



**WORLD ORGANISATION FOR ANIMAL HEALTH**  
*Protecting animals, preserving our future*

# SEACFMD Bulletin

Foot and Mouth Disease Situation  
January to December 2015



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## 1. Introduction

### 1.1 Aims

Foot and mouth disease (FMD) is one of the most ubiquitous and contagious transboundary animal diseases. Its transboundary nature is becoming increasingly important because of the rapid development of international trade in animals and animal products and the increase of people movements worldwide. Countries and regions that are free of FMD are continuously threatened by the presence of the disease elsewhere. Surveillance for FMD is critical to identify the current hazards and to predict heightened risk and finally to control and eradicate the disease. This requires sustained effort directed towards the monitoring of FMD, along with collection and characterisation of foot and mouth disease virus (FMDV) and integration of findings with associated epidemiological intelligence. This report will present a synopsis of information regarding the distribution of the different serotypes and variants of FMDVs as compiled in 2015 and the associated activities of the South-East Asia and China FMD programme (SEACFMD) vaccination campaign.

### 1.2 Reporting period

1<sup>st</sup> January 2015 - 31<sup>st</sup> December 2015

### 1.3 Data source

Sources of the information in this report include data from OIE animal disease database WAHID and ASEAN Regional Animal Health Information System (ARAHIS), OIE/FAO official reports and presentations, as well as reports and presentations from the World Reference Laboratory (WRL) and Regional Reference Laboratory (RRL) for FMD.

## 2. Outbreaks of FMD in SEACFMD Countries in 2015

### 2.1 Overview of the regional situation in 2015

In 2015, FMD outbreaks have continued to affect traditionally endemic countries (China, Myanmar, Lao PDR, Viet Nam Thailand, Cambodia, and peninsula Malaysia) (Figure 1). A total of 256 FMD outbreaks were reported in mainland South-East Asia (SEA) and China and more than 10<sup>4</sup> animals were affected. Vietnam reported the most FMD cases, whilst China and Malaysia reported the least. Cattle were the main affected animal, followed by buffalo, pig and goat (Figure 2). The majority cases occurred in October and November, which accounted for 34% of the total outbreaks (Figure 3). Samples for virus identification were collected in 156 cases, and a total of 144 viruses were recovered. Of these, 78% tested positive to serotype O, while 22% positive to serotype A.

