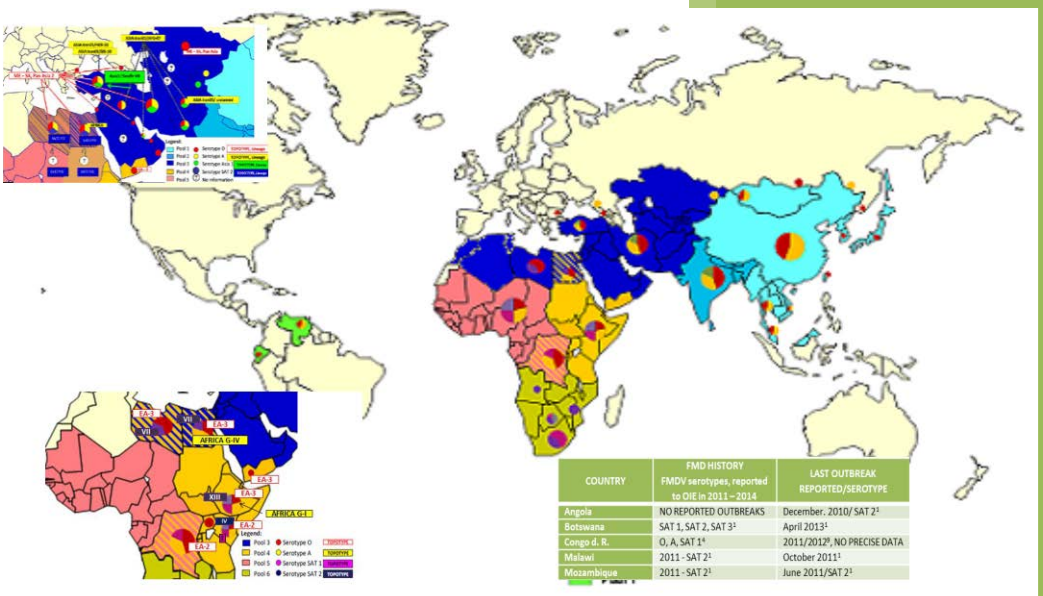
2016

Foot-and-Mouth Disease Situation
Monthly Report July 2016



COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2011 – 2014	LAST OUTBREAK REPORTED/SEROTYPE
Angola	NO REPORTED OUTBREAKS	December, 2010/ SAT 2[2]
Botswana	SAT 1, SAT 2, SAT 3[2]	April 2013[1]
Congo d. R.	O, A, SAT 1[4]	2011/2012[4], NO PRECISE DATA
Malawi	2011 - SAT 2[2]	October 2011[1]
Mozambique	2011 - SAT 2[2]	June 2011/SAT 2[2]

EuFMD

Foot-and-Mouth Disease Situation
Food and Agriculture Organization of the United Nations
Monthly Report

July 2016

Guest editor
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#INFORMATION SOURCES USED:

Databases:
OIE WAHID World Animal Health Information Database
FAO World Reference Laboratory for FMD (WRLFMD)
FAO Global Animal Disease Information System (EMPRES-i)

Other sources:
FAO/EuFMD supported FMD networks
FAO/EuFMD projects and field officers

The sources for information are referenced by using superscripts.
The key to the superscripts is on the last page.

Please note that the use of information and boundaries of territories should not be considered to be the view of the U.N. Please, always refer to the OIE for official information on reported outbreaks and country status.

Contents

Guest Editor's comments

It is a pleasure to be asked to be Guest Editor on the EuFMD Global Monthly Report. For almost 30 years, I have been involved in animal health research. More precisely, my research interests cover several aspects of animal virology, especially the study of animal virus-host interactions and the evolution of viral populations through genetic recombination and reassortment in orbiviruses. Since 2001 and the incursion of FMDV in Europe (and in France), I am also interested in FMDV research, in particular in improving the diagnostic methods and in the persistence mechanisms.

There is some great work being carried out in FMD diagnosis and surveillance around the world. The EuFMD Monthly Report plays a crucial role in this international surveillance system by informing the different actors (private and public) involved at different levels in FMD management. The information in these reports is as real time as possible and of the highest quality. It is a useful tool in particular for the national reference laboratories which are on the front seat in case of FMD emergence.
This month, the report provides updates on different FMD outbreaks in many parts of the world and highlights again, if needed, the necessity of surveillance to address the gaps in our knowledge about the FMD viruses circulating in endemic areas. I wish to draw your attention to two particular outbreaks in this report: the FMDV outbreak on the Island of Rodrigues and the one on the Mauritius Island (two islands separated by 350 miles) and located in the Indian Ocean.

As indicated in this report, FMD broke out on the 7th of July 2016 on the island of Rodrigues. Beginning of August, FMD-like clinical signs were detected in Mauritius after importing cattle from Rodrigues. The first laboratory results were based only on serology (and only against some serotypes). Another set of samples were sent to my lab in Maisons-Alfort. The samples were received on the 11th of August late in the afternoon. On the 12th of August (after RT-PCR, virus isolation and antigen detection ELISA carried out on the cell-culture viral isolate and VP1 sequencing – and thanks to the efficacy of Dr Labib Bakkali-Kassimi's team), the serotype was determined as serotype O).

This Rodrigues/Mauritius event is interesting firstly because it represents the occurrence of FMD in islands which were supposed to be quite isolated and at low risk of FMD; secondly, it illustrates the necessity of rapidly performing laboratory analysis to confirm (or not) FMD even in areas supposed at low-risk of emergence; thirdly, it illustrates a difference of delay between the detection of an event in the field (few weeks) and the delay of the competent laboratory to give a diagnosis (about 24h); finally, the absolute necessity to know the serotype present in the field before using FMD vaccines.

No doubt that the reader will conclude that the EuFMD Monthly Report plays a crucial role in the international surveillance system, by informing us not just about the FMD information which is available globally, but by reminding us of the gaps which must be addressed.

