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SEACFMD Bulletin

Foot and Mouth Disease Situation
January to December 2021

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Summary

- The present issue summarises the Foot-and-mouth disease (FMD) outbreaks in the SEACFMD region in 2021 and the characterization of detected FMD viruses (FMDVs).
- In total,306 FMD outbreaks were reported in mainland South-East Asia, China and Mongolia, amongst which 51 were due to serotype O and 13 were serotype A. Serotype Asia-1 was not reported.
- The most dominant strain was O/ME-SA/Ind-2001e
- Samples were not collected from 35 % (107 out of 306) of the reported FMD outbreaks.
- High proportions of samples that were collected were not typed or have pending results (67.5%, 133/197)
- There was no observed seasonal pattern throughout the year.
- Significant epidemiological events in 2021 included: 1) O/ME-SA/Ind-2001e is still dominant in the region 2) exotic serotype O lineage (O/ME-SA/SA-2018) was prevalent in the neighbouring region (OIE/FAO FMD Reference Laboratory Network annual report)3) Mongolia reported FMD after two years of absence.
- ***Brunei, Indonesia, the Philippines, and Singapore*** did not report any FMD outbreaks in 2021 and maintained their official status of FMD free without vaccination.

Introduction

1. Aims

Following the previous issues of the SEACFMD Bulletin presenting the regional FMD situation in 2015 to 2020[1], the current issue was developed to summarize the FMD situation in the entire year of 2021 in the SEACFMD region including 10 ASEAN Member States, China, and Mongolia. The SEACFMD bulletins aim to regularly update member countries, partners, and stakeholders of the regional FMD situation and facilitate the formulation of risk-based strategies and more effective FMD control and prevention measures.

2. Reporting period

January 1st - December 31st, 2021

3. Data source

Sources of information in this report include data submitted by members to OIE through the World Animal Health Information Systems (WAHIS) and ASEAN Regional Animal Health Information System (ARAHIS). In addition, reports from OIE FMD Reference Laboratories in Pirbright (UK) and Lanzhou (China), and ASEAN Regional Reference Laboratory for FMD in Pakchong (Thailand), and the countries' reports at the 26th OIE SEACFMD Sub Commission Virtual Meeting, March 2022[2] were considered.

[1] https://rr-asia.oie.int/en/projects/fmd/seacfmd-bulletin/

[2] https://rr-asia.oie.int/en/events/26th-meeting-of-the-oie-sub-commission-for-foot-and-mouth-disease-in-south-east-asia-china-and-mongolia/

An FMD outbreak is defined as the occurrence of FMD in one or more animals in an epidemiological unit (refer to a commune in Vietnam, a sub-district in Cambodia, or village/farm in the other SEACFMD countries). All cases within 2 weeks from the previous case are considered as part of the same outbreak.

4. Data analysis

The descriptive analysis was performed based on the official reports and country presentations by the SEACFMD countries during the period. The MS Excel programme was used for handling data and to describe temporal distribution of FMD outbreaks. QGIS software was applied to visualize the spatial distribution of FMD, heatmap and circulating FMD virus serotypes.

Outbreaks of FMD in SEACFMD Countries in 2021

1. Overview of the regional situation in 2021

In 2021, FMD outbreaks continued to affect traditionally endemic countries (China, Myanmar, Vietnam, Thailand, Cambodia and peninsular Malaysia), whereas Lao PDR did not report any new outbreaks, and Mongolia has reported FMD outbreaks after its absence for two years (Figure 1). Of the total 306 outbreaks reported[3], 142 were due to serotype O, 13 were identified as serotype A, and the remaining 151 were not typed due to the absence of/insufficient samples collected or delayed laboratory testing. Serotype A was detected only in Thailand and Myanmar. The number of FMD outbreaks declined (556 outbreaks were reported in 2020) significantly which could be because of the COVID-19 pandemic restrictions.

Cattle/buffaloes were affected in 208 outbreaks, pigs in 6, and sheep/goat in 76 outbreaks. Infection involving small ruminants was commonly noted in Malaysia, Mongolia and Vietnam. The highest outbreaks were observed in Mongolia, Vietnam, Thailand and Cambodia, with specific clusters in some parts (Figure 2). There was no seasonal pattern throughout the year (Figure 3).

[3] Data differed from the presentation at the 26th OIE SEACFMD Sub-Commission Virtual Meeting, March 2022, because the source of the data was cleaned and validated by countries.