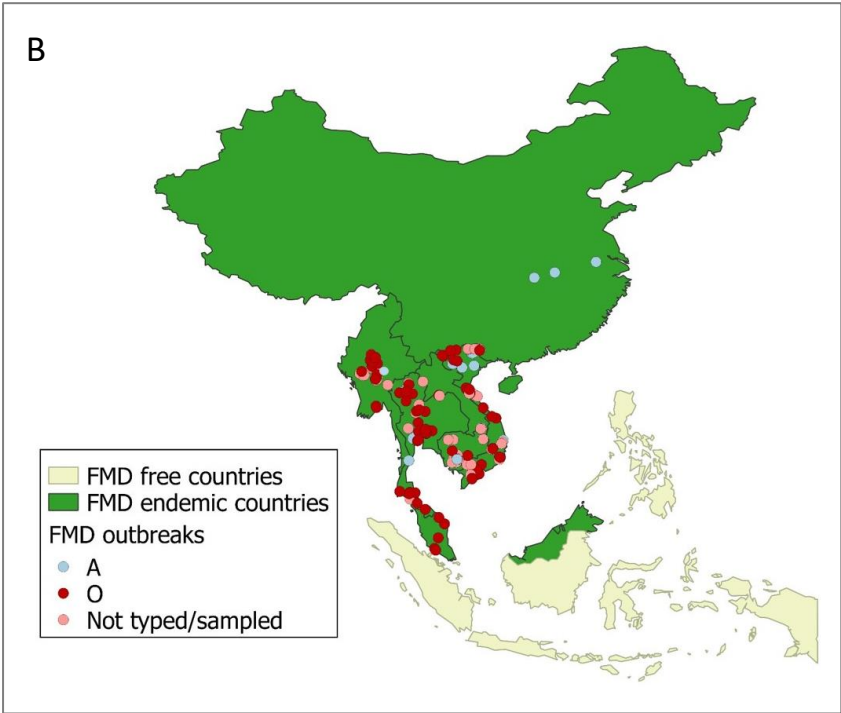
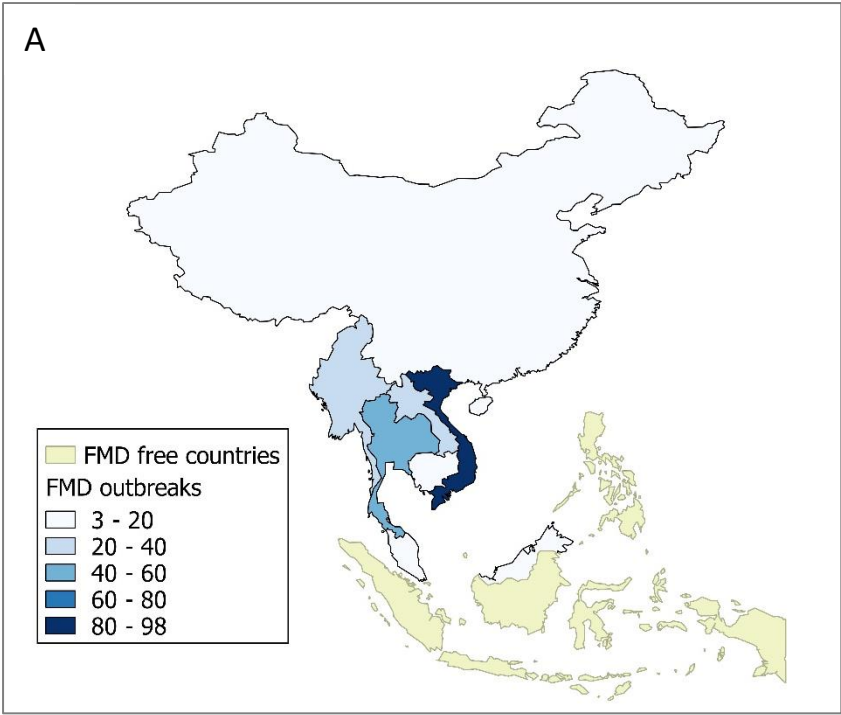


Figure 1. FMD outbreaks distribution in SEACFMD countries, 2015

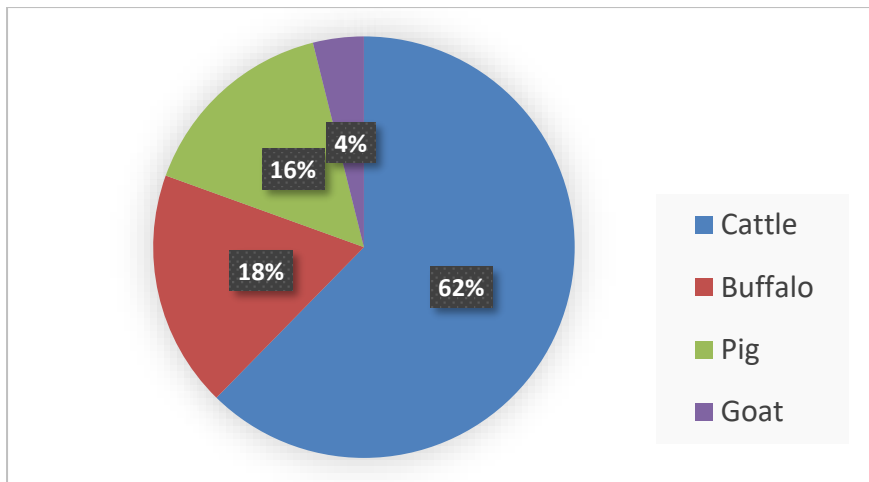


Figure 2. Distribution of FMD outbreaks in different animal species, 2015.

