya-98	Unpublished data

1 Knowles et al., Pandemic strain of foot-and-mouth disease serotype O. Emerging Infectious Disease. P 1887-1893.

Ref. no	Month/Year	Province	District	Species	Type	Topotype/Strain	Reference
070	August 2008	Vientiane Capital	Xaythany	Buffalo	O	SEA/Mya-98	Unpublished data
071	April 2008	Vientiane Capital	Sikhottabong	Porcine	O	SEA/Mya-98	Unpublished data
078	February 2008	Xayabuary	Xayabuary	Cattle	O	SEA/Mya-98	Unpublished data
081	September 2008	Louangnamtha	Louangnamtha	Cattle	O	SEA/Mya-98	Unpublished data
091	October 2008	Louangnamtha	Sing	Cattle	O	SEA/Mya-98	Unpublished data
096	January 2009	Champasak	Pakse	Cattle	O	SEA/Mya-98	Unpublished data
098	January 2009	Champasak	Phonthong	Buffalo	O	SEA/Mya-98	Unpublished data
099	January 2009	Xiengkhouang	Thathom	Cattle	O	SEA/Mya-98	Unpublished data
100	January 2009	Champasak	Champasak	Buffalo	O	SEA/Mya-98	Unpublished data
101	January 2009	Oudomxay	Namor	Cattle	O	SEA/Mya-98	Unpublished data
O/LAO/2/2010	2010	-	-	-	O	ME-SA/PanAsia	WRLFMD
-	2010	-	-	-	O	ME-SA/PanAsia	OIE SRR
016/11(B)	2011	Phongsaly	-	-	O	ME-SA/PanAsia	Unpublished data
020/11(P)	2011	Vientiane Capital	-	-	O	ME-SA/PanAsia	Unpublished data
023/11(C2)	2011	Vientiane Capital	-	-	O	ME-SA/PanAsia	Unpublished data
024/11(C)	2011	Champasak	-	-	O	ME-SA/PanAsia	Unpublished data
025/11(C)	2011	Attapeu	-	-	O	ME-SA/PanAsia	Unpublished data
O/LAO/1/2012	2012	Vientiane Capital	Sihottabong	Pig	O	ME-SA/PanAsia	Unpublished data
O/LAO/4/2012	2012	Vientiane Capital	Nasaythong	Pig	O	ME-SA/PanAsia	Unpublished data
O/LAO/1/2013	December 2012	Luangnamtha	Sing	Cattle	O	SEA/Mya-98	RRLFMD
O/LAO/2/2013	December 2012	Luangnamtha	Sing	Cattle	O	SEA/Mya-98	RRLFMD
O/LAO/3/2013	February 2013	Xayabury	Paklay	Cattle	O	SEA/Mya-98	RRLFMD

3. Goals and objectives for the control programme including rationale and approach for these

The **GOAL** of the National FMD Control Plan for Lao PDR is to reduce the incidence of foot-and-mouth disease in Lao PDR in the next three years and move the country forward to the next level of the progressive control pathway as well as to contribute to improving the existing critical competencies.

The **PURPOSE** of the National FMD Control Plan for Lao PDR is to provide a clear guideline in combating FMD at source and along critical control points for FMD control in Lao PDR.

The **KEY OBJECTIVES** of the National FMD Control Plan for Lao PDR are to lay down priority actions for strengthening technical activities, intensify advocacy, and operationalize coordination mechanisms for FMD control in Lao PDR.

Rationale and Approach of the National FMD Control Plan for Lao PDR

The National FMD Control Plan for Lao PDR will provide guidance and directions for FMD control activities in the country following the overarching regional and global strategies as detailed in the SEACFMD Roadmap and the FAO/OIE Global FMD Control Strategy. Thus, specific national FMD control activities, to be identified and implemented by its own Veterinary Services based on this National FMD Control Plan, will serve as the foundational building blocks at the ground level that are accordingly streamlined and remaining cohesive with the directions being taken at the Regional and Global levels.

Benefit from FMD control in Lao PDR is projected across its society: consumers will benefit from better stability and availability of livestock products; livestock owners and the livestock industry will be protected from potential losses and gain better market opportunities; actions relevant to FMD control will also help empower the veterinary services of Lao PDR particularly to its capacity in handling various transboundary animal diseases and other animal health concerns. Moreover, mutual benefits are also seen for neighboring countries and the region, overall. Conversely, failure to control FMD in Lao PDR will jeopardize parallel control efforts of its neighboring countries and negatively impact regional and global efforts.

The National FMD Control Plan will be guided by the FMD Global Strategy and the key strategies of the SEACFMD Roadmap. It will thus **focus on addressing national FMD control**, while **strengthening its veterinary services** and **preventing and controlling other major animal diseases**. To achieve this, the country will plan and implement actions towards refining **technical activities** to control FMD, strengthen **communication and advocacy** to gain stakeholder and political support, and streamline **coordination** mechanisms of Lao PDR.

The design and implementation of the Lao PDR National FMD Control Plan will utilize existing accessible tools and guidelines such as the Progressive Control Pathway (PCP) and the Performance of Veterinary Services (PVS).

4. Current PCP status

During the Upper Mekong Working Group in February 2012, Lao PDR's initial self-assessment placed the country at Stage 1, which is the stage where the country is identifying control options. The focus for this stage is to gain an understanding of the epidemiology of FMD in the country and

develop a risk-based approach to reduce the impact of FMD. A more detailed self-assessment conducted by FAO during a National Consultation for the Republic of Korea (ROK) FMD Control Project last August 2015 further confirmed this classification. Evaluation of the items detailed under the eight outcomes for Stage 1 confirmed that 41% of the targets have already been done or are ongoing, 41% are yet to be accomplished, and 18% of the items listed were not applicable to Lao PDR. Following this, gaps were identified for the country. Based on these findings, the needs, relevant activities and implementation plans for the country were also detailed. For Year 1 of the project, the target was set to have the PCP Stage 1 assessment status reach 60%, Year 2, 80% and at Year 3 PCP Stage 1 assessment status is expected to reach 100% and Lao PDR to achieve partial Stage 2 status.

5. Targeted PCP status by 2020

By the end of the implementation period of the National FMD Control Plan (2015-2018), it is projected that Lao PDR will have to achieve PCP stage 3 and PCP stage 4 by the year 2020.

6. Proposed plan to achieve this targeted status

The National FMD Control Plan for Lao PDR will focus on three distinct but complementary areas for FMD control: technical, communication and advocacy, and coordination.

Technical activities for this phase of the plan will focus on (a) identification of and immediate response to foci of FMD infection, (b) elimination of the source of FMD, (c) prevention of spread of FMD, and (d) protection of susceptible hosts. The technical activities are formulated based on a strategy of understanding and identifying areas of substantial risk of FMD incursion or spread within Lao PDR and neighbouring countries and subsequently implementing a plan based on these risks.