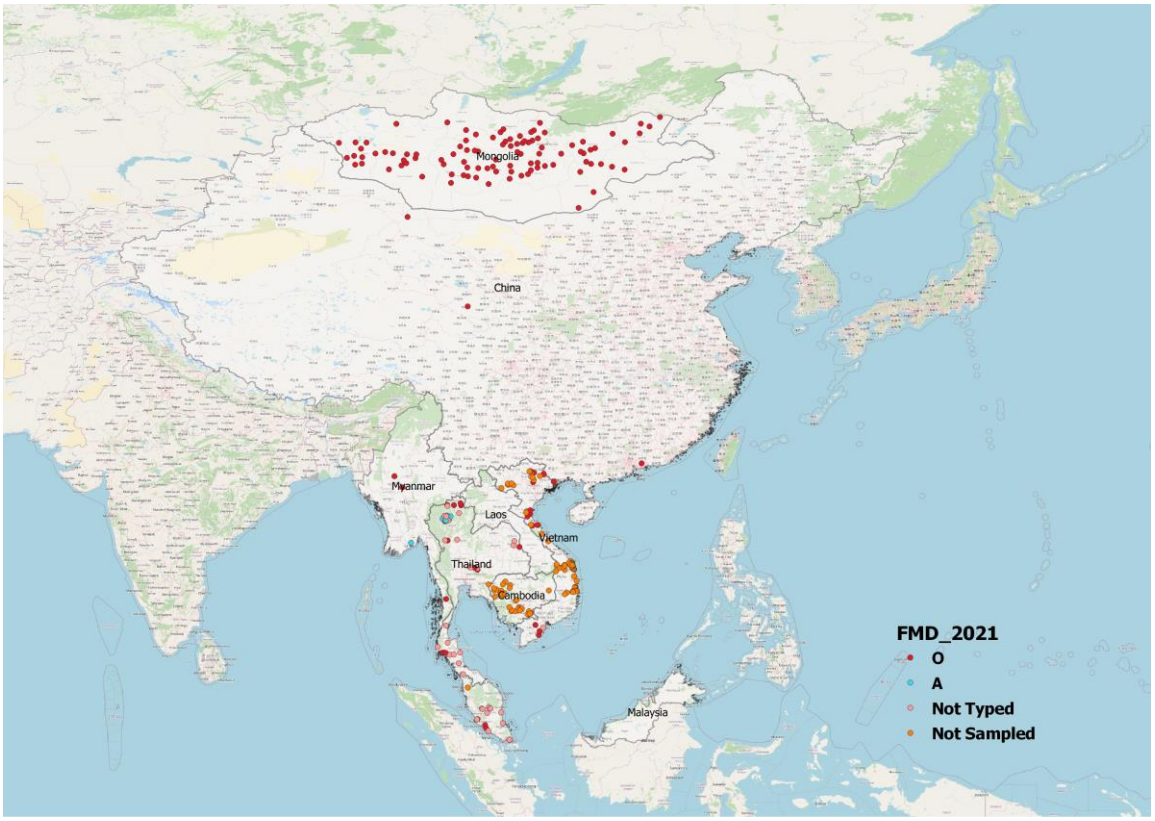


Figure 1. Distribution of FMD outbreaks in SEACFMD countries, 2021.