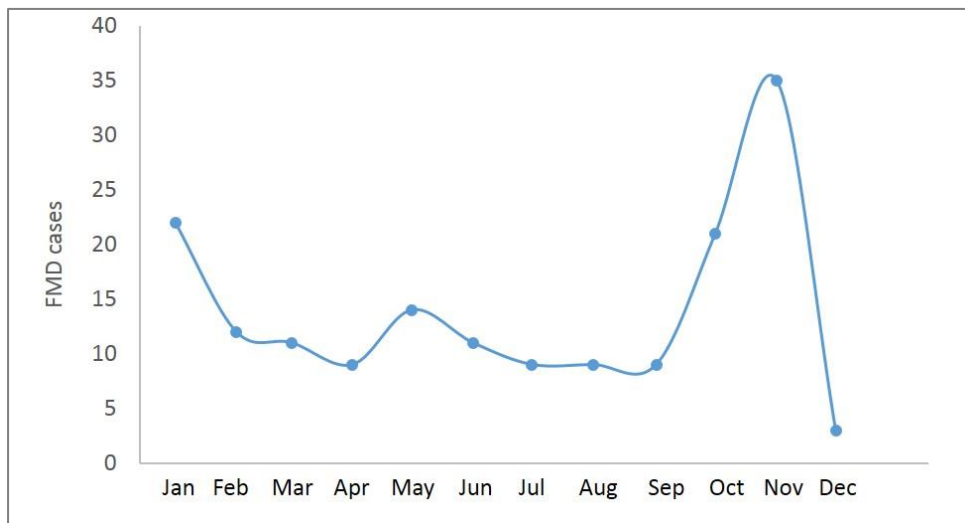


Figure 3. Monthly distribution of FMD outbreaks in SEACFMD countries, 2015

## 2.2 FMD situation in SEACFMD countries

*The Philippines, Indonesia, Singapore, and Brunei Darussalam* did not report any FMD cases in 2015 and maintain their official status of FMD free without vaccination.

### *China*

In 2015, China reported three FMD outbreaks in cattle or pigs (Figure 4). The two affected provinces were Anhui and Hubei, and all infections were due to serotype A viruses.



Figure 4. FMD outbreaks in China, 2015

### Myanmar

By the end of September 2015 Myanmar has reported 39 FMD cases in Central Myanmar (Mandalay, Sagaing, Magwe and Naypyitaw) and Yangon, all in cattle (Figure 5). Of these, 22 cases were caused by serotype O viruses and 3 cases were caused by serotype A viruses. Outbreak investigations are still ongoing and the disease status will be updated in the next issue.

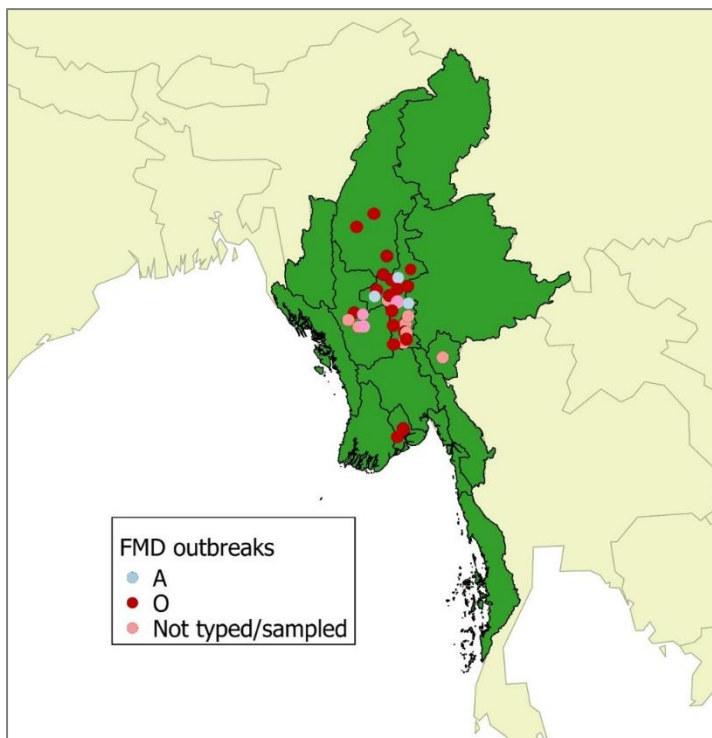


Figure 5. FMD outbreaks in Myanmar, 2015

### Lao PDR

Lao PDR has reported 33 FMD outbreaks by the end of June 2015, which were almost equally distributed in cattle, buffalo, goats and pigs (Figure 6). All cases were restricted to Attapeu and Vientiane provinces. Serotype A virus was identified from only one case, whilst serotype O viruses were isolated from eight cases.