Communication and advocacy activities will involve active engagement of various stakeholders for (a) increased cooperation in FMD prevention and control, (b) improved capacity of the veterinary services in behavior change communication and advocacy, (c) creating awareness and securing the support of veterinary services, donors, NGOs and other development partners about and to the National FMD Control Plan.

Lastly, the coordination component will focus on establishing a functional coordination mechanism within the (a) National and Sub-National levels, as well as (b) regional and international levels. This will include areas of monitoring and evaluation of the implementation of FMD control measures and operationalization of this National FMD Control Plan.

It is expected that activities within all components will contribute towards modifying, implementation, and continuous monitoring of the effects of legislation to strengthen disease prevention and control activities conducted within the country.

Activities within this plan will take guidance from the recommendations and provisions provided in the relevant sections of the OIE Terrestrial Animal Health Code and Terrestrial Animal Health Manual.

It should be noted that this plan serves as a guideline for activities for Lao PDR at this stage in its FMD control. However, the plan is constructed in such a way that it should be able to be streamlined with any initiatives for FMD control, such as zoning programs, which may be introduced in the future.

A. Technical activities

The fundamental principle to prevent, control and eradicate FMD and other transboundary animal diseases (TADs) is to break the transmission cycle of the virus. The transmission pathway may come from an infected animal transmitting the virus directly to a susceptible animal or an infected animal shedding the virus in the environment and susceptible animals getting infected from contaminated pasture or water, fomites from infected vehicles or establishments.

The technical activities provide a set of interrelated actions to break the transmission cycle. These activities involve rapid identification of the foci of infection, elimination of the source of FMD, prevention of infection of susceptible hosts, and increasing herd and animal immunity to FMD. These activities for FMD control are also applicable to other TADs. Due to limitations of resources, a number of these activities will be focused on areas of substantial risk of FMD incursion, multiplication, and spread in order to maximize the benefits of interventions which are implemented. It is key to remember that risk assessment is dynamic due to the intrinsic lability of drivers for several elements which are crucial to disease propagation and spread. An example of these would be the element of animal movement, which is crucial to the spread of disease, whose pathways are susceptible to volatile drivers such as price in different countries.

As FMD is listed as one of the epidemic diseases of animals for which declaration is required by the Government, technical activities relevant to FMD were thus listed in accordance with the provisions as stipulated in Chapter 3 Section 1 of the Law on Livestock Production and Veterinary Matters, and the Decree on the control of the movement of animal and animal products.

a) Identification of foci of FMD infection

- **IMPROVE** reporting system and surveillance
- **STRENGTHEN** outbreak investigation
- **STRENGTHEN** diagnostic capacity for FMD
- **MAP OUT** critical control areas

b) Elimination of the source of FMD

- **MANAGE** FMD-infected animals
- **MANAGE** FMD-infected carcasses
- **MANAGE** FMD in infected areas and surrounds
- **STRENGTHEN** biosecurity plans and implementation relevant to FMD -infected areas
- **FACILITATE** enforcement of the law relevant to FMD-infected areas

c) Prevention of the spread of FMD virus

- **CONTAIN** FMD-infected herds
- **CONTROL** animal movement in contained areas
- **DEVELOP** SOPs/guideline for ring vaccination
- **STRENGTHEN** biosecurity relevant to animal movement
- **FACILITATE** enforcement of the law relevant to animal movement

d) Protection of susceptible hosts

- **IDENTIFY** high-risk areas and vaccinate
- **ENSURE** vaccine quality (correct strains, good quality, etc.)
- **BUILD** capacity in implementing vaccination campaigns
- **IMPLEMENT** animal identification
- **STRENGTHEN** biosecurity plans relevant to non-FMD infected animals and premises
- **FACILITATE** enforcement of the law relevant to non-FMD infected animals and premises

B. Communication and Advocacy

Communication

- Improve capacity of veterinary services in risk communication, advocacy and social marketing
- Increase participation of farmers, traders and relevant stakeholders in FMD prevention and control efforts (i.e. vaccination, early reporting, applying biosecurity measures and safe movement of animals)
- Coordinate various communication activities implemented under different FMD control programs (e.g. OIE/AusAID STANDZ, OIE/EU HPED Vaccine Bank, FAO/Korea FMD project)

Advocacy

- Create awareness of DLF staff and other relevant government offices of the important contributions of the National FMD Control Plan to livestock development and food security
- Advocate for increased human and financial resources as well as policy support from within MAF and relevant government agencies
- Raise awareness of donors, NGOs and development partners about the National FMD Control Plan and how they can support its implementation

The targets for this component include:

- **ENGAGE FARMERS** in FMD control in Lao PDR
- **ENGAGE the PRIVATE SECTOR** (eg: traders) in FMD control in Lao PDR
- **ENGAGE the LOCAL GOVERNMENT** in FMD control in Lao PDR
- **ENGAGE FUNDING BODIES** to support FMD control in Lao PDR

C. Refinement and Operationalization of Coordination Mechanisms

Coordination mechanisms are essential to the effective control of FMD (and other TADs) in Lao PDR. It is crucial to have a specific group of staff who should be accountable for overseeing planning, implementation, monitoring, and evaluation of FMD control activities in the country.

It is suggested that the team will be composed of coordinators for each of the identified major components listed herein (technical, advocacy, coordination). These will be as follows:

a) Technical activities will be handled by the SEACFMD LabNet Focal point (Diagnostic Strategies) and the EpiNet Focal point (Epidemiology and all other technical strategies).

b) The FMD Focal Point for communication will be the coordinator for all advocacy strategies relevant to FMD control.

c) The Coordination strategy will be handled by the National SEACFMD Coordinator, who will oversee the national FMD control activities in the country and coordinate with regional and international programs and activities.

The targets for this component include:

- ESTABLISH technical team
- ORGANIZE funding/resourcing to support FMD control in Lao PDR
- REINFORCE law and legislation relevant to FMD control
- SUPPORT capacity building

Malaysia

Veterinary Services

The Department of Veterinary Services is a Federal Government agency under the Ministry of Agriculture Malaysia and Agro-Based Industries, whilst the State Department of Veterinary Services is administered under the authority of the State Governments. The Department of Veterinary Services is led by the Director General. The headquarters is located at the Ministry of Agriculture and Agro-Based Industries, Podium Block, Lot 4G1 and 4G2, Precinct 4, Federal Government Administration Centre, Putrajaya.