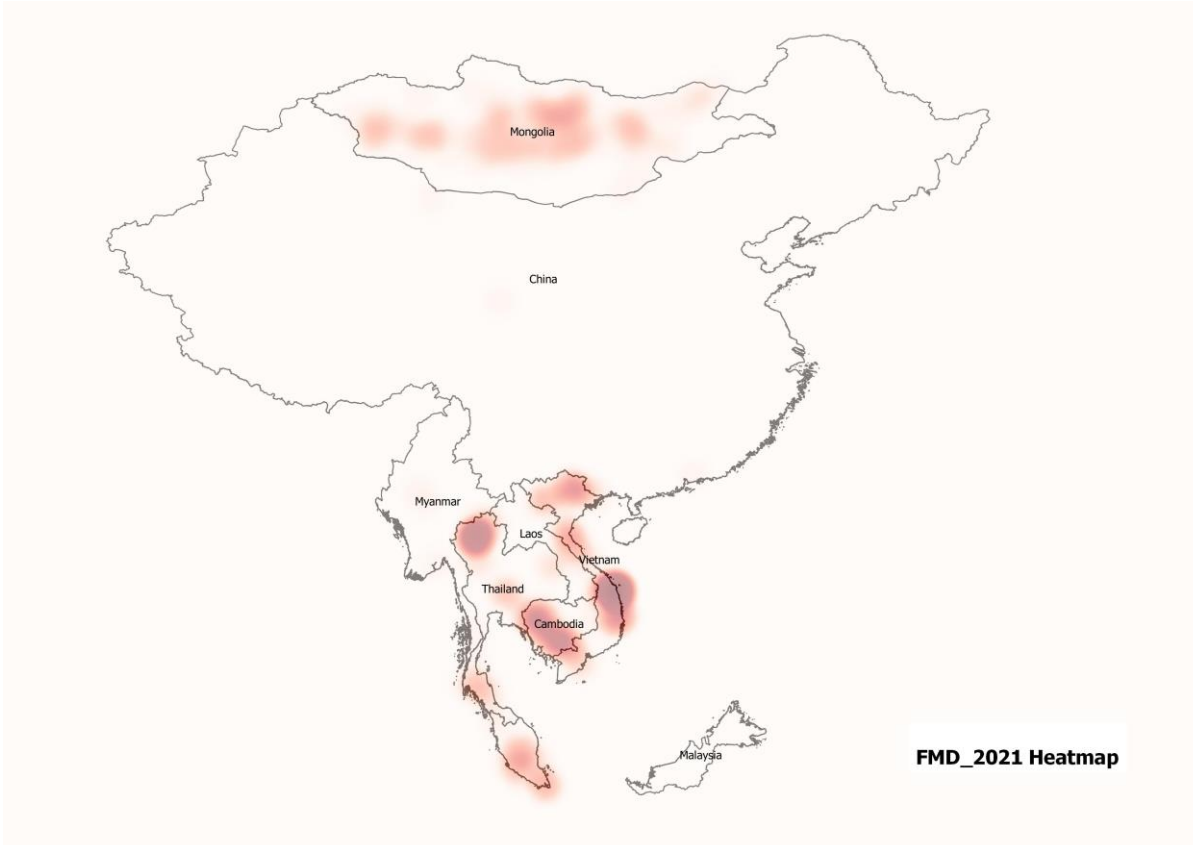


Figure 2. FMD heatmap in SEACFMD countries, 2021

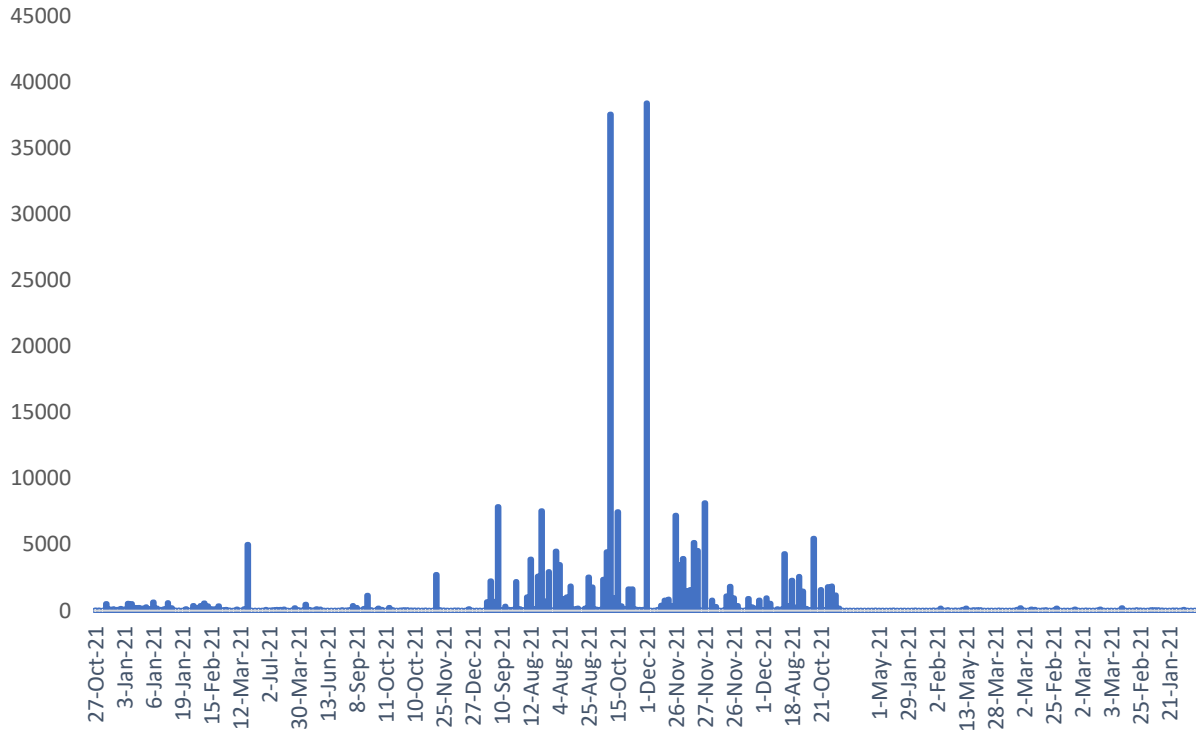
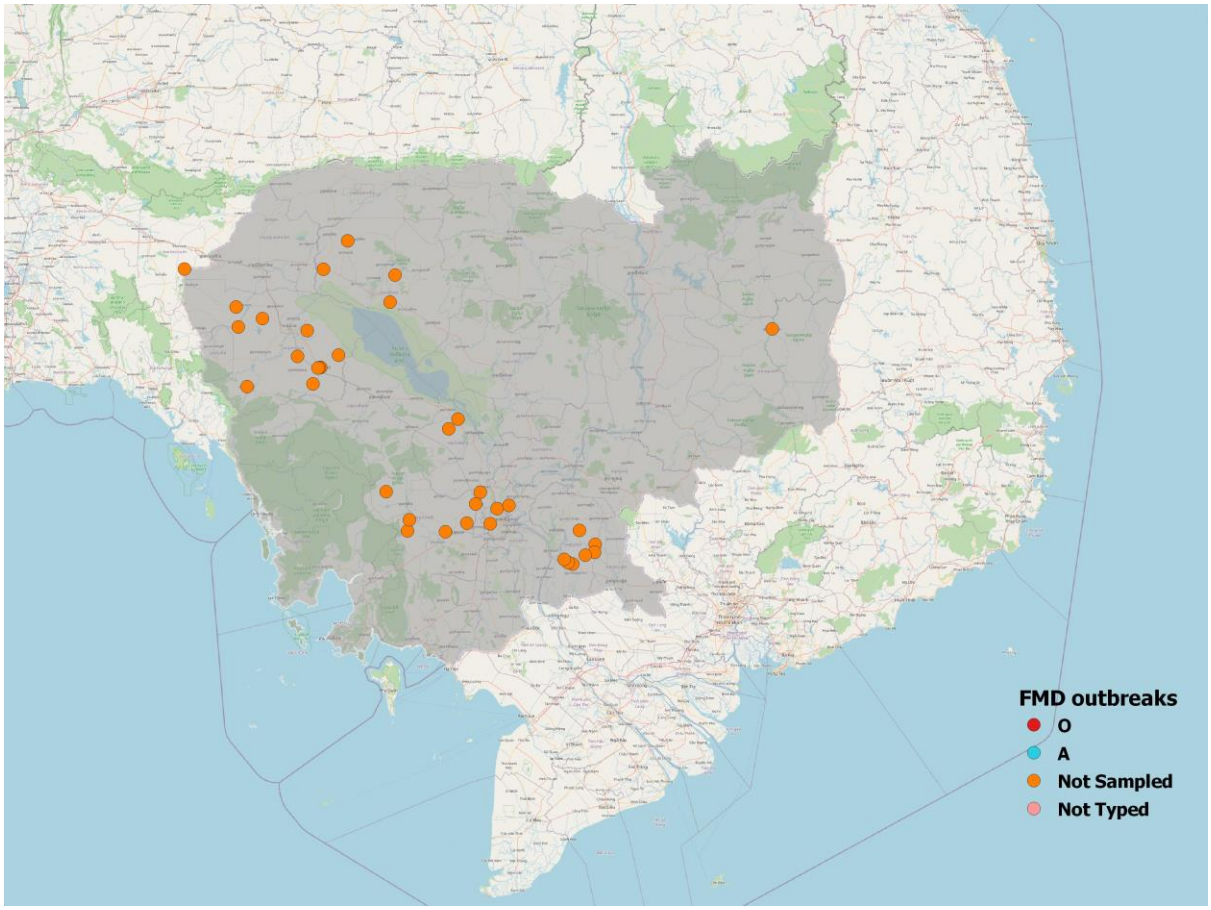