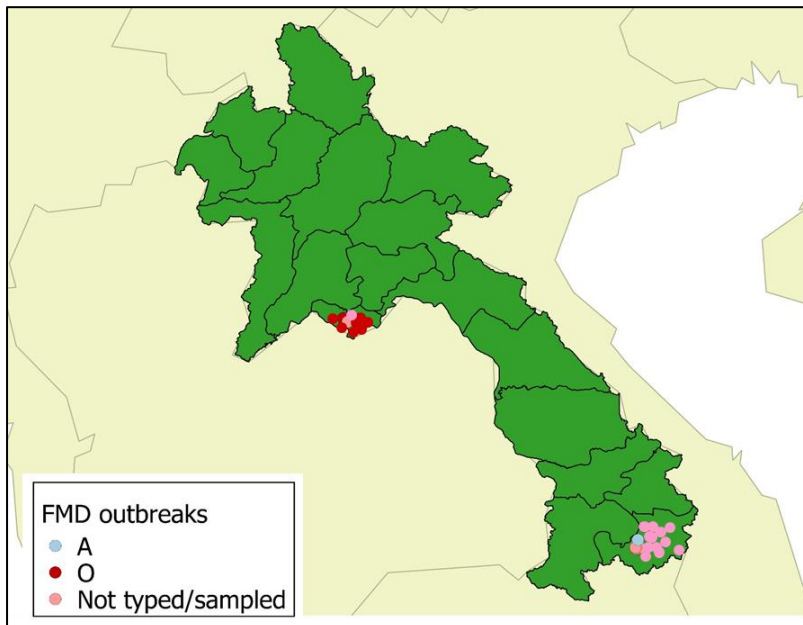


Figure 6. FMD outbreaks in Lao PDR, 2015

### Viet Nam

Viet Nam reported 98 FMD outbreaks that were throughout the country. Infections include 45 cases in cattle, 28 cases in buffalo, 24 cases in pigs, and 1 case in goats (Figure 7). Fifteen cases were due to serotype A viruses and 36 were caused by serotype O viruses.

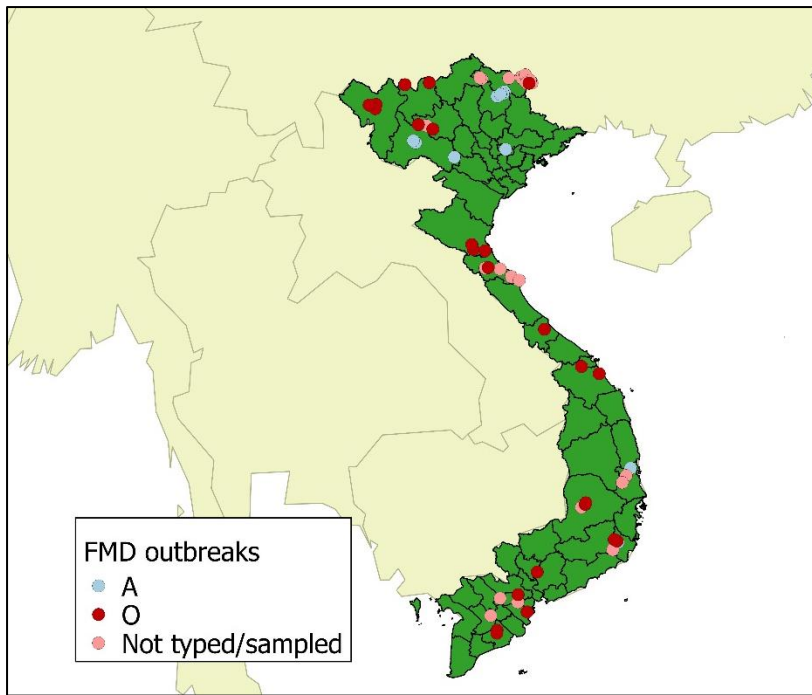


Figure 7. FMD outbreaks in Viet Nam, 2015

*Thailand*

Thailand reported 56 FMD cases that were throughout the country (Figure 8). Affected animals include cattle (51 cases), buffalo (4 cases), and pigs (1 case). A total of 7 serotype A and 40 serotype O viruses were identified.