Vision

A competent veterinary authority serving the animal industry for the sake of human welfare

Mission

Provide quality veterinary services as an assurance for public health and sustainable livestock industry for the sake of human welfare

Objectives

The main objectives of the DVS Malaysia are as below:

i. Strengthen and maintain animal health status conducive to the animal industry
ii. Public health assurance through the control of zoonotic diseases and wholesome food production from animal based products
iii. Encourage sustainable livestock production and value added industry
iv. Explore, develop and encourage the use of technology and optimum use of sources in animal based industry
v. Promote animal welfare practices in all aspect of rearing and production system

Functions

The main functions of the DVS Malaysia are as below:

i. Control, prevent and eradicate animal and zoonotic diseases.
ii. Production of livestock, livestock produce and animal feed.
iii. Inspection of meat, milk, eggs, animal feed, abattoirs and veterinary product processing plant.
iv. Control of import and export of livestock and animal produce and quarantine services.
v. Training for the livestock and domestic animal industries.
vi. Expand livestock production and animal health as well as general veterinary health.
vii. Research on animal diseases and animal genetic sources.
viii. Control the welfare of animals and conservation of animal's genetic resources.

The Organizational Structure of the Department of Veterinary Services, Malaysia (DVS) is composed of the Federal and State DVS level. The Federal DVS is associated with planning and policy-making whilst the State DVS implements the policy that has been drafted at the Federal DVS and as approved by the Ministry. Malaysia has twelve (12) states in West Malaysia and Two (2) states in East Malaysia (Borneo).

Veterinary Service Supervision in FMD control related activities

There are two (2) concurrent government authorities that provide supervision of Veterinary Services in FMD control related activities: the Federal and the State Veterinary Services. At Federal level, FMD control and eradication is under the Division of Biosecurity and SPS Management. Implementation of the program is by the Diseases Control and Eradication Section. This function is executed by the Veterinary Health Division of the State Veterinary Services organization.

Monitoring and evaluation of the National FMD Control Program is done by the Division of Management of Biosecurity and SPS through the Epidemiology and Surveillance Section and the Disease Control and Eradication Section. Information from the State Veterinary Services related to the activities implemented for the control and eradication of FMD are reported by the above-mentioned two sections. This information is analysed and feedback is given to the State Veterinary Services for effective control of FMD in the states. National Surveillance Plan for FMD is distributed to all State Veterinary Services and results of the surveillance is reported back to the Epidemiology and Surveillance Section. The Department of Veterinary Services at the Federal level allocates annual budgets to the State Veterinary Services to maintain all FMD related activities in the country.

Diagnosis for FMD is done at the National FMD Laboratory in Kota Bharu, Kelantan. The laboratory participates in the annual Inter-laboratory proficiency testing with OIE RRL Pakchong, Thailand.

Animal movement between states and districts are managed by using an electronic permit system (E-Permit 2 for interstate movement and E-Permit 3 for movement between districts in the same state) in accordance with Section 36 of the Animal Act 1953 (Revised 2013).

Veterinary laws and legislation which is directly related to the FMD control program are Animal Act 1953 (Revised 2013), Veterinary Surgeons Act 1974 (registration and practice of Veterinarians), Abattoirs (Privatization) Act 1993, Malaysian Quarantine and Inspection Services (MAQIS) Act 2011, Feed Act 2009 and Poisons Act 1952.

Current Status of FMD

The States of Sabah and Sarawak are OIE recognised FMD free zones in Malaysia without vaccination since 2004 and maintained FMD free status to date. In Peninsular Malaysia, which is the infected zone, the status of FMD improved significantly in the year 2015, with reduction in outbreaks by 97% from a peak of 146 outbreaks in year 2008. This was possible with the support of expertise and assistance from the SEACFMD campaign. The status of FMD in the Malaysia-Thailand-Myanmar (MTM) Control zone (border states) also improved significantly in the year 2015 compared to the same period in 2014. There were only 2 outbreaks in 1 state (Terengganu) out of 6 Border States in the MTM control zone. For the whole Peninsular Malaysia there were 5 outbreaks in 4 states (Terengganu, Pahang, Negeri Sembilan and Melaka) out 12 states, with 8 states having no outbreaks.

Cattle were the only affected species. Serotyping results of specimens from outbreaks were only serotype ' O ' and there was no outbreak involving serotype ' A ' from January to August 2015 as compared to year 2014. The serotyped samples are sent to the RRL for FMD for sub-typing and vaccine matching.

The management of imported animals in approved temporary licensed private quarantine stations has significantly reduced illegal animal movements across the northern border but there were outbreaks related to a very small number of illegal animal movements from across the only land northern border. This is a continuous threat in the introduction of FMD into the country and requires strengthening regional cooperation in the animal movement management across borders.

Control of FMD

The Master Document FMD Control Plan 2009 – 2016 (PVM 1/9:1/20011), which will be reviewed for extending the period to year 2020, and supporting documents (SOPs), is a risk-based FMD control plan. For example, livestock sourcing from endemic countries had to undergo Pre-Border and Post-Border control, that is in pre-border there is risk assessment and management of the livestock source and mitigation output is the Import Protocol, whereas the post-border are the control measures before release of animals from the quarantine stations.

Diagnostic work is done at the National FMD Laboratory at Kota Bharu, Kelantan where serotyping is done and sub-typing and vaccine matching is done at the OIE World Reference Laboratory for FMD, Pirbright, England or at the RRL FMD Pakchong, Thailand. From 5 outbreaks in the country 12 epithelial tissues were sent to the National FMD Laboratory for diagnosis and confirmation. Five samples were serotyped as 'O' and in seven samples no virus was detected because this samples were taken from aged FMD lesions. These five serotyped samples are being prepared to be sent to the OIE World Reference Laboratory for FMD, Pirbright, England and also to the RRL Pakchong, Thailand.

The following activities were implemented to rapidly identify FMD foci and eliminate the source of FMDV;

- √ Mandatory reporting by stakeholders of occurrence or suspicion of FMD like syndrome under Section 30 of Animal Act (Revised 2006). A penalty of Ringgit Malaysia 25,000 is served to stakeholders who did not report the incidence of FMD.
- √ Initiation of Outbreak Investigation applying epidemiology as according to SOP APVTM 22(f):1/2011.

- √ Effectively implement "Outbreak Control Management" according to SOP APTVM(16a/16b(1):2009.
    - From detection of outbreak until free from disease is verified after two incubation periods. This includes movement control, quarantine of premises affected, vaccination, disinfection and reporting.

To prevent the spread of FMDV the following activities are implemented;

- √ Management of Animal movement through e-permit which regulates the animal movement from zones of same status. The Veterinary Health Certificate is the key document for strict compliance for approval of permit.
- √ Approved Licensed Private Temporary Quarantine Stations in MTM control zone to facilitate trade. This acts as the first line of risk mitigation measure and has been successful in the reduction of FMD virus release into the country.
- √ Ring vaccination during outbreaks.