Figure 3 Temporal distribution FMD outbreaks in SEACFMD countries 2021

2. FMD situation in SEACFMD countries

Cambodia

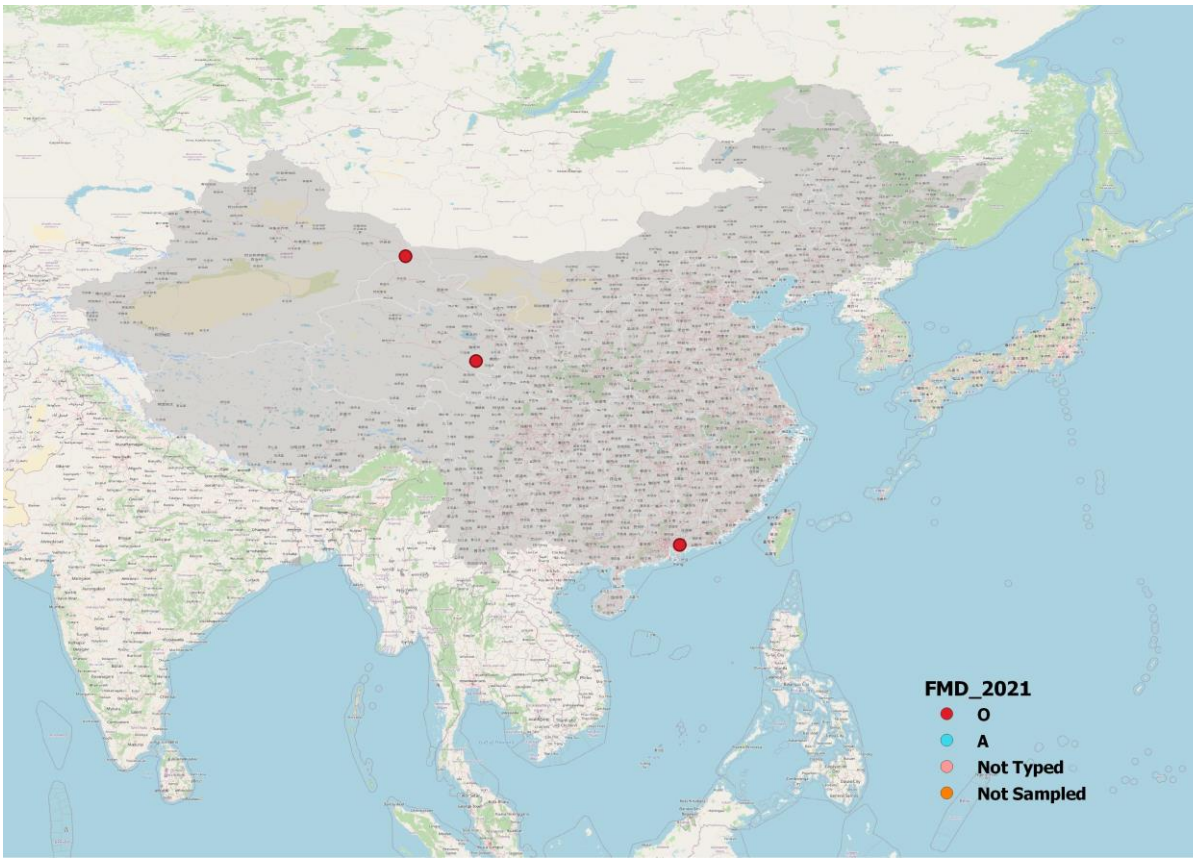
Cambodia reported 36 FMD outbreaks across the country in 2021[4]. The FMD occurrence was significantly decreased compared with 248 outbreaks reported in 2020. Affected animal species included cattle and buffaloes. None of the outbreaks was characterized in 2021. The causes for the outbreaks in 2021 have not been studied.



[4] Data from ARAHIS

China

In 2020, China reported 3 FMD outbreak from 3 province/municipality[5]. The outbreak was caused by O serotype, and only yaks were affected.



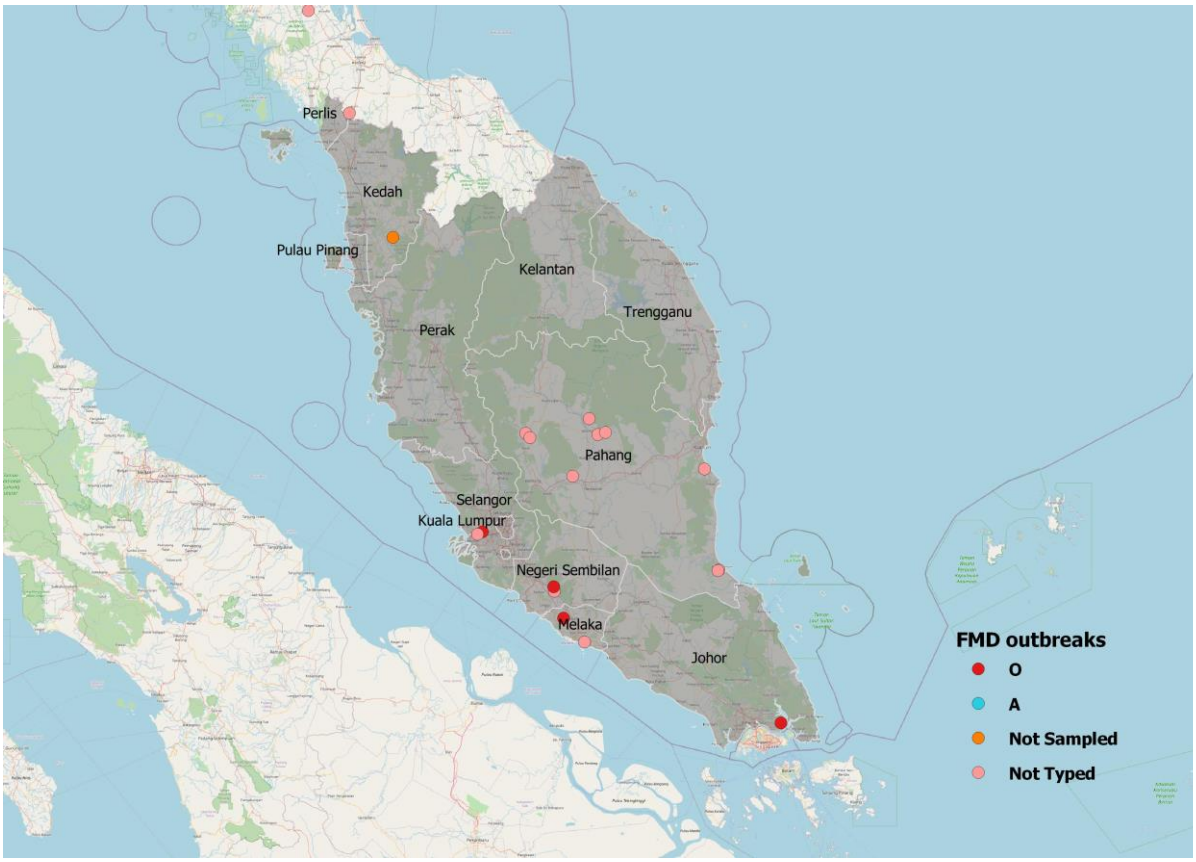
[5] Country report 26th OIE SEACFMD Sub-Commission Virtual Meeting, March 2022

Lao PDR

Lao PDR did not report any FMD outbreaks in 2021.