I. GENERAL OVERVIEW

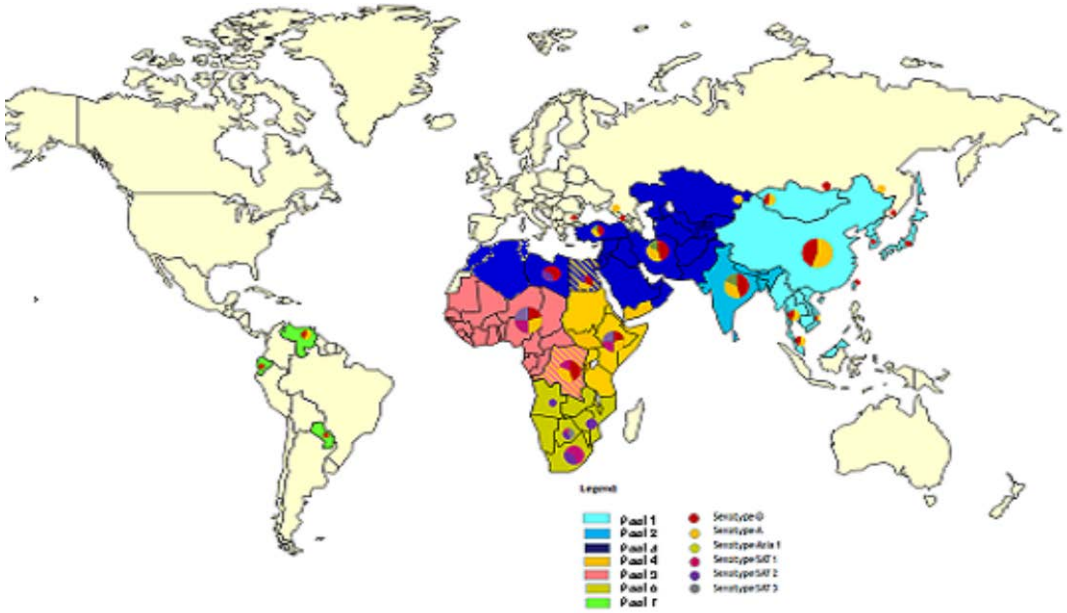
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below are continuously circulating in parts of the pool area and would be detected if sufficient surveillance was in place (Table 1).*

Table 1: List of countries representing each virus pool for the period 2011 – 2015

POOL	REGION/COUNTRIES – colour pools as in Map	SEROTYPES
1	**SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA** Cambodia, China (People's Rep. of), China (Hong Kong, SAR), China (Taiwan Province), Korea (DPR), Korea (Rep. of), Laos PDR, Malaysia, Mongolia, Myanmar, Russian Federation, Thailand, Viet Nam	**O, A and Asia 1**
2	**SOUTH ASIA** Bangladesh, Bhutan, India, Nepal, Sri Lanka	**O, A and Asia 1**
3	**WEST EURASIA & MIDDLE EAST** Afghanistan, Algeria, Armenia, Azerbaijan, Bahrain, Bulgaria, **Egypt**, Georgia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, **Libya**, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Tajikistan, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan	**O, A and Asia 1**
4	**EASTERN AFRICA** Burundi, Comoros, **Congo D. R.**, Djibouti, **Egypt**, Eritrea, Ethiopia, Kenya, **Libya**, Mauritius, Rwanda, Somalia, Sudan, South Sudan, Tanzania, Uganda, Yemen	**O, A, SAT 1, SAT 2 and SAT 3**
5	**WEST/CENTRAL AFRICA** Benin, Burkina Faso, Cameroon, Cape Verde, Central Afr. Rep., Chad, **Congo D. R.**, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea Biss., Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome Principe, Senegal, Sierra Leone, Togo	**O, A, SAT 1 and SAT 2**
6	**SOUTHERN AFRICA** Angola, Botswana, **Congo D. R.,** Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe	**{O, A}*, SAT 1, SAT 2 and SAT 3**
7	**SOUTH AMERICA** Ecuador, Paraguay, Venezuela	**O and A**

Egypt, Libya and **Congo D. R.** (highlighted in bold) are indicated as being in multiple pools, since they have evidence of FMDV originating from 2 or more pools in the past four years. * ONLY IN NORTH ZAMBIA AS SPILL-OVER FROM POOL 4

MAP 1: Foot-and-mouth disease (FMD) virus pools: world distribution by serotype in 2011-2015



II. HEADLINE NEWS

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

Cambodia [1] – Nineteen new FMD outbreaks occurred in Cambodia between June and July 2016.

Laos [2] **–** Genotyping by the WRLFMD identified the FMDV as O/SEA/Mya-98. This virus was detected in the field sample collected from outbreaks occurring in this country during 2016.
Details of the results of the cell culture/ELISA serotyping, genotyping of VP1 and vaccine matching strain differentiation (VMSD) tests carried out by the WRLFMD on FMDV field strains, which are cited in this report, will be available in the forthcoming issue of the 3rd Quarterly WRLFMD Report (July-September 2016).

Malaysia [1] **–** Nine new FMD outbreaks occurred in Malaysia between June and July 2016.

Mongolia [3] **–** A FMD outbreak caused by serotype A took place on the 16th of July 2016 in cattle in Govisümber Province, Mongolia.

Myanmar [4] **–** FMD outbreaks broke out during June 2016 in ploughing cattle in the Maungdaw Township, Arakan State of Myanmar.

Thailand [1] **–** Thirty new FMD outbreaks occurred in Thailand between June and July 2016.

Vietnam [1] **–** A new FMD outbreak was reported in Vietnam in June 2016.

POOL 2 - SOUTH ASIA

India [5,] – During July 2016, the Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India detected FMDV serotype O in the eight samples collected from large domestic ruminants.

Nepal [2, 6] **–** The National Foot and Mouth Disease (FMD) and TADS Laboratory, Nepal reported the detection of FMDV serotype O during July 2016.

VMSD tests conducted on two field isolates collected during 2015, belonging to FMDV serotype O, obtained good matching results with nearly all of the three vaccine strains employed.

POOL 3 - WEST EURASIA & MIDDLE EAST

Egypt [2, 7] **–** Three field samples collected between 2011 and 2015, forwarded for confirmation to the WRLFMD, resulted positive for FMDV serotypes O and SAT 2.
In April 2016, nine FMD outbreaks were reported in Egypt with the exclusive detection of FMDV serotype O.

Iran [2] **–** Twenty-nine samples collected between January and April 2016, from cattle, sheep, as well as from a dog, were forwarded to the WRLFMD. Genotyping identified the FMDV serotypes detected in these samples as A/ASIA/G-VII, Asia1/ASIA/Sindh-08 and O/ME-SA/PanAsia-2^{QOM-15}.

Pakistan [8] **-** The Progressive Control of Foot and Mouth Disease Project reported that during July 2016, 57 FMD outbreaks occurred in Pakistan caused by FMDV serotypes A, Asia 1 and O.