For the protection of susceptible animals, strategic vaccination at critical points, hotspots and ring vaccination during outbreaks is done. Animal owners and around their premises are mandatorily vaccinated 14 days prior to receiving new animals if the last vaccination date exceeded 5 months. Animals that are to be transferred out to another area were also vaccinated 14 days prior to movement. All animals tested positive to NSP ELISA test and resident animals from previous outbreak are not approved to move to established free areas. Historically in Malaysia cattle and to lesser extend buffaloes are the main species that are involved in the spread and outbreaks of FMD. From the total population of 263,163 cattle and buffaloes in the hotspots and movement pathways, 218,282 cattle and buffaloes were vaccinated with trivalent (O manisa, O 3039, A Malaysia 97 and Asia 1 shamir) vaccine manufactured by Merial, Pirbright, England. This accounts to 82.94% of the target population vaccinated that plays the most important role in FMD outbreaks in the country. Surveillance for the Post Vaccination Monitoring was done where 414 samples were tested using LPBE ELISA and 361 (87.19 %) samples resulted in positive protective titres.

For the coordination and advocacy activities, nationally two important committees are held as follows:

- √ Committee for National Disease Control – Chaired by the Director General of DVS. Discussions are on the Policy, Strategy effectiveness and Budget, twice a year.
- √ Sub-National Committee for Coordination and Implementation of FMD Control which meets thrice a year to evaluate the progress of control plan and discuss any constraints.

Private licensed temporary quarantine stations were established with the collaboration of livestock traders and importers for effectively facilitating trade and risk management. These quarantine stations were coordinated and regulated by Malaysian Agriculture Quarantines and Inspection Services (MAQIS) Department on livestock importation but the control of disease was under the jurisdiction of DVS Malaysia.

At Regional level, the Department attends MTM Control Zone Tri-State Meeting, Meeting of the National Coordinators and Meeting of the OIE SEACFMD Sub-Commission.

Public awareness and communication is a continuous activity. From January to August 2015 there were 71 campaigns held with a total of 2,430 stakeholder attendees.

FMD Control Plan refresher courses were held for DVS staff at the field to keep them aligned to the policies and the strategy to control, prevent and eradicated FMD. Outbreak Investigation training is planned to be held in November this year. States are kept informed of the location of outbreaks for decision making prior to allowing animal movement.

There is strong political commitment to control and eradicate FMD in the country and the Government of Malaysia has invested Ringgit Malaysia 21,397,969 (USD 6,686,865.31) for the last five years. As with other member countries of the OIE SEACFMD Campaign, Malaysia is dependent on the OIE SRR SEACFMD for it guidance and support in the control and eradication of FMD nationally and regionally.

Goals and Objectives for Control Programme

FMD is a devastating disease with great economic impact on the livestock stakeholders. This has affected the household income or the livelihood of rural farmers. Furthermore, it is also the concern of food security and food safety. Therefore, it is important that FMD be controlled and eradicated.

In light of these facts, the goal is to be free of FMD without vaccination in 2020.

Objectives of the control programme is to reduce outbreaks and progressively establish free districts in the infected zone of Peninsular Malaysia, prevent from reinfection, and maintenance of free status. The approach taken to achieve these goals and objectives will be to effectively implement the National FMD Control Plan in line with the SEACFMD Roadmap 2020.

Current PCP Status

The current FMD status is at the PCP 3 stage with efforts towards PCP stage 4 in the Phase 5 of the SEACFMD Campaign. Malaysia is submitting the dossier for the Endorsement of the National FMD Control Programme to OIE this year.

Targeted PCP Status by 2020

Malaysia targets the PCP Stage 4 by year 2018, FMD free with vaccination, and in year 2020 PCP Stage 5 FMD free without vaccination.

Proposed Plan To Achieve PCP Status

The National FMD Control Programme is developed to control and eradicate FMD in the country. A minor review to extend the year of PCP stages will be done this year and also to be aligned with the SEACFMD Roadmap 2016 – 2020.

All the control strategies underline in the control plan will be implemented such as reporting, surveillance, public awareness, laboratory diagnosis, vaccination, import control, quarantine management, disinfection and outbreak management.

The control measures mentioned above in the control of FMD are key to achieving the improved PCP status through to 2020.

Myanmar

1. Veterinary Services

The Livestock Breeding and Veterinary Department (LBVD) is one of the departments under the Ministry of Livestock, Fisheries and Rural Development. It covers activities on1) livestock production for the development of the national livestock sector, 2) animal health care and disease control. The Director-General, who oversees both activities is the Chief Veterinary Officer and Delegate to the OIE. Myanmar's Veterinary Services are highly centralized. Animal Health and Development Law has been updated to improve animal movement control within the country. The national Foot and Mouth Disease (FMD) control program has been finalized with the supported of OIE. In 2014, the Biosafety Level-2 FMD Diagnostic Laboratory was opened in Nay Pyi Taw, with the support of KOICA to strengthen FMD Diagnosis, Surveillance, Control and Prevention in Myanmar.

A PVS Gap Analysis conducted by OIE in December 2010, highlighted a number of constraints and deficiencies in the Veterinary Services, notably: 1) insufficient access of VS to a large number of smallholders in remote villages, 2) poor physical resources of the LBVD to make effective use of human resources generally of good standard and uniform across the country, and 3) a lack of proper management of veterinary public health, particularly relating to animal product food safety. Some of the points highlighted relevant to FMD control include:

1. There are inadequate veterinarians and/or veterinary paraprofessionals working with livestock smallholders, resulting in a lack of national coverage for surveillance, reporting, and animal health services delivery;
2. Laboratory diagnosis activities are affected by various constraints, such as lack of a regular budget, difficulty of sample collection from remote areas and insufficient links to the field;
3. Border control does not have the capability to capture illegal imports;
4. Surveillance and disease control activities are affected by poor linkages with the very high number of smallholders.

2. Current Status of FMD (Distribution, risks, spread)

FMD is endemic in Myanmar and has been recorded in all states and regions of the country. The outbreaks are mainly caused by serotype O but in 2005, serotype Asia 1 was reported in Kayah State and Magway Region, although it has not been identified since that time. In 2010, serotype A was reported in Rakhine State situated close to the border with Bangladesh, after its last report in 1999 in Tanintharyi Region. Serotype "O" (Mya-98) is the most commonly isolated topotype in Myanmar.