Malaysia

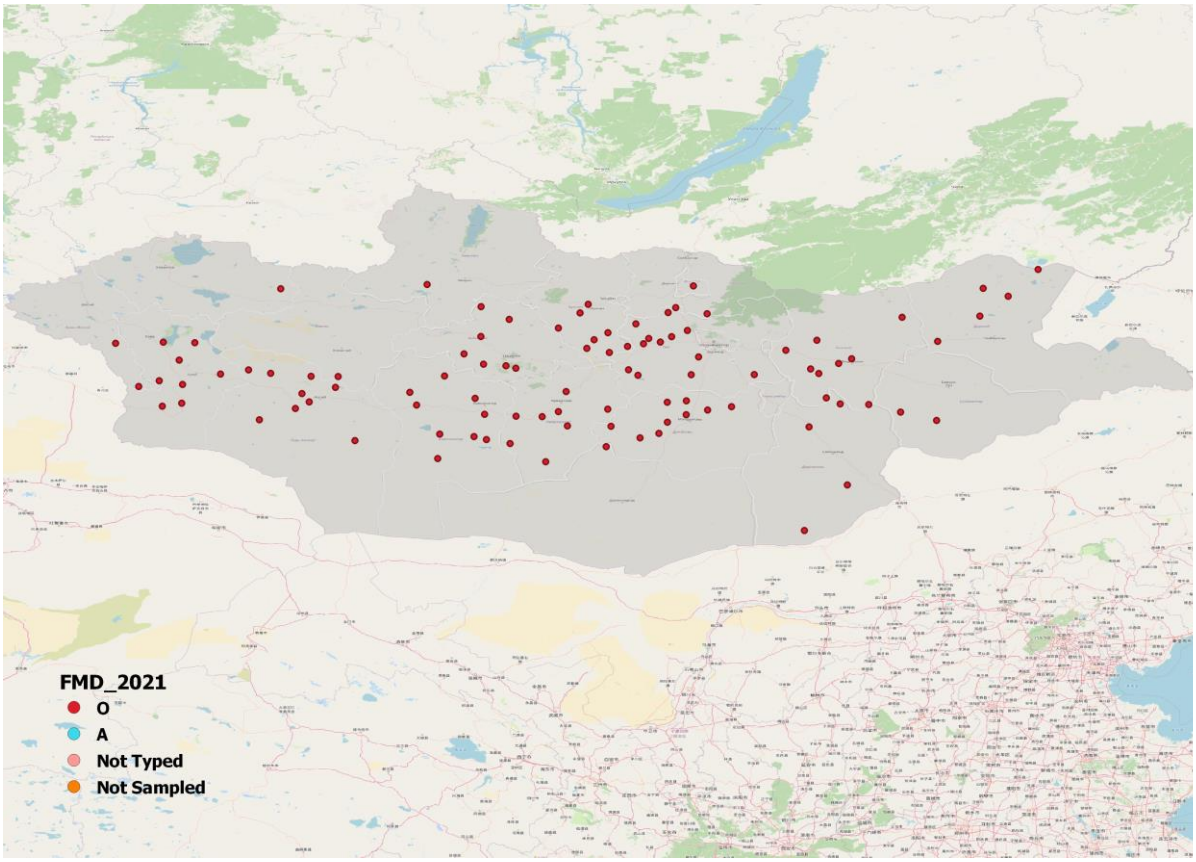
Malaysia reported 17 FMD outbreaks across the peninsular region[6], with cattle and goats being affected. Four outbreaks were typed as serotype O viruses, and the remaining were not characterized.



[6] Data from ARAHIS

Mongolia

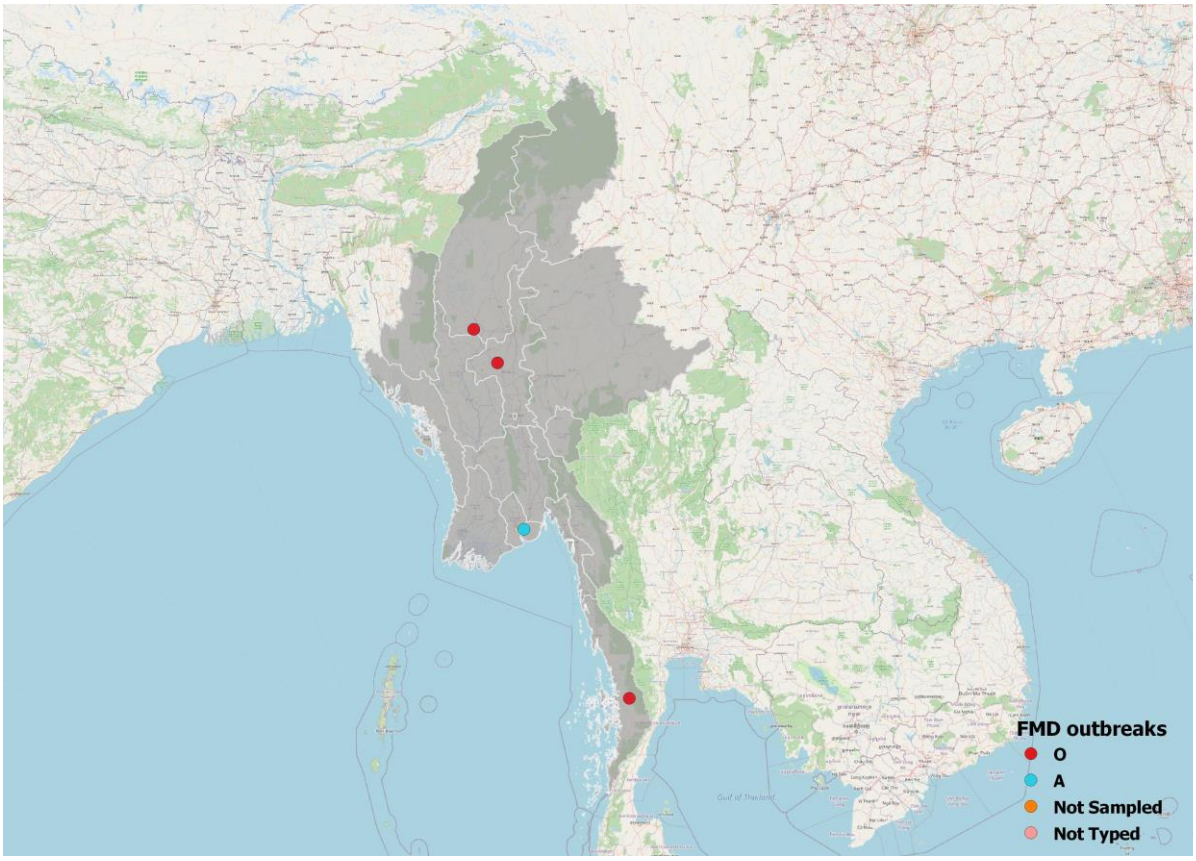
After two years, Mongolia reported 101 FMD outbreaks[7] in 15 districts caused by serotype O. Cattle and sheep/goats as the mixed herd was affected by FMD in the country. The epidemic started in March 2021, with a few reported outbreaks in the Eastern part of the country, which peaked in August. FMD infection continued until the end of the year, spreading in the Central and Western parts of Mongolia. The prevalent strain was identified as O/ME-SE/Ind2001e.