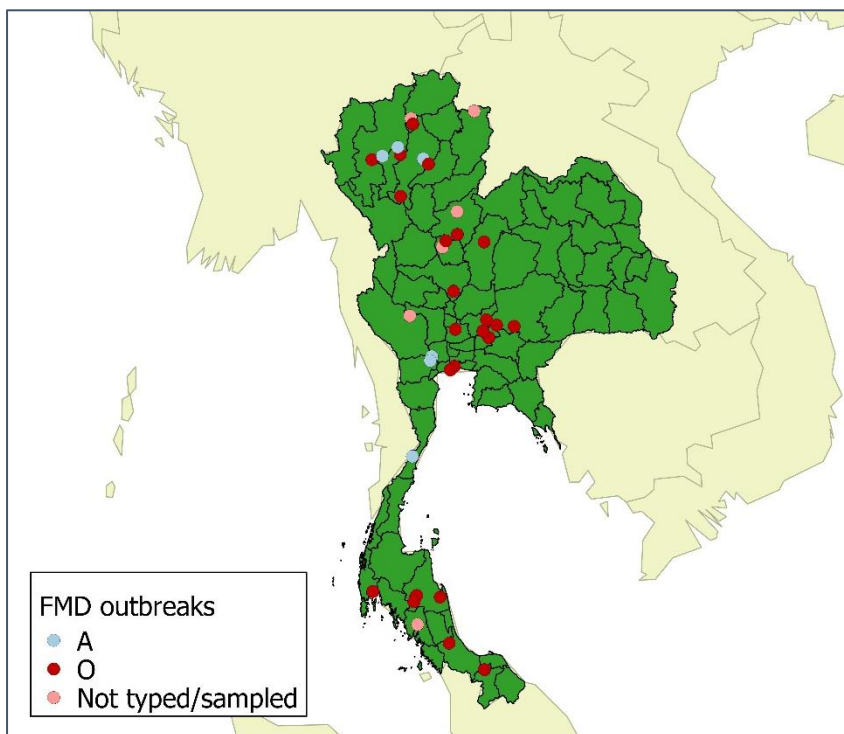


Figure 8. FMD outbreaks in Thailand, 2015



### *Cambodia*

Cambodia reported 19 FMD cases and almost half of its provinces were involved (Figure 9). Infections include 16 cases in cattle, 2 cases in buffalo, and 1 case in pigs. Up to date, 2 serotype A and 2 serotype O viruses have been identified. Virus serotyping and genotyping is still ongoing in collaboration with RRL Pakchong and WRL, and the results will be updated in the next issue.