Saudi Arabia [2] **–** A field sample collected in the country during April 2016 was genotyped by the WRLFMD as O/ME-SA/Ind-2001d.
VMSD tests conducted on two field isolates collected earlier this year, belonging to FMDV serotype O identified all of the three vaccine strains used as likely to confer protection.

United Arab Emirates [2] **–** Even in this case, the VMSD tests conducted on a field isolate belonging to FMDV serotype O identified all of three vaccine strains employed as likely to confer protection.

POOL 4 - EASTERN AFRICA

Kenya [9] **-** The National FMD Reference Laboratory Embakasi, Kenya detected FMDV serotypes A and SAT 1 among the 18 bovine samples examined during July 2016.

Mauritius [3] **–** Several FMD outbreaks due to serotype O were reported for the first time on the Islands of Rodrigues and Mauritius. These events, which are reported as continuing, started on the 7th of July 2016 and involved different domestic susceptible species.

POOL 5 - WEST/CENTRAL AFRICA

No FMD outbreaks were reported in this Region during July 2016.

POOL 6 - SOUTHERN AFRICA

Botswana [2] **–** The WRLFMD detected FMDV serotypes SAT 1 and 2 among the six bovine samples collected in Botswana during 2015.

Mozambique [2] **–** FMDV serotype SAT 2 was detected by the WRLFMD in a bovine field sample collected during 2015 in Mozambique.

Zimbabwe [2] **-** FMDV serotype SAT 2 was detected by the WRLFMD among the four bovine field samples collected during 2015 in Zimbabwe.
Furthermore, the same serotype caused a FMD outbreak that broke out on the 20th of June 2016 involving cattle in a village in Matabeleland South, Zimbabwe.

POOL 7 - SOUTH AMERICA

Latin America [3] – No FMD events were reported for this Region during July 2016.

COUNTER

****** 55 MONTHS SINCE THE LAST OUTBREAK IN SOUTH AMERICA WAS REPORTED***

****** 143 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED***

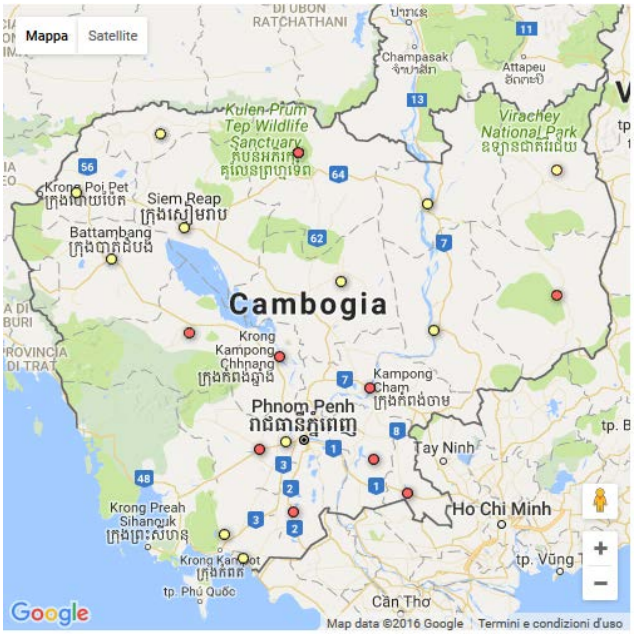
III. DETAILED POOL ANALYSIS

A. POOL 1 – *SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA*

Cambodia [1]

Further to the 118 on-going FMD outbreaks, Cambodia registered 19 new events between June and July 2016. The latest outbreaks were either not sampled, (13 outbreaks) or pending typing (six outbreaks). FMDV serotype O was detected for six of the on-going outbreaks, while most of the remaining events (94.1%) were not sampled. Location of provinces with on-going or new outbreaks is reported in Map 2.

Map 2: location of provinces in Cambodia with new● and on-going ●FMD outbreaks occurring during June and July 2016.



Laos [2]

Genotyping by the WRLFMD identified field sample collected in a water buffalo on the 23rd of March 2016 as O/SEA/Mya-98, with O/TAI/28/2015 the most closely related field virus not pertaining to the country having a sequence identity (seq id) of 99.96%.
Last report of the same genotype by the WRLFMD was in 2014, while during 2015 the genotype detected was different and was represented by O/ME-SA/Ind-2001d.

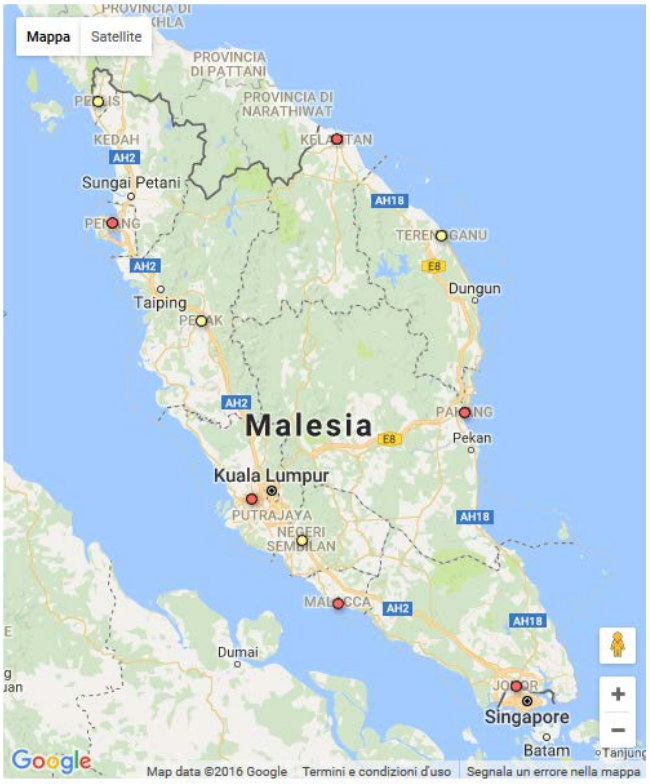
Malaysia [1]

During July 2016, the number of on-going FMD outbreaks reported in Malaysia was 60, with nine new events occurring between June and July 2016. FMDV serotypes responsible for the outbreaks are A and O. A summary of their distribution is reported in Table 2. Location of provinces with on-going or new outbreaks is presented in Map 3.
Last genotypes reported in the country by the WRLFMD for the above serotypes were respectively A/ASIA/Sea-97 in 2014 and O/SEA/Mya-98 in 2013.