[7] The outbreak number differed from the country report 26th OIE SEACFMD Sub-Commission Virtual Meeting, March 2022, the data was cleaned and validated by General Agency for Veterinary Service Mongolia

Myanmar

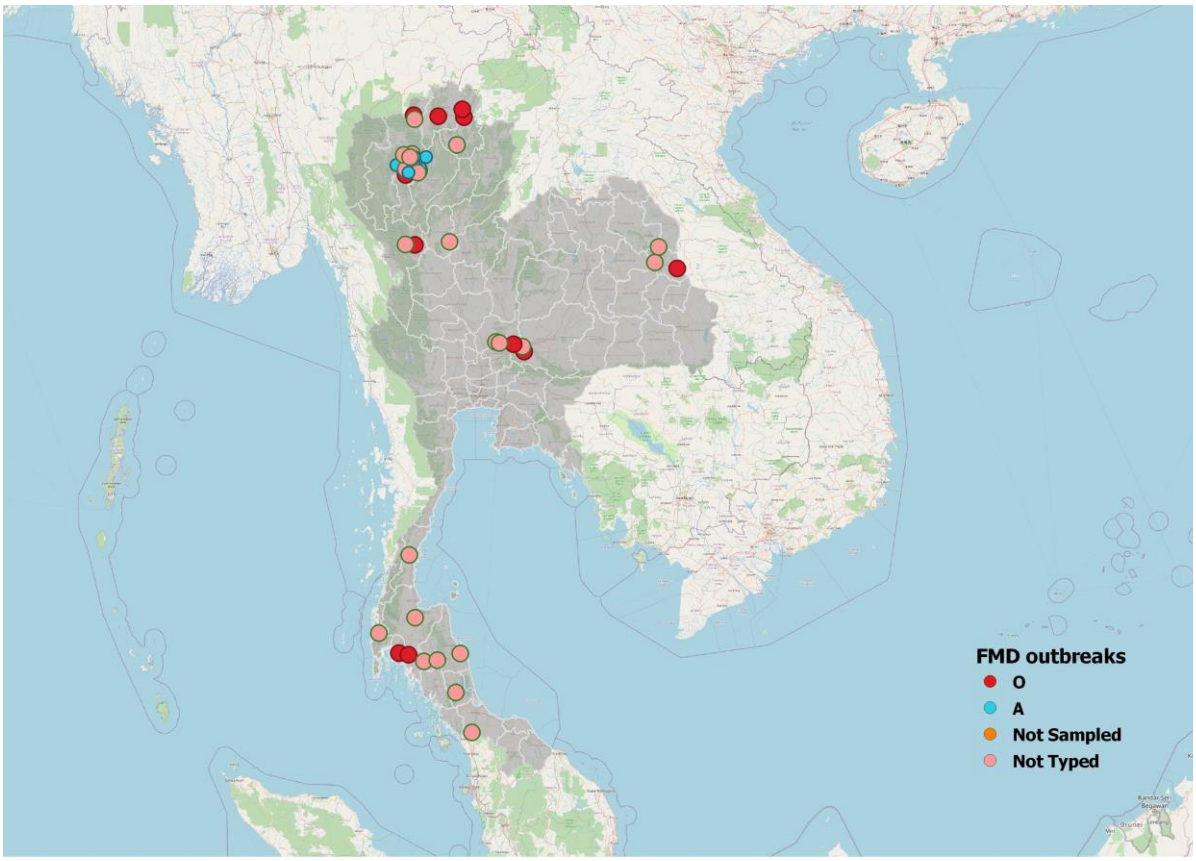
Myanmar reported 4 FMD outbreaks in 3 states [8],3 of them caused by serotype O and a single case was caused by serotype A. Cattle, goats, and pigs were the affected species.