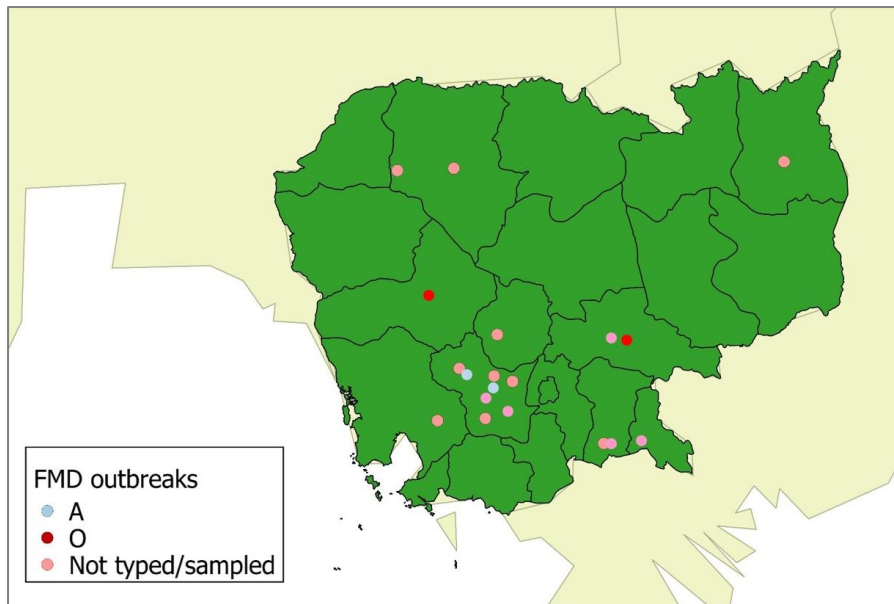


Figure 9. FMD outbreaks in Cambodia, 2015

### *Malaysia*

Malaysia has reported five FMD cases in the peninsular part, which all occurred in cattle and were caused by serotype O viruses (Figure 10).

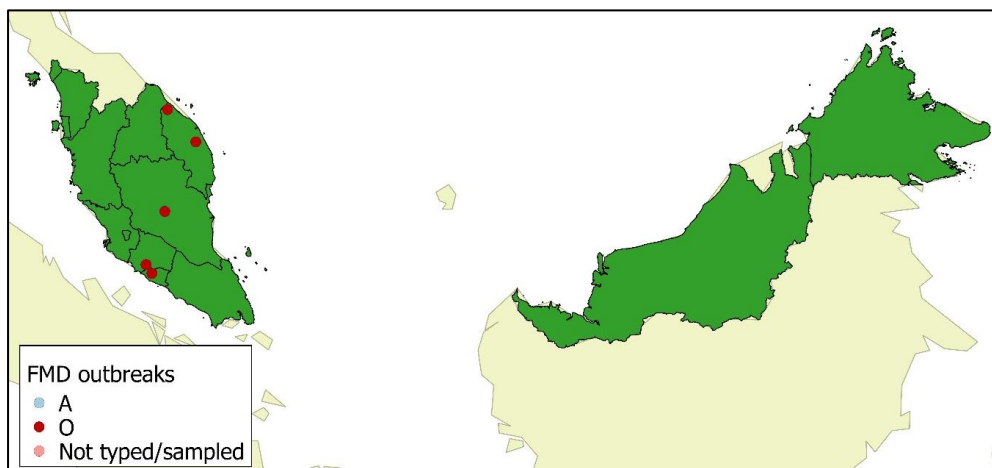


Figure 10. FMD outbreaks in Malaysia, 2015

### 3. Characterisation of FMDVs in SEACFMD Countries in 2015

Only serotype A and O FMDVs have been found in SEA and China in 2015. A selection of FMD samples have been submitted to and characterized in RRL and WRL (Table 1). Based on the current available VP1 sequence data, circulating FMD viral lineages in mainland SEA and China include:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/ME-SA/Ind-2001d
- Serotype A: A/ASIA/Sea-97

Table 1. Samples submitted to RRL/WRL for laboratory characterization.

Country	Virus isolation & Antigen ELISA typing					VP1 Sequencing	
	Total samples	Serotype O	Serotype A	Serotype Asia 1	NVD	Serotype O	Serotype A
China	3	0	3	0	0	0	3
Thailand	263	160	27	0	76	20	5
Lao PDR	15	6	5	0	4	7	3
Vietnam	20	1	19	0	0	1	19
Cambodia	19	2	2	0	15	2	2
Myanmar	40	24	3	0	13	1	0
Malaysia	5	5	0	0	0	5	0

Genetic analysis of viral VP1 shows all serotype O viruses from Thailand, Myanmar and Vietnam belong to O/SEA/Mya-98 lineage, whilst serotype O viruses from Lao PDR and Cambodia have been characterised as either O/SEA/Mya-98, or ME-SA isolates. Different from Cambodia's ME-SA isolates that are PanAsia strains, ME-SA isolates from Lao PDR are classified as Ind-2001d strains and show a very close relationship (>98% nucleotide sequence identity in VP1) with current endemic viruses from Southern Asia. This is an indication of a new introduction of FMDV from South Asia, and the extent to which those viruses have spread in SEA countries deserves further investigations.