Table 2: FMDV serotypes responsible for on-going and new outbreaks in Malaysia.

FMD serotype responsible for outbreak	Number of on-going outbreaks	Number of new outbreaks		Totals
		June 2016	July 2016	
A	1	0	1	2
O	5	7	1	13
Not sampled	2	0	0	2
Not typed	31	0	0	31
Pending	12	0	0	12
Totals	**51**	**7**	**2**	**60**

Map 3: location of provinces in Malaysia with new ●nd on-going FM● outbreaks occurring during June and July 2016.



Mongolia [3]

A FMD outbreak caused by serotype A occurred on the 16th of July 2016 in cattle in Govisümber Province, Mongolia. Diagnosis was carried on the 22nd of July 2016 by the State Central Veterinary Laboratory employing the following methods: antigen (Ag) detection ELISA, non-structural protein (NSP) ELISA, reverse transcription - polymerase chain reaction (RT-PCR) and virus sequencing.

Summary of the animals involved and location of outbreak are respectively reported in Table 3 and Map 4.

Source of infection is unknown while the sanitary measures applied are movement control inside the country, screening of animals, disinfection, quarantine, and zoning. In case of availability, vaccination will be applied, while no treatment is being provided to affected animals.

Previous FMD outbreaks in the country were in September and October 2015, respectively due to serotype A and O. A/ASIA/Sea-97 was genotype last identified in 2013 by the WRLFMD, relative to the FMDV serotype responsible for the present outbreak.

Table 3: summary of the animals involved in the FMD outbreak that occurred in Govisümber Province, Mongolia on the 16th of July 2016.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	**	43	3	1	**	**	**	6.98%	**

*Removed from the susceptible population through death, destruction and/or slaughter

**Not calculated because of missing information

Map 4: location of FMD outbreak that occurred in Govisümber Province, Mongolia on the 16th of July 2016.

Myanmar [1, 4]

FMD broke out in Maungdaw Township, Arakan State on 11th of June 2016 causing serious difficulties for paddy farmers to plant rice, as their cattle are the major ploughing instrument.

The South-East Asia and China Foot and Mouth Disease *(*SEACFMD*)* Campaign reported three on-going FMD outbreaks for this country during July 2016.

A/ASIA/Sea-97 and O/SEA/Mya-98 were the last genotypes detected in this country in 2015 by the WRLFMD.

Russian Federation [10]

The Russian Research Institute for Animal Health (FGBI-ARRIAH), Russia carried out post-vaccination monitoring by screening 11,523 sera. Studies on the immunobiological properties of FMDV serotypes A are being conducted.

The laboratory continues in its support to the Federal Service for Veterinary and Phytosanitary Surveillance of the Ministry of Agriculture of the Russian Federation and to the Veterinary Services of the Russian Federation Subjects by respectively supplying materials and technical advice.

Thailand [1]

During June and July 2016, SEACFMD Campaign reported 30 new FMD outbreaks further to the 23 on-going events. As for Malaysia, A and O are the FMDV serotypes responsible for the outbreaks. A summary of their distribution is reported in Table 4. Location of provinces with on-going or new outbreaks is represented in Map 5.

Again as for Malaysia and Myanmar, last reported genotypes by the WRLFMD for this country were respectively O/SEA/Mya-98 and A/ASIA/Sea-97 during 2016.

Table 4: FMDV serotypes responsible for the on-going and new outbreaks in Thailand.

FMD serotype responsible for outbreak	Number of on-going outbreaks	Number of new		Totals
		June 2016	July 2016	
A	8	0	1	**9**
O	4	4	5	**13**
Not sampled	5	0	1	**6**
Not typed	3	0	1	**4**
Pending	3	4	14	**21**
Totals	**23**	**8**	**22**	**53**

Map 5: location of provinces in Thailand with new and on-going FMD outbreaks occurring during June and July 2016.

Vietnam [1]

The last FMD outbreak in Vietnam was reported in June 2016, further to the 25 FMD events on-going in the country. A summary of the distribution of the circulating serotypes is reported in Table 5. Location of provinces with on-going or new outbreaks is presented in Map 6.

As for the abovementioned SEACFMD countries for which new events were reported during June and July 2016, last circulating genotypes detected in the country by the WRLFMD were O/SEA/Mya-98 and A/ASIA/Sea-97 from outbreaks of 2015.

Table 5: FMDV serotypes involved in on-going and new outbreaks in Vietnam.

FMD serotype responsible for outbreak	Number of on-going outbreaks	Number of new		Totals
		June 2016	July 2016	
A	0	1	0	**1**
Asia 1*	15	0	0	**15**
O	1	0	0	**1**
Not sampled	7	0	0	**7**
Not typed	1	0	0	**1**
Totals	**24**	**1**	**0**	**25**

*Although the SEACFMD Campaign reports the circulation in Vietnam of FMDV serotype ASIA 1, this was last detected in 2006 by the WRLFMD.

Map 6: location of provinces in Vietnam with new 🔴 and on-going FM🟡 outbreaks occurring during June and July 2016.

SEACFMD [1]

The list of countries belonging to this organization with the relative number of FMD outbreaks, which occurred between January and July 2016, is presented in Table 6. Trend of the number of outbreaks since the beginning of 2016 is characterised by peaks in January and July.

Table 6: Distribution of FMD outbreaks among the SEACFMD countries reported between January and July 2016.

	N° of FMD outbreaks per month (2016) in the SEACFMD countries						
	January	February	March	April	May	June	July
Cambodia	124	125	128	126	127	126	137
Myanmar	3	3	4	4	3	3	3
Malaysia	47	49	49	48	52	58	53
Thailand	54	33	22	20	23	31	53
Viet Nam	52	54	48	33	24	25	23
Total	**280**	**264**	**251**	**231**	**229**	**243**	**269**