3. Control of FMD

The national Foot and Mouth Disease (FMD) control program has been finalized, with the overall objectives to: (1) establish a feasible FMD free area and gradually extend to other regions, (2) increase the productivity of the livestock production sector by implementing FMD free status in the country, and (3) increase the income, food security and quality of life of rural communities and contribute to national agriculture and livestock production. The Yangon FMD laboratory currently produces 150,000 doses of FMD monovalent vaccines (Serotype O) per year, which is insufficient to cover vaccination of FMD-susceptible animals in the country. Mass vaccination campaigns and public awareness programs, supported by the EU-HPED vaccine bank and the STANDZ SGF facility was initiated in 2012, in two townships in Sagaing Region and four townships in Tanintharyi Region, which have high densities of FMD susceptible animals. Additional mass vaccination campaigns and a Post Vaccination Monitoring (PVM) study were conducted in Sagaing Region and Mandalay Region in 2013 and 2015.

4. Goals and Objectives for the FMD control programme, including rationale and approach for these

By the SEACFMD Road Map 2020, LBVD aims to achieve FMD freedom in the Malaysia-Thailand-Myanmar (MTM) zone, in the Upper Mekong Zone and in the Rakhine Zone; FMD freedom in Sagaing and Mandalay Regions, where the mass vaccination program has been conducted in 2015. From these zones, FMD freedom will progressively be extended to the whole country.

5. Current PCP Status

The current FMD status is at PCP Stage 1.

6. Targeted PCP Status by 2020

By 2020, the targeted FMD status will beat PCP Stage 4.

7. Proposed plan to achieve this targeted status

For the proper implementation of national FMD Control program to achieve targeted PCP Stage, national FMD Control Activities Workshop will be conducted including key person from the FMD endemic areas. Mass Vaccination Campaign will be extended from the previous area to whole country supported by OIE. In case of FMD outbreak, outbreak investigation is conducted in a timely manner, and the origin of the disease is traced back and outbreak containment is conducted promptly. FMD diagnosis capacity, surveillance, animal identification and animal movement control will be strengthened to achieve the targeted PCP.

Philippines

The Bureau of Animal Industry (BAI) is the lead animal health agency of the Philippines. The BAI is under the umbrella of the Department of Agriculture (DA) and it is composed of six divisions with specific duties and functions. BAI has technical supervision over the veterinary services of the Department of Agriculture Regional Field Offices (DARFOs). Under the DA, there are Provincial Agriculture Offices (PAO) and Municipal Agriculture Offices (MAOs) which take on some veterinary services also. The responsibilities of each division are as follows:

- **Animal Feeds, Veterinary Drugs and Biologics Control Division**:
  Regulates animal feeds, feed ingredients and veterinary drugs/products;
- **Animal Health & Welfare Division**:
  Prevents, controls, and eradicates priority animal diseases; Regulates the local movement of animals and animal products; Implements the Animal Welfare Act;
- **Veterinary Laboratory Division:**
  Provides laboratory support to other divisions through production of biologics and pharmaceuticals, quality control testing, feeds and feed stuff analyses and drug assay. Provides diagnostic laboratory services and conducts animal health researches and supports disease surveillance;
- **Livestock Research & Development Division:**
  Formulates long and short-term programs on production, acquisition, distribution and marketing of improved breeds of livestock. Research management and Technology packaging and transfer;
- **National Veterinary Quarantine Services Division:**
  Regulates the international and local movement of animals, Services and animal products through the issuance of Veterinary Quarantine Clearance and other permits;
- **Research and Development Centers:**
  Conduct research on animal health, breeding, nutrition, production and management as well as the processing and utilization of feeds, forage and pasture resources;

Apart from the BAI, the National Meat Inspection Service (NMIS) is also responsible for veterinary public health issues. The NMIS is an attached agency under the DA and its scope for public health is limited to meat and meat products. The agency promulgates and implements policies,

procedures, guidelines, rules and regulations governing post production flow of livestock and meat and meat products (both locally produced and imported) through the various stages of marketing and proper handling, inspection, processing storage and preservation of such products. The NMIS coordinates with the BAI in the volume of meat and meat products importation, policy making, inspection of cold storage warehouses, and evaluation of livestock/meat establishments for imported commodities to the Philippines.

The FMD virus serotype O Cathay topotype was first detected in August 1994 in a backyard piggery in Rizal province. It later caused a major outbreak spreading to 27 provinces in Luzon Island in 1995.

Evidence shows that serotype O Cathay topotype was the only remaining FMD virus strain circulating in Luzon after 1995. From 1999 to 2005, all of the epithelial samples from suspected and confirmed outbreaks that were tested in the National FMD Diagnostic Laboratory were confirmed as serotype O. Samples were also sent to the World Reference Laboratory in Pirbright for confirmation.

The Philippine National FMD Task Force applied a progressive zoning approach for FMD control and eradication by classifying different regions based on their FMD status. The following are the dates of the last outbreak and vaccination in each zone and corresponding year of OIE recognition:

Zone 1 (North Luzon) & Zone 3 (South Luzon)

- Last outbreak: April 2005 (Zone 1), April 2003 (Zone 3)
- Last date of vaccination:
  Zone 1- Progressive withdrawal of vaccination started in 2003 with most provinces stopping vaccination; its last province ceased vaccination in 2006. A stamping out policy in case of isolated FMD cases was implemented since 2003.
  Zone 3- Ceased vaccination in 2004 with provision to stamp out in case of isolated FMD cases
- Recognized by the OIE as FMD-Free Zone without Vaccination in 2010

Zone 2 (Mid Luzon)

- Last outbreak: December 2005
- Last date of vaccination: progressive withdrawal started in 2007 with less than 10% of the population vaccinated. In 2009, with less than 1% being vaccinated, the government imposed a no vaccination policy in July 2009. Based on information and documents provided for by the farmers, the last date of vaccination was in August 2009.
- Recognized by the OIE as FMD-Free Zone without Vaccination in 2011

Zone Visayas, Palawan and Masbate

- Last outbreak: September 1999 in Visayas, Masbate in 1979 while Palawan is historically free
- Last date of vaccination: Visayas in December 1998, Masbate in 1986
- Recognized by the OIE as FMD-Free Zone without Vaccination in 2002

Zone Mindanao

- Last outbreak: South Cotabato in 1987
- Last date of vaccination: South Cotabato in 1990
- Recognized by the OIE as FMD-Free Zone without Vaccination in 2001

Since 2008, no vaccination has been conducted in ruminants (MO No. 4 Series of 2008) and in 30 June 2009, there was a total withdrawal of vaccination in swine, the remaining susceptible species (AO No. 12 Series of 2009). The last recorded outbreak in the country was on 28 December 2005 in Quezon Province and was of the Type O Cathay topotype.

The Philippines applied for OIE Recognition in September 2014 as FMD-free country without practicing vaccination and was bestowed a certificate of freedom recognition during the 83rd General Assembly of OIE Delegates on May 28, 2015 in Paris, France.