[8] Country report 26th OIE SEACFMD Sub-Commission Virtual Meeting, March 2022

Thailand

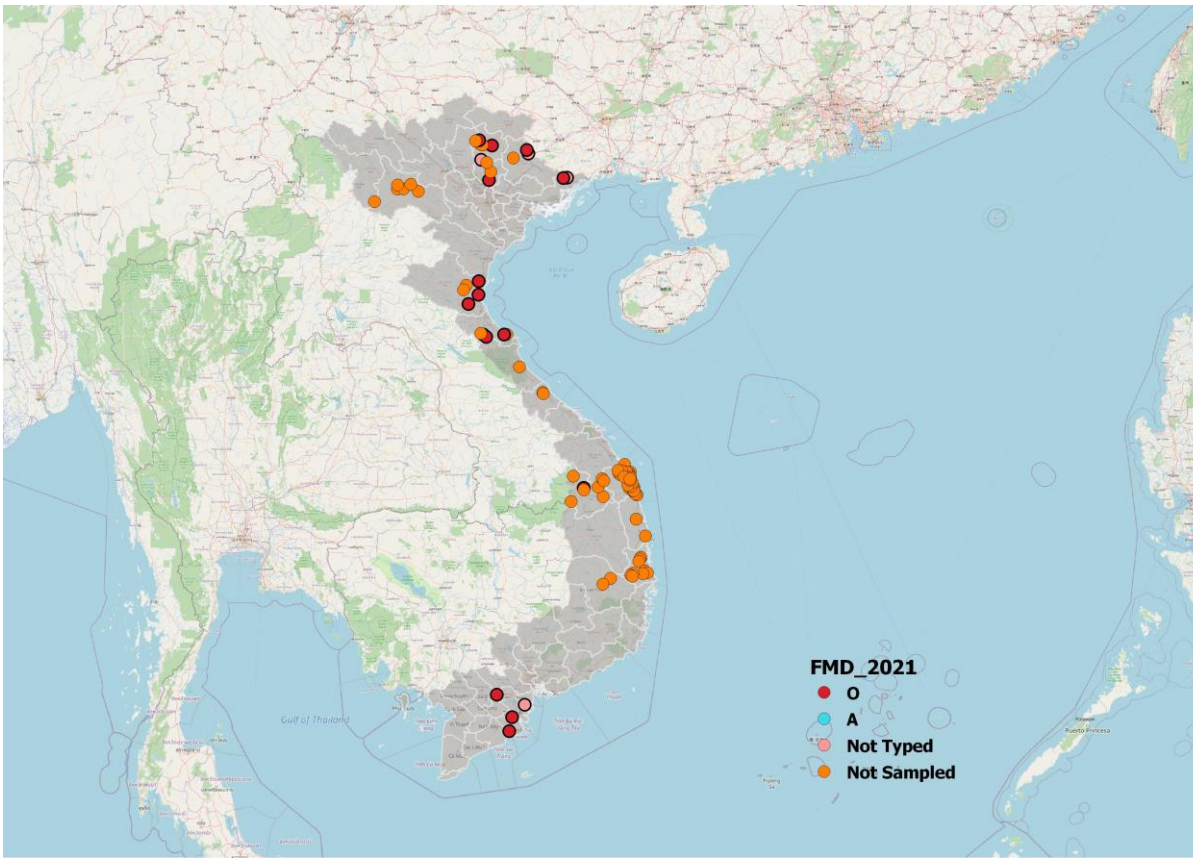
In 2021, Thailand reported 48 FMD outbreaks across the country [9], mainly occurring in the Northern and Southern Regions of the country. Affected animals includes cattle and buffaloes. Of all the reported outbreaks, 13 were identified as serotype O, and 23 were not sub-typed. Although no A-serotype FMD was reported last year, 12 cases have been reported in 2021.



[9] Data from ARAHIS

Vietnam

Vietnam reported 89 FMD outbreaks in the North, central highlands, and the South[10]. FMD outbreaks involved cattle, buffaloes, pigs, and goats. Fifteen out of 89 outbreaks were identified as serotype O.



[10] Data from ARAHIS

Characterization of FMDVs in SEACFMD Countries in 2021

In 2021, some FMDVs were sequenced in the VP1 coding region, by which the following strains were detected:

- Serotype O: O/ME-SA/Ind-2001, O/SEA/Mya-98 and O/ME-SA/PanAsia

Table 1. FMDV strains detected in SEACFMD Member Countries in 2021.

Country	**Serotype O**	Topotype…				**Serotype A**	**Serotype Asia-1**
		SEA/ Mya-98	ME-SA/ PanAsia	ME-SA/ Ind-2001	Cathay	ASIA/ Sea-97	Asia/ G-VIII
Cambodia							
China	+						
Lao PDR[a]							
Myanmar	+					+	
Malaysia	+		+	+			
Mongolia	+			+			
Thailand	+					+	
Viet Nam	+	+		+			

+: the FMDV lineage present in the country.
Note: data were based on the genotyping reports of the World Reference Laboratory for FMD (WRL) http://www.wrlfmd.org/country-reports and ASEAN Regional Reference Laboratory for FMD, Pakchong Thailand and country reports presented at the 26th OIE SEACFMD Sub-Commission Virtual Meeting, March 2022.

In 2021, serotype O remained the dominant serotype, with the Ind-2001 strain (e sublineage) being the most prevailing, while PanAsia and Mya98 strains are still circulating in the region.

Serotype A was detected at low frequencies in Thailand, and a single case was reported in Myanmar.

None of the SEACFMD member countries have reported serotype Asia-1 since its last detection in the Rakhine state of Myanmar in 2017.

FMD related activities

1. Rolling of SEACFMD Roadmap 2021-2025

Upon successful completion of the Phase 5 of the SEACFMD campaign 2016-2020 (https://rr-asia.woah.org/wp-content/uploads/2019/10/seacfmd-roadmap_2016-2020.pdf), the SEACFMD Roadmap 2021-2025, was developed and endorsed by the 25th Meeting of the SEACFMD Sub-Commission in December 2020. The first year of the Phase 6 of the SEACFMD campaign focused on the rolling out the SEACFMD Roadmap 2021-2025 which includes preparation of regional and country level SEACFMD Roadmap Implementation Plan, development of M&E framework for the roadmap to guide the implementation of the roadmap and provide information on the progress in FMD control. These activities were facilitated through regular SEACFMD Governance meetings (SEACFMD Sub-Commission Meeting, Steering Committee Meeting, 24th National Coordinators meeting and EpiNet/ LabNet meetings) and bilateral meetings with MCs.

2. Capacity Building Programme

The following virtual training programmes were conducted in 2021 to build and strengthen capacities of the Members in South-East Asia, China, Mongolia and Pacific in FMD and TAD's prevention and control. The trainings were conducted in collaboration with Massey University and other Experts hired by OIE.