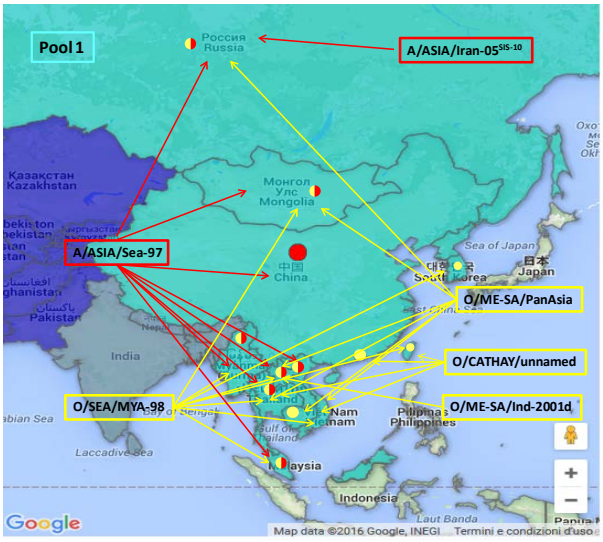
Table 7: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 7 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	O, 2013-2015/NOT SAMPLED	July 2016/ not typed or not sampled, Sep 2015/O and A, Aug 2014/ not typed, June 2014/not typed	See text Typing required
China (People's Rep. of)	2012-2013/O, 2013 & 2015/A 2012 -2014/NOT TYPED**	May2016/O, May 2015/A	Typing required
China (Hong Kong, Sar)	O**	Dec 2015/O	Follow-up needed
China (Taiwan Province)	2012-2013/O, A/2015**	Jun 2015/A	Typing required
Korea (DPR)	2012-2013/DISEASE ABSENT 2014 & 2015/ NO DATA REPORTED	May 2014/not confirmed, July 2014/O	Follow-up needed
Korea (Rep. of)	2012-2013/DISEASE ABSENT 2014/O, 2015/ NO DATA REPORTED	Mar 2016/O	Follow-up needed
Laos PDR	2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS 2015/ NO DATA REPORTED	Mar 2016/O Mar 2015/A,	See text Follow-up needed
Malaysia	2012 –2015/O 2013 & 2015/NOT TYPED	June-July/A & O	See text Follow-up needed
Mongolia	2013/A & NOT TYPED, 2014 & 2015**/O	July 2016/O, Sept 2013/A,	Follow-up needed Typing required
Myanmar	2012-2014/O, 2015/A & NOT TYPED	July 2016/ not typed, Oct 2015/A and O,	See text
Russian Federation	2012, 2014 & 2015/O, 2013 - 2015/A	Jan 2016/ A and Dec 2015/O	See text
Thailand	O, A NOT SAMPLED & NOT TYPED	June – July 2016/not typed, Mar 2016 /A & O	See text
Vietnam	O, NOT SAMPLED, NOT TYPED 2013, 2014 & 2015/A,	Mar 2016/O, Feb 2016/A and not typed	See text

Map 7: FMD distribution by serotype and topotype in South East Asia, 2012 – 2015.

Conjectured circulating FMD viral lineages in Pool 1 per 2015 [3, 17]:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/CATHAY, O/ME-SA/Ind-2001d
- Serotype A: A/ASIA/Sea-97 and Iran-05^{SIS10} sublineages
- Serotype Asia-1 has not been detected in the region since 2005 (Myanmar) and 2006 (China (People's Rep. of) and Vietnam)



B. POOL 2 – South Asia

India [5]

For July 2016, the ICAR-PDFMD, Mukteswar, India reported the detection of FMDV serotype O among the eight samples, six from cattle and two from buffaloes, using FMDV antigen and/or RNA detection. Genotyping was carried out for six virus isolates positive for FMD serotype O. The laboratory also tested 2,119 serum samples for epidemiological studies. The laboratory tests were carried out using diagnostic kits developed at ICAR-PDFMD.
The laboratory personnel was also for this month involved in the field investigation of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities. ICAR-PDFMD is continuing research studies and collaborations with international organisations.

Nepal [2, 6]

As for the previous months, the FMD and TADS Laboratory in Nepal reported for July 2016 the detection of FMDV serotype O. Serological analyses for FMD were also carried out. FMDV isolates were forwarded to the WRLFMD for further investigation. The laboratory personnel was also involved in outbreak investigations and in the provision of expert advice to the Government and to the National and Local authorities.
Vaccine isolates O 3039, O Manisa and O/TUR/5/2009 employed in the VMSD tests conducted by the WRLFMD obtained, in general, good matching results with field isolates O/NEP/1 and 18/2015, respectively belonging to the following genotypes, O/ME-SA/PanAsia^{KAT-15} and O/ME-SA/Ind-2001d. Lowest value r_1, classified as borderline, was obtained for O Manisa with O/NEP/18/2015.

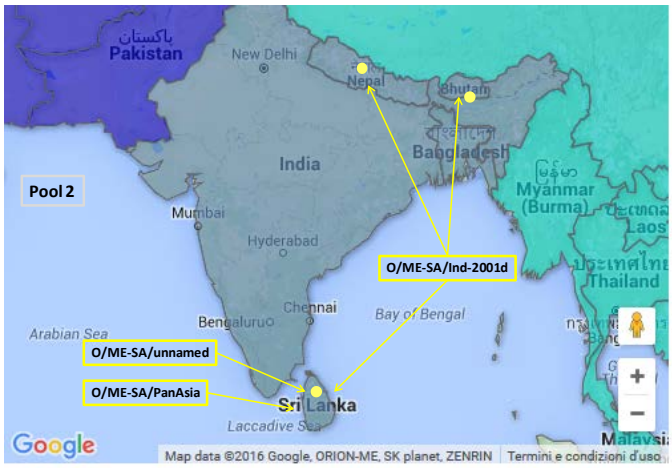
Table 8: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 8 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Bangladesh	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Bhutan	NOT TYPED, 2013 & 2014/NOT SAMPLED 2013-2015/O	Not available	Follow –up needed
India	O, A, NOT SAMPLED 2012-2014/Asia 1 2013/NOT TYPED	July 2016/O, Apr 2015/A Apr 2015/Asia 1	See text
Nepal	O, 2012-2103/Asia 1	July 2016/O	See text
Sri Lanka	2012 – 2014/O, 2015/NO DATA REPORTED	Sept 2014/O	Follow-up needed

Map 8 FMD distribution by serotype and topotype in South Asia, 2012 – 2015 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2015 [3, 17]:

- O/ME-SA/Ind-2001 predominates (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been recognized during 2012-15)
- O/ME-SA/PanAsia-2 (last detected in 2014 in Sri Lanka)
- A/ASIA/G-VII (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters)?



C. POOL 3 – West Eurasia & Middle East

Egypt [2, 7]

Two of the three field samples collected in Egypt from cattle between 2011 and 2015 FMD were respectively identified as positive for FMDV serotypes O and SAT 2. Genotyping claffified these isolates as: O/ME-SA/unnamed for isolate collected in 2011, with the most closely related field viruses pertaining all to the same country (seq id 100%) isolated between 2006 and 2009; SAT 2/VII/Ghb-12, field isolate of 2015, with PAT/1/2012 representing the most closely related field virus not pertaining to the same country (seq id 99.5%).