The Philippines is determined to remain FMD-free amidst the present threats and dangers of FMD incursion brought about by innovations and the impending ASEAN integration with its corresponding free flow of goods and trade. Animal quarantine or movement management is one of the basic components of the FMD program and to further strengthen the quarantine functions, the Bureau of Animal Industry is in the process of hiring additional manpower to guard the major seaports, airports and crucial checkpoints in the land. Regular serological surveillance and clinical surveillance (composed of negative monitoring, checkpoint monitoring and slaughter house monitoring) as well as implementation of strict biosecurity measures throughout the country are also strategies currently employed to substantiate freedom from the disease.

An FMD Emergency Preparedness Plan Manual and Veterinary Quarantine Directory Cards have been disseminated to the local government offices to guide frontline staff in the event of an incursion. A series of Tabletop Simulation Exercises covering regional, provincial, city and municipal veterinarians, livestock inspectors and agricultural technicians are also being conducted to assess and gauge the level of preparedness at different levels. These simulation exercises are coupled with lectures on basic disease recognition, sample collection techniques and FMD preparedness protocols that are relevant to review and update the knowledge of the participants.

In the event of an FMD incursion, there is a systematic protocol that will be followed as to the immediate destruction and disposal of affected/suspected animals, establishment of animal checkpoints between villages, intensive serological surveillance of all susceptible animals, disinfection of facilities, emergency vaccination utilizing the 100,000 doses of O1 Manisa vaccines maintained by the Government, and conduct of intensified public awareness campaigns. Indemnification to the affected farmers and operational costs of eradication will also be charged to the Government's emergency fund allocation.

Singapore

Singapore remains as an FMD free country where vaccination is not practised. This summary paper provides a background on the veterinary services, current risks of FMD and the prevention of FMD in Singapore.

1. CURRENT VETERINARY SERVICES

1.1 The Agri-Food and Veterinary Authority of Singapore (AVA) is the competent veterinary authority in Singapore, having the mission to ensure the health and welfare of animals, ensure safe food and facilitate agri-trade. The AVA takes reference from the standards recommended in the *OIE Terrestrial Animal and Aquatic Animal Health Codes and the Manual for Diagnostic Tests in Terrestrial and Aquatic Animals.*

1.2 The Veterinary Services in Singapore is empowered by eight key Statutes. They are the Agri-Food and Veterinary Authority Act, the Animals and Birds Act, Endangered Species (Import and Export) Act, the Feeding Stuffs Act, Fisheries Act, the Sale of Food Act, the Wholesome Meat and Fish Act, the Wild Animals and Birds Act, and their subsidiary legislations. Full copies of the legislation can be found at: http://www.ava.gov.sg/legislation.

1.3 FMD is gazetted as a notifiable disease under the Animals and Birds Act (CAP 7), which provides the legislative powers to prevent the incursion and spread of animal diseases, and to control the movement of animals into, within and from Singapore. Under the act, any person must report any suspicion or positive detection of FMD to AVA immediately. Those who fail to report FMD may be subjected to prosecution liable to a fine and imprisonment upon conviction.

2. HISTORY OF FMD IN SINGAPORE

2.1 Currently, Singapore is recognised by the OIE as an “FMD free country where vaccination is not practised”. The last case of FMD in Singapore was detected in 1935. No outbreak of FMD has occurred in domestic and wild animals since then.

2.2 Due to limited land for farming, the local livestock industry is small. There are only three dairy cattle farms, one goat farm, and a zoological collection. The low livestock population coupled with the free status and stringent import control measures are factors in our favour to maintain FMD free status.

2.3 There are still many countries in the South-East Asian region and many parts of the world where FMD remains endemic. Therefore, there is a need to control the risks of FMD incursion through stringent import control measures and local surveillance.

3. CURRENT RISKS OF FMD

3.1 Although Singapore has been free of FMD since 1935, the possibility of the introduction of FMD is still real and is taken very seriously by AVA.

Possible incursion of FMD through import of live pigs

3.2 FMD virus may be introduced into Singapore through the import of infected pigs. However, this presents a low risk as the infected animals will most likely be detected before export to Singapore. Singapore presently imports its only source of live pigs from Pulau Bulan which is an Indonesian island 35 km south of Singapore. AVA works closely with our counterpart veterinary authority in Indonesia (DGLAHS) and conducts regular inspections and audits on the farm. These measures greatly mitigate the risk of FMD incursion through import of live pigs.

Possible incursion of FMD through smuggling of meat products

3.3 Smuggling of FMD-infected meat products (meat, offal or milk) into Singapore is a possible scenario where FMD may be introduced into the city state. Consignments entering Singapore are subject to control by AVA and the Immigration and Checkpoints Authority (ICA) at the point of entry. ICA mans these entry ports round the clock and officers ensure that all consignments come with the proper documents. Singapore has in place standard operating procedures with ICA to deal with illegal import of commodities. The procedures involve detention of suspect consignments and investigation proceedings. Heavy penalties including fines and imprisonment can be imposed for smuggling of animals and animal products into Singapore.

Possible incursion of FMD through fomites

3.4 People may act as mechanical vectors for FMD virus, by carrying the virus on clothing or skin and spreading to susceptible animals locally. This usually involves occupations who are in close contact with animals. Hence, AVA actively engages local farmers to ensure that biosecurity protocols, sanitary facilities and good compliance with personal hygiene are implemented on all farm premises.

Infection of local wild boar population and subsequent spread to ruminants

3.5 The high level of transmissibility of the FMD virus makes the spread of FMD by feral animals, especially wild boars, in Singapore a potential risk of disease incursion. As Singapore's rural-urban interface grows, wild animals come into closer contact with the public. To avert the establishment of FMD and other diseases in Singapore, feeding of food scraps or refuse to wild animals (including wild pigs) is prohibited under the Parks and Trees Act (section 9). As local and imported animals are naïve and not vaccinated against FMD, an outbreak of FMD could cause high morbidity and can be effectively picked up through clinical surveillance. AVA conducts regular targeted surveillance for FMD in wild boars and local ruminant farms.

4. FMD PREVENTION AND PREPAREDNESS PROGRAMME

FMD Prevention Programme

4.1 Having in place accreditation and import control programmes that are based on science and a risk-based approach, and, only allowing the importation of meat and meat products from FMD-free countries or regions are part of the major strategies to maintain the country FMD free status.

4.2 Routine surveillance activities are carried out by AVA on the local farms through active serological and clinical surveillance. Testing of the serological and clinical samples is supported by AVA Animal Health Laboratory (AHL) which provides FMD diagnostic test capabilities using OIE recognised methods.

4.3 Through regular meetings and dialogue sessions, AVA actively engages relevant stakeholders such as local farms, meat traders and the zoo to create awareness and stress the importance and impact of FMD.

4.4 A contingency plan is in place to address measures to be taken for FMD outbreaks in farms. This plan is regularly reviewed in discussions with stakeholders.