All serotype A viruses isolated in SEA and China belong to the A/Asia/Sea-97 lineage. Importantly, genetic analysis of the VP1 genes shows all three A viruses from China belong to the SEA G2 clade but not China's local G1 clade. This is not unprecedented, as serotype Asia 1 and O FMDVs endemic to SEA have also been found to cause outbreaks in China in 2006 and 2003, respectively.

### 4. SEACFMD Vaccination Campaigns

In 2015, SEACFMD implemented FMD vaccination campaigns in selected townships in Central Myanmar and Northern Lao PDR, which aims to achieve 80% immunity in cattle and buffalo populations by 2016. The vaccination target areas were selected due to their history of FMD and large cattle and buffalo populations, as well as the substantial movement of cattle for both legal and illegal international livestock trade. Post-vaccination monitoring (PVM) was conducted to assess the efficacy of vaccinations. In details, serum from a random selection of vaccinated animals were sampled at 1

month and 7 months post boost vaccination, and liquid-phase blocking ELISA (LPBE) was used to assay vaccine-induced seroconversion.

with support from OIE HPED vaccine bank and STANDZ initiative

#### *Myanmar*

During the campaign, two rounds of approximately 250,000 FMD vaccines, which contain bivalent O (Manisa + 3039) viruses, were delivered in 18 townships in central Myanmar (Mandalay and Sagaing districts). The primary vaccination started in February 2015, and a boost vaccination followed one month later. It is shown 84% cattle developed a protective serum antibody titre ( $\geq 1:80$  by LPBE) at 1 month post boost vaccination. Serological results at a later time point (7 months post the boost vaccination) are pending.

Up to date, there is no evidence that FMD outbreaks occurred in villages where the vaccination campaign has been implemented in the early 2015.

#### *Lao PDR*

A total of 27 districts in Northern Lao PDR are classified as high risk or hot spot areas, and targeted for FMD vaccinations. The vaccine used in this campaign contain bivalent O (Manisa + 3039) and bivalent A (Malaysia 97 + Iraq 22) viruses. In 2015, a boost vaccination was given to around 290,000 animals that primed with FMD vaccines in 2014 or earlier, and two rounds of vaccination were given to around 105,000 animals that had never been vaccinated before. It is shown in the LPBE assay that after two rounds of vaccinations, 88% and 84% of animals developed protective serum antibodies against serotype O and A vaccine strains respectively, whilst only 73% and 53% of these animals remained at protective level 6 month later.

There have been no FMD outbreaks in vaccinated areas up till now. Attentions are required to Attapeu and Vientiane, where FMD cases have been repeatedly reported during 2015.

## **5. Conclusions**

In 2015, a total of 256 FMD outbreaks were reported in SEACFMD countries, which is slightly decreased as compared to 308 cases in 2013 and 449 cases in 2014. Field samples have been characterised as either serotype O or serotype A. Serotype O regained its dominant status in 2015, whilst in 2013 and 2014 similar O and A FMDVs were isolated. Current studies have shown a general close epidemiologic links between field outbreaks in countries in SEA. Still, the epidemiologic situation is dynamic and complex and affected by viral evolution, waxing and waning of herd immunity and livestock trading patterns. Although serotype Asia 1 viruses have not been detected in SEACFMD countries since 2007, they still remain active in Southern Asia, and cautions are needed for transboundary transmissions. Indeed, the frequent incursions of FMDV from Southern Asia into SEA, as well as virus expanding from SEA into Eastern Asia, demonstrate the porous nature of borders between mainland SEA and neighbouring countries and highlight the continued threat posed by FMD as a transboundary disease. Close monitoring of genecity and antigenicity of endemic FMDVs and the spread of FMDVs originating from other regions is essential to ensure that the risks for continued and further outbreaks can be mitigated.

So far, the vaccination campaigns in Central Myanmar and Northern Lao PDR have shown promising results, as they at least provide clinical protection in vaccinated villages. The outbreaks areas that are outside of the vaccination regions will be evaluated as potential hotspots in the future.



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