During April 2016, nine FMD outbreaks were reported in the Central Region and in the Delta of Egypt, in the following Governorates: Bani Souif, Behera, Dkhalia, Fayoum, Gharbia and Giza. Samples were collected from all outbreaks with only one resulting positive for FMDV serotype O. Eight outbreaks occurred in households and the remaining in a farm. Spatial distribution of outbreaks is presented in Map 9.

Relative to January-April 2016, vaccination coverage of cow and buffaloes estimated at 46%, with Dkhalia, Quena, South Sini and Kafr el Sheikh reaching the highest coverage with values between 71% and 73 % while Governates with the lowest coverage were Menia (19%) and North Sini (21%).

Vaccine coverage for small ruminants for the same period was 12% with South Sini having the highest values of 72% while in some of the other Governorates vaccination was only 1% of this animal population.

Constraints reported for the FMD surveillance were missed data, lack of follow-up of outbreaks to record the new cases along the time and weakness of passive surveillance and reporting systems. In view of these points, the following recommendations were made: emphasis on passive and active surveillance as well as vaccination, to employ this as principal control measure; increase awareness of animal owners on vaccination and for reporting of cases; ensure entries to decrease missing data.

Map 9: location of villages with FMD outbreaks occurring in Egypt during April 2016.

Iran [2]

Twenty-nine samples collected between January and April 2016 from Iran, consisting of 14 buccal epithelia samples collected from cattle, 10 miocardic tissue samples collected from one puppy, four lambs, and six sheep, and four viral isolates of unknown species, were positive for FMDV serotypes A (7 cattle samples), ASIA 1 (1 bovine sample) and O (1 puppy, 6 sheep, 4 lamb and 3 bovine samples and 2 isolates of unknown species). Five samples (3 bovine and 2 isolates of unknown species) were negative for FMDV. The detection of FMDV in the domestic dog is exceptional as this species is usually implicated only in the mechanical transmission of the infection.

Genotyping by the WRLFMD of FMDV serotypes detected in field samples collected during the first months of 2016 identified these viruses respectively as A/ASIA/G-VII, Asia1/ASIA/Sindh-08 and O/ME-SA/PanAsia-2^{QOM-15}. A summary of the results are presented in Table 9 and location from where the samples were collected in Map 10.

Map 10: location of provinces from where FMDV positive samples were collected in Iran between January and April 2016.

Serotype O

Serotype A

Serotypes A and Asia 1

Serotypes A and O

Table 9: summary of the genotyping results of FMDV positive samples collected in different areas of Iran between January and April 2016.

Sample Identification	Origin	Date of collection	Host species	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species	Date of collection
IRN/4/2016	NA	04/01/2016	NA	O/ME-SA/PanAsia-2^{QOM-15}	KUW/1/2016 (99.4- 100%)	Cattle	30/01/2016
IRN/5/2016		04/01/2016	NA				
IRN/9/2016	Esfahan	14/02/2016	Domestic dog				
IRN/10/2016	Markazi	26/02/2016	Sheep				
IRN/13/2016	Khozestan	13/03/2016	Cattle				
IRN/15/2016	Mazandaran	17/03/2016	Sheep				
IRN/16/2016	Esfahan	18/03/2016					
IRN/17/2016	Kermanshah	21/03/2016					
IRN/18/2017	Kordestan	24/03/2016					
IRN/19/2018	Zanjan	29/03/2016					
IRN/21/2019	East Azerbaijan	04/04/2016	Cattle				
IRN/22/2016	West Azerbaijan	05/04/2016	Sheep				
IRN/25/2017	Gilan	12/04/2016					
IRN/27/2018	West Azerbaijan	19/04/2016	Sheep				
IRN/28/2016	East Azerbaijan	25/04/2016					
IRN/29/2016	East Azerbaijan	28/04/2016					
IRN/1/2016	Qom	04/01/2016	Cattle	A/ASIA/G-VII	ARM/1/2015 (99,1%)	NA	NA
IRN/6/2016	East Azerbaijan	06/01/2016			TUR/14/2015	Cattle	14704/2015
IRN/8/2016	Tehran	04/02/2016			ARM/1/2015 (99,5%)		NA
IRN/11/2016	Qazvin	27/02/2016			ARM/1/2015 (99,4%)		
IRN/12/2016	Ardebil	29/02/2016			ARM/1/2015 (99,7%)		
IRN/20/2016	Yazd	02/04/2016			ARM/1/2015 (99,8%)		
IRN/23/2016	Alborz	07/04/2016			ARM/1/2015 (99,4%)		
IRN/26/2016	Alborz	18/04/2016	Cattle	Asia1/ASIA/Sindh-08	TUR/12/2015 (99,4%)	Cattle	30/03/2015

As can be noted from Table 9, based on the data relative to the most closely related field virus not pertaining to the country as also that of their temporal detection, FMDVs in this region are circulating across borders of neighbouring countries.

Pakistan [8]

The Progressive Control of Foot and Mouth Disease Project in Pakistan reported 57 FMD outbreaks during July 2016 prevalently caused by FMDV serotype by O (35.1%), followed by Asia 1 (28.1%) and A (10.5%). A summary of the number of outbreak distinghuised by serotypes in relation to the districts were the outbreaks are occurring is reported in Table 10. Location of districts with FMD outbreaks is presented in Map 11.

Ring vaccination and vaccination on cost sharing basis that involves a contribution from the farmers, were carried out in the Pakistan during July 2016 with the administration of 17,635 doses. A brief description of the interventions and locations in which they were carried out is presented in Table 11.

The PCFMD carried out capacity building of field staff by training 140 Veterinary Officers in the Punjub province Sample collection kits were also distributed to the field personnel.

Table 10: FMD outbreaks with relative serotypes that occurred during July 2016 in the different Districts of Pakistan.