Objectives and Priorities

4.5 The many strategies implemented in Singapore's FMD prevention programme aims to prevent the introduction of FMD into Singapore and maintain our FMD-free status. In an event of a FMD outbreak, these policies can promptly and swiftly provide solutions for Singapore to eradicate FMD and regain freedom.

4.6 Singapore has identified several capacity building activities as one of the core priorities to attain this objective. They are:

i. Training AVA officers and management in FMD outbreak investigation
ii. Application of OIE standards for FMD surveillance

Rationale

4.7 As the statutory board under the Ministry of National Development, AVA is the national authority to oversee animal health and safeguard Singapore against exotic animal diseases, including FMD. By maintaining a FMD-free classification for Singapore, AVA is also fulfilling its core mission to facilitate agriculture-trade.

5. FUTURE ACTIVITIES

5.1 AVA will continue to work with relevant stakeholders to enhance existing disease surveillance programmes. It will also take on more capacity building activities to increase the robustness of the FMD prevention programme and keeping abreast of new scientific developments.

Kingdom of Thailand

Veterinary Services

The Department of Livestock Development (DLD) was founded by the Royal Decree of on 5 May 1942. It is an executive agency which is under supervision of the Ministry of Agriculture and Cooperatives. The DLD is the National Veterinary Authority of Thailand and is responsible for promoting animal health, animal production and livestock extension, food safety of animal-derived products, and international animal health matters including disease control and eradication, quarantine, disease reporting, import-export controls, health certification, and monitoring of animal farms, slaughterhouses, and processing plants.

DLD requested for the PVS Evaluation mission in 2012 and the PVS Gap Analysis in 2014 in order to evaluate and identify gaps of VS capabilities within the context of internationally agreed criteria set out in the OIE Terrestrial Animal Health Code (Chapters 3.1 and 3.2), using the OIE PVS tool. The PVS evaluation mission was conducted from 15th March 2012 to 30th March 2012 by a team made up of three independent technical experts and one OIE observer, all approved and selected by the OIE. Then the PVS Gap Analysis mission was conducted from 7th – 16th January 2015 by the OIE experts.

The DLD of the Ministry of Agriculture and Cooperatives (MOAC) of Thailand has as one of its priorities, amongst other tasks, to facilitate the ongoing and improved access to international markets for animals and animal products. Thailand's decision to request an OIE PVS evaluation is therefore an important step towards this goal, measuring current performance with an independent, objective, external evaluation. This information, especially if it is partnered with a subsequent OIE PVS Gap Analysis mission (as the next step along the PVS Pathway), can feed into VS strategic planning, investment and implementation to better meet national livestock priorities, including for trade.

The National FMD Control Plan is one of the key priorities and government commitments to eradicating FMD. Thailand has invested and afforded their resources to control and eradicate FMD in Thailand and the Southeast Asian region as a whole. Thailand has participated in SEACFMD campaign jointly supported by OIE.

Current Status of FMD (Distribution, risks, spread)

Foot and Mouth disease (FMD) is considered as the most contagious disease in livestock. Domestic livestock raised in Thailand still encounter this problem. The economic consequences due to FMD are significant, especially having adverse socio-economic effects on farmer's livelihood. It is also a major constraint for international trade. FMD outbreaks occur in all part of Thailand except the eastern region. Currently the status of FMD in Thailand and contiguous border countries could be called endemic except in the FMD free zone established in the eastern region of Thailand.

The FMD outbreaks mainly occur in cattle, and mostly in the central part of Thailand. These outbreaks relate with the north-west and the north of Thailand according to the route of animal movement and trade. FMD viruses isolated from these outbreaks have been serotypes O and A. The Asia 1 serotype was last isolated in 1997. However, the potential recurrence of this type needs to be closely monitored. From disease investigations, animal movement and fomites have been a major factor associated with the occurrences.

Control of FMD

Vaccination and animal movement management are the main FMD control strategies of Thailand, however other measures should not be diminished. DLD has established National FMD strategic plans 2008-2015 and 2016-2023 to use as a framework for control and eradication of FMD in Thailand. These plans include activities that are harmonized with the SEACFMD campaign and its Roadmap 2020, towards achieving FMD freedom with vaccination. The strategic plan comprises 8 components for FMD control which are resource management, legislation, disease surveillance and control, development of animal raising and related industry, public relation and warning system, research and technology development, international collaboration, and monitoring and evaluation. Thailand, via DLD, drafted a new strategy called National Foot and Mouth Disease Strategic Plan of Thailand in 2016-2023. This strategic plan continues from the last plan (2008-2015) and includes a SWOT Analysis by considering the up-to-date situation of livestock husbandry system and its trend in Thailand and Southeast Asia Region.

Goals and Objectives for a control programme, including rationale and approach for these

The vision of the plan is "Thailand is free from FMD by 2023 and is a leader in Southeast Asia region in FMD control". Through application of Thailand's Plan, and application to OIE, it is expected that Thailand will achieve OIE endorsement of Thailand as (1) "FMD free zone with vaccination" for the eastern region, (2) "FMD free zone with or without vaccination" for other regions and (3) progressively as a "FMD free country with vaccination". The objectives of the control programme are the following:

1. To prevent, control and eradicate FMD from Thailand.
2. To establish progressive FMD free zones with official recognition from OIE.
3. To support exportation of livestock and livestock product to global markets.

Goals of this programme are:

1. Thailand has no spread of FMD in standard pig farms by 2018 and in small pig farms by 2020.
2. Thailand has no spread of FMD in cattle, buffaloes, goat and sheep by 2020.
3. Thailand has no incidence of FMD by 2023

- Region 2 (Eastern) is free from FMD by 2016
- Region 8 and 9 (Southern) have no incidence of FMD by 2019
- Region 3 and 4 (Northeastern) have no incidence of FMD by 2020
- Region 1, 5, 6 and 7 (Central, Northern and Western) have no incidence of FMD by 2022.

Current PCP Status

With FAO and OIE collaboration, Thailand did a self-evaluation in July 2013 for the Progressive Control Pathway (PCP) stage for FMD control within the country and all livestock regions. The results showed that Thailand made progress in three of the five progressive stage. It means that the country now understands the FMD outbreak situation and knows the risk factors for the disease in the country, and is currently at Stage 3 of the FMD PCP.

Targeted PCP Status by 2020

The aim is that FMD outbreaks are greatly reduced and a zone in Thailand has had no incidence of FMD. To leverage progression to level 4 and 5 in the future, Thailand will need to focus on the social and economic impact of the disease, risk factors of supply chain information, risk factors of social networks in the production and trading of animals, options to manage the risk of disease, analysis of outbreak investigations to know the source of the disease, enhancement of understanding between farmers and officers, public relations and establish a collaborative network to further control the disease.