- Advanced GIS training (27 July-30 August 2021) – Attended by 31 participants from 10 countries to assimilate advanced spatial risk assessment (SRA) tools using QGIS and multi-criteria decision analysis (MCDA).
- Training of trainers (ToT) on Outbreak Investigation and response management (31 May – 8 July 2021) - Twenty-one participants from nine countries have successfully completed the course. The topics covered during the training are adult learning methods, biosecurity and sample submission, epidemiological investigations, outbreak response, and communication.
- Epidemiological study design training course (11 November – 10 December 2021) - A total of 34 participants from 11 countries attended this training programme. The course focused on study design topics, questionnaire design, cross sectional study and case control study design.
- Transborder value-chain analysis in South-East Asia and the Pacific (24 March –19 May 2021) - Nominated contact points for value chain studies from Philippines, Papua New Guinea, Sabah and Sarawak and Timor Leste attended series webinars to build capacity in value chain analysis.

3. Support SEACFMD Members on the design of FMD surveillance and to improve countries' ability in implementing FMD vaccination

During the joint virtual LabNet–EpiNet meeting on 23 February 2021, the LabNet and EpiNet Focal Persons were introduced to key principles of setting fit-for-purpose FMD surveillance by Dr David Paton, a FMD Expert who is Member of OIE FMD Ad-hoc Group.

The second day of the 24th SEACFMD National Coordinators Meeting on 30 July 2021 focused on FMD vaccination with presentations from the Experts, sharing of success stories of public-private partnership in FMD vaccination by the Members, and discussions on the challenges and modalities for accessing the quality FMD vaccines in the field. Besides, the preliminary findings of the survey on the implementation of FMD vaccination by 12 SEACFMD member countries were presented to the participants.

4. Field studies and surveys

In 2021, three scientific manuscripts have been published in the International Journal in collaboration with the OIE Collaborating Centre for Veterinary Epidemiology and Public Health (Massey University EpiCentre) and partners (Department of Livestock and Fisheries, Lao PDR; Ministry of Primary Industries, New Zealand) with support from 'ASEAN Regional strengthening FMD Control in SE Asia Project' funded by New Zealand.

- Detection of Foot-and-Mouth Disease Virus in the Absence of Clinical Disease in Cattle and Buffalo in South-East Asia. Front. Vet. Sci. 8:691308. https://www.frontiersin.org/articles/10.3389/fvets.2021.691308/full
- Livestock movement patterns in the main livestock production provinces of Lao PDR https://onlinelibrary.wiley.com/doi/full/10.1111/tbed.14303
- Impact of risk-based partial vaccination on clinical incidence and seroprevalence of foot and mouth disease in Lao PDR https://onlinelibrary.wiley.com/doi/10.1111/tbed.14299
- The SRRSEA conducted a questionnaire survey and prepared a "Report on the implementation of foot and mouth disease (FMD) vaccination programmes in SEACFMD countries"

5. Communication and advocacy

The SEACFMD Campaign has been actively engaged with stakeholders and involved in raising awareness and strengthening capacities along the bovine value chain to prevent and control FMD. Various learning resources and tools have already been produced in collaboration with national veterinary services and partners.

In order to provide stakeholders a platform to access all information on SEACFMD campaign from one platform/ source, the OIE SRR-SEA initiated development of web-based digital SEACFMD dashboard and SEACFMD toolbox. This is being done to provide knowledge-based support, strengthen networking and coordination; and eventually enhance FMD control in the region.
The digitization of the available communication materials to facilitate timely communication through the available user friendly digital platforms such as mobile phone is also being pursued.

Conclusions and discussions

In 2021, a total of 306 FMD outbreaks were reported in the SEACFMD region, much lower than the previous year, which was 556. A significant reduction was observed in 2021 which could be attributed to COVID-19 pandemic restrictions. Serotype O remained the dominant serotype, with the Ind-2001 strain (e sublineage) being the most prevailing genotype. The re-emergence of Serotype A in Thailand and Myanmar may require further investigation.

This report was based on the FMD reports submitted by SEACFMD Member countries through WAHIS and ARAHIS and country presentations during the 26th SEACFMD Sub-Commission meeting in March 2022. Inconsistencies in FMD data/ report from the Members were observed between the different sources and where possible validation of the FMD information with the concerned SEACFMD National Coordinators were made. The under reporting of FMD outbreaks remains still a crucial issue because of which we may not get the true epidemiological pattern of the FMD situation in the region. Despite the significant decline of FMD outbreaks, the high percentage of non-sampling (35%, 107/306) remains the biggest challenge to get a better estimate of the prevalence of circulating virus serotypes. Considering the importance of detailed outbreak investigations and collection of samples to understand the disease epidemiology and circulating virus, the indicator for Output 1.1 - Fit-for-purpose and sustainable FMD surveillance system established (in SEACFMD Roadmap 2021-2025) is kept as percentage of reported outbreaks with full investigation including virus characterization, which will be assessed annually.

The incursion of emerging infectious diseases (EID) in SEACFMD region such as African swine fever (ASF), Lumpy skin disease (LSD) and peste des petits ruminants (PPR) significantly impacted the SEACFMD Campaign activities. The controlling of these EIDs, consumes resources that could have been used for FMD prevention and control. Considering SEACFMD Campaign as one of the successful regionally coordinated programme to combat FMD, Members are encouraged to use SEACFMD campaign model for the coordination of other Transboundary animal diseases (TADs) such as ASF and LSD. Recognizing the resource limitation, the SEACFMD Members are encouraged to actively explore and deploy synergies for control of FMD and other TADs.

In addition, the COVID-19 pandemic has affected FMD related activities such as livestock trade, animal movements, vaccination and surveillance. On a positive note, COVID pandemic led to building up of one health team for the member countries involving human health, animal health and relevant stakeholders. Since FMD and EIDs/ TADs in livestock seriously affects the livelihood of the communities and national economy at large, control of these diseases should be pursued adopting one health approach as well as cost-efficient synergies and strategies.

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