Province	District	Number Outbreaks/ District	Number of Outbreaks(%) due to FMDV serotype(s)				
			O	A	Asia-1	Mixed	Un-Typed
Sindh	Karachi	29	17	6	1	1	4
Federally Administered Tribal Areas	Bajur	4	3	-	-	-	1
Khyber Pakhtunkhwa	Lower Dir	3	-	-	2	-	1
	Swat	3	-	-	-	-	3
	Abbottabad	2	-	-	-	-	2
Azad Kashmir	Mirpur	5	-	-	2	-	3
Punjab	Jhang	8	-	-	8	-	-
Islamabad Capital Territory	Islamabad	3	-	-	3	-	-
Totals		57	20 (35.1%)	6 (10.5%)	16 (28.1%)	1 (1.8%)	14 (24.6%)

Map 11: Location of the districts where FMD outbreaks occurred in Pakistan during July 2016.

Table 11: Vaccination activities carried out during July 2016 in the various Provinces of Pakistan.

Province	Ring Vaccination	Cost sharing basis (Doses)	
Sindh	1,900	14,335	
Balochistan	-	1,000	
Khyber Pakhtunkhwa	5,000	-	
Punjab	350	3,225	
Islamabad Capital Territory	350	-	
Total	**7,850**	**18,560**	**26,410**

Saudi Arabia [2]

The field sample collected in April 2016 from one cattle in Durma, Riyadh, Central Region, Saudi Arabia was genotyped by the WRLFMD as O/ME-SA/Ind-2001d. Most closely related field virus not pertaining to the country was represented by O/UAE/1/2015 with a seq id of 99.22%.

VMSD tests conducted on two field isolates O/SAU 1 and 7/2016 collected from cattle in February 2016, both genotyped as O/ME-SA/Ind-2001d confirmed all of the three vaccine strains used, O 3039, O Manisa and O/TUR/5/2009 as likely to confer protection.

United Arab Emirates [2]

As For Saudi Arabia, the VMSD test conducted on field isolate O/UAE/2/2016, collected from one cattle in Al - Tawalaa, United Arab Emirates and genotyped as O/ME-SA/Ind-2001d, confirmed the three vaccine strains used, O 3039, O Manisa and O/TUR/5/2009 as likely to confer protection.

Table 12: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 12 below.

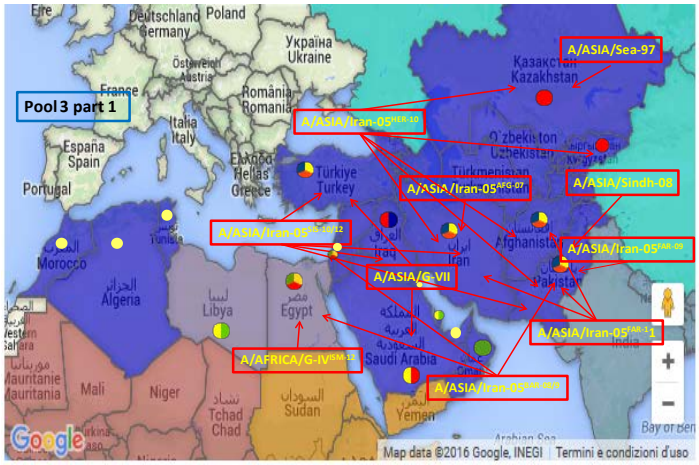
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2015**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	2014/A, Asia 1, O	Follow –up needed
Algeria	2014 -2015**/O	Apr 2015/O	Follow –up needed
Armenia	2012-2014/DISEASE ABSENT 2015/A	Dec 2015/A	Follow –up needed
Azerbaijan	DISEASE ABSENT**	2007/0	Follow –up needed
Bahrain	2012, 2014 &2015 /O	Oct 2014/O	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	March 2016/A & Sat 2, April 2016/ O	See text
Georgia	DISEASE ABSENT	2001/ASIA 1	Follow –up needed
Iran	2012-2014/A, Asia 1 & O 2015**/SEROTYPE NOT REPORTED	July 2016/A & O, 2013/Asia 1	See text Follow –up needed
Iraq	2012-2013/O, 2012-2014/A 2015/ SEROTYPE NOT REPORTED	Dec 2013/A, O	Follow –up needed
Israel	2012-2015**/O	December 2015/O	Follow –up needed
Jordan	DISEASE ABSENT**	2006/A	Follow –up needed
Kazakhstan	2012/O	Aug 2012/O, Jun 2013/ A	Follow –up needed

	2012 –2013/A 2014-2015**/ DISEASE ABSENT		
Kuwait	2012/O 2013 – 2014/ DISEASE ABSENT	Jan-Feb 2016/O	Follow –up needed
Kyrgyzstan	2012-2014/O, A 2015/ NO DATA REPORTED	Apr 2013 /O, A, Aug 2014/not typed	Follow –up needed
Lebanon	DISEASE ABSENT 2015/ NO DATA REPORTED	2010/not typed	Follow –up needed
Libya	NO DATA REPORTED	Oct 2013/O	Follow –up needed
Morocco	DISEASE ABSENT**	Oct 2015/O	
Oman	2012-2014/O 2015/ NO DATA REPORTED	May 2015/SAT 2	Follow –up needed
Pakistan	2012 & 2015/ NO DATA REPORTED 2013-2014/A, ASIA 1 & O	July 2016/A, Asia 1 and O	See text
Palestine	O, 2012-2013/SAT 2	Dec 2015/O Mar 2013/Sat 2	Follow –up needed
Qatar	2012-2015/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2012-2014/O 2015/ NO DATA REPORTED	April 2016/O, April 2015/A	See text
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2012- 2013/NOT TYPED 2014-2015**/DISEASE ABSENT	Nov 2011/Asia 1, Nov 2012/ NOT TYPED	Follow –up needed
Tunisia	2014/O 2015/ DISEASE ABSENT	Oct 2014/O	Follow –up needed
Turkey	Asia 1, A & O, NOT TYPED	Oct 2015/ A May 2014-2015/ Asia 1 and O	Follow –up needed
Turkmenistan	2012/NO DATA REPORTED 2013-2015/DISEASE ABSENT	Not available	Follow –up needed
United Arab Emirates	2012, 2015/DISEASE ABSENT 2013-2014/O	Feb 2016/O	See text Follow –up needed
Uzbekistan	2012,2013 & 2015/NO DATA REPORTED 2014/DISEASE ABSENT	Not available	Follow –up needed

Map 12: FMD distribution by serotype and topotype for West Eurasia and Middle East, 2012 – 2015 (EuFMD).