The Working Group for drafting the National Foot and Mouth Disease Strategic Plan of Thailand in 2016-2023 reviewed and reset the goal in 2015. The target area and PCP stage goal are concluded in the table below.

Timeline for transition along the Progressive Control Pathway of Foot and Mouth Disease in Thailand

Target area	Current PCP stage	PCP stage goal	Year goal
Region 2 (Eastern)	4	4 (with OIE endorsement)	2016
Region 8 and 9 (Southern)	3	5	2019
Region 3 and 4 (North-eastern)	3	4	2020
Region 1, 5, 6 and 7 (Central, Northern and Western)	3	4	2022
Thailand (whole country)	3	4	2023

Proposed plan to achieve this targeted status

As the PCP evaluation, Thailand made progress in three of the five progressive stage. The country now understands the outbreak of FMD and knows risk factors for the disease in the country as well. FMD outbreak was greatly reduced and a zone, eastern region, in Thailand has had no incidence of FMD by our progressive control program. Thai government encourages FMD control as always in term of political and financial support. Thailand hopes to gain the free status for eastern region from the OIE in year 2016, plans to have no spread of FMD in all production types of susceptible animal by 2020, plans to progressively eradicate FMD in all zones by 2023, and becomes increasingly competitive in international markets in the very near future.

Vietnam

1. Veterinary Services

Vietnam's Veterinary Service is one of the earliest bodies established by the Ministry of Agriculture and Rural Development with initial roles of monitoring and controlling diseases of livestock and poultry. Along with the upward trend of the society, Vietnam's Veterinary Service also has undergone dramatic change, especially in recent years to meet the higher demands placed upon it. Today, the veterinary services not only ensure the role of monitoring and control of diseases of livestock and poultry, but also take more responsibility for disease control such as control of aquatic diseases, food safety, transport, animal slaughter and processing of animal products, as well as the management of drug and biological products for veterinary use. With such a range of duties, in recent years the Veterinary Services have received much attention by the Government, with many investments in facilities and human resources especially after the outbreaks of Foot and Mouth Disease in cattle in 1998 and the first avian influenza outbreak in Vietnam in 2003. With efforts and comprehensive change, Vietnam's Veterinary Services has made significant progress despite encountering many difficulties and problems.

Currently, the organizational structure of the state management in veterinary services at central level is the Department of Animal Health (DAH) under the Ministry of Agriculture and Rural Development, including ten divisions, seven Regional Animal Health Offices (RAHO) and three Regional Animal Quarantine Sub-Departments (RAQS). In addition, there are specialized centers (National Center for Veterinary Diagnosis- NCVD, National Center for Veterinary Hygiene Inspection No.I and II, National Center for Veterinary Medicine Control No. I and II) to support professional operations in the state management of DAH.

Also, to meet the requirements of international integration and circulation in the region, DAH has an international border gate animal quarantine station system responsible for border quarantine and inspection of imported and exported animals and animal products. The system of focal animal quarantine stations, which have been established at key traffic hubs, contribute significantly to preventing the spread of disease due to inland transportation.

At the local level, the system of veterinary services are relatively complete, all 63 provinces have their own provincial veterinary service (Sub-Department of Animal Health) subordinated to the Department of Agriculture and Rural Development (DARD).

The system of legal documents on the Veterinary Service of Vietnam is currently built on the basis of the Veterinary Ordinance promulgated in 1993. This will be replaced by the Veterinary Law in 2015 (effectively from 01 July 2016) which created the legal framework for animal health activities. The system of legal documents on animal health has been amended, complemented and improved in accordance with the new legislation promulgated by the State in recent years as the Law on Food Safety Act (2010), Law on Product and Goods Quality (2007), Law on Standards and technical regulations (2006) to ensure the integrity of the legal system.

2. Current Status of FMD (Distribution, risks, spread)

In 2014, there were 63 FMD outbreaks reported in Viet Nam, and 11 outbreaks reported from January to June 2015.Both serotype O and serotype A FMDV have been recovered from these outbreaks. Sequencing analyses of FMDV show that serotype O isolates belongs to the PanAsia and Mya-98 strains, while serotype A belongs to Sea-97 strain.

3. Control of FMD

Based on factors such as the epidemiological situation, geography, husbandry practices, socio-economic factors, the ability and financial capacity and disease control targets, in the last 5 years, Viet Nam has implemented an FMD control program by three zones (control, buffer, and low risk zones).

In order to control and eliminate the disease in zones, the country has adapted an integrated control programme using the combination of measures best suited to the existing situation. This includes vaccination, disinfection, movement control and modified stamping out.

FMD vaccination has been applied for cattle and buffalo in control and buffer zones. For other animals, vaccination can be applied at the livestock owners' expenses. Based on the evidence from the investigation of FMD outbreaks in recent years, bivalent vaccine (type O&A) has been used for areas where type A FMDV has been identified, while monovalent vaccine (type O) is used for areas where only type O FMDV has been identified.

4. Goals and Objectives for a control programme, including rationale and approach for these

After ten years of implementation of national FMD control programmes (2006 – 2010 and 2011 – 2015), many provinces throughout the country have successfully controlled the disease, thereby supporting development of the livestock sector. The disease has been gradually reduced each year, with no large scale spread of the virus, confirming that the approach taken for prevention and management of FMD has been effective. Vaccination coverage has been increased for cattle. When FMD outbreaks occur, most provinces have been demonstrated early detection and timely control of the disease. Therefore, the disease has occurred only in small areas and has not spread widely, unlike in previous years when the national program had not been in place. Effective implementation of program measures has contributed actively to the control and prevention of FMD in recent years.

Based on results from previous experiences and results of national FMD control programmes, Viet Nam is developing the national FMD Control Plan for 2016 – 2020. This Plan will extend the previous Plans, with the overall objective to successfully control of FMD, and establish at least one FMD free zone by 2020.

5. Current PCP Status

Vietnam has just completed PCP stage 2, and the country is now entering stage 3.

6. Targeted PCP Status by 2020

By 2020, the targeted FMD status will be at the end of PCP stage 3.

7. Proposed plan to achieve this targeted status

The National FMD Control and Prevention programme for 2016 - 2020 has clarified the objectives of FMD prevention and control by 2020, with a roadmap and strategy to achieve this targeted FMD status. Technical measures include zoning, establishment of disease free zones, vaccination, movement control (including animal ID/traceability system), veterinary hygiene and inspection, disease surveillance, management of FMD outbreaks, communication/awareness.

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C/O DLD, 69/1 Phaya Thai Road • Ratchathewi 10400 • Bangkok • Thailand • tel. +66 2 653 4864 • fax. +66 2 653 4904
www.oie.int | www.rr-asia.oie.int | srr.seasia@oie.int