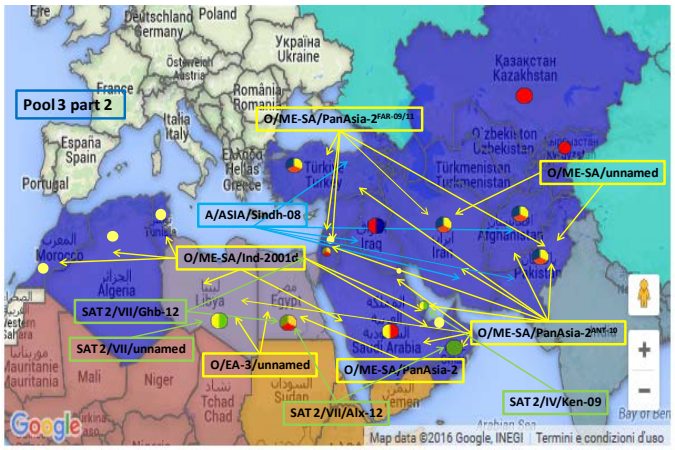
Conjectured circulating FMDV lineages in Pool 3 per 2015 [3, 17]:

- A/ASIA/Iran-05 (from AFG-07, HER 10, SIS-10/12, SIS-, FAR-09/11 and BAR-08 sub-lineages)
- A/Asia/G-VII (recent incursion from South Asia)[1]
- A/ASIA/Sea-97
- A/ASIA/Sindh-08
- A/AFRICA/G-IV
- Asia-1 (Sindh-08 lineage).



Conjectured circulating FMDV lineages in Pool 3 **(cont'd)**

- O/ME-SA/PanAsia-2 (predominantly from ANT-10 and FAR-09/11 sub-lineages)
- O/ME-SA/Ind-2001 (recent incursion per 2013/14 from the Indian sub-continent)
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa

Ethiopia [11]

The National Animal Health Diagnostic and Investigation Center (NAHDIC), Ethiopia reported that there were no FMD outbreaks occurring during July 2016.

A total of 317 sera samples were tested by ELISA with 3 samples resulting positive (0.95%) for antibodies against non-structural proteins of FMDV. These samples were from goats and sheep. The testing was carried out for export certification.

NAHDIC is is still involved in a National surveillance programme, conducted on trade sensitive animal diseases represented by FMD, rift valley fever, peste des petits ruminants and contagious bovine pleuropneumonia.

NAHDIC, in collaboration with WRLFMD, is organizing a five-day training course on outbreak investigation for regional veterinary laboratory professionals, which is to be held in October 2016.

Kenya [9]

The National FMD Reference Laboratory examined 18 bovine samples detecting FMDV serotypes A in 2 samples and SAT 1 in 8 samples. Serotype confirmation was conducted using FMD antigen ELISA. Virus isolation and RT-PCR were also carried out. Last genotypes identified by the WRLFMD in the country for the FMDV serotypes responsible for the present outbreaks were respectively A/AFRICA/G-I and SAT 1/I (NWZ)/unnamed in 2013.

Mauritius [3]

FMD broke out on the 7th of July 2016 on the Island of Rodrigues, a dependency of Mauritius situated at 350 miles on the Northeast coast of Mauritius. Up to the 14th of August 2016, 158 outbreaks were registered on this isalnd, involving cattle, sheep, goats and pigs.

On the 1st of August, the disease passed onto Mauritius due to the importation from Rodrigues on the 15th of July 2016 of six cattle that were introduced into a local herd including sheep and goats. The newly imported animals presented first clinical signs 14 days after their entry. The infection has spread to neighbouring farms affecting local herds.

A summary of the number of animals involved in the outbreaks in Rodrigues and Mauritius is reported in Table 13 and location in Map 13.

The first case in Rodrigues was treated as an isolated case, however due to the continuous appearance of other cases, blood samples were collected and analysed at the Animal Health Laboratory at Reduit, in Mauritius. First positive FMD diagnosis was conducted using competitive ELISA. Diagnosis for the case in Mauritius was confirmed on the 5th of August 2016. Samples were sent for further confirmation to Onderstepoort Veterinary Institute (OVI) in South Africa and results for these are pending. Another set of samples were sent to the French Food Security Agency (ANSES), which confirmed the presence of FMDV, by PCR and virus isolation; antigen detection ELISA carried out on the cell-culture viral isolate which was identified as FMDV serotype O. This event represents the first occurrence of FMD in the country.

Source of the outbreak is attributed to the following transmission pathways: introduction of new live animals, legal movement of animals, fomites (humans, vehicles, feed, etc.) and airborne spread. Control measures put in place are: movement control inside the country, disinfection, traceability, quarantine, surveillance outside containment and/or protection zone, stamping out, official destruction of animal products, official disposal of carcasses, by-products and waste, surveillance within containment and/or protection zone, zoning and vaccination if available for the specific FMDV serotype. No treatment is being provided to the affected animals.

Table 13: summary of the animals involved in the FMD outbreaks that occurred during July and August 2016 on the Islands of Rodrigues and Mauritius.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	41	5 **	2	527	0	**	**	**	**
Sheep / goats		**		1068	0	**	**	**	**
Swine		**		190	0	**	**	**	**
Goats	12	0	0	12	0	0.00%	0.00%	-	100.00%
Sheep	48	0	0	48	0	0.00%	0.00%	-	100.00%
Totals	60	5	2	1845	0	0.00%	0.00%	-	100.00%

*Removed from the susceptible population through death, destruction and/or slaughter

**Not calculated because of missing information

Map 11: Location of the Mauritius Islands where FMD outbreaks occurred in during July and August 2016.

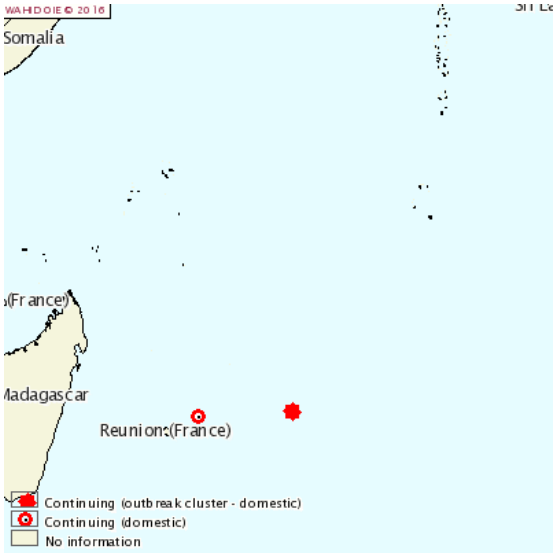


Table 14: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 14 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Congo d. R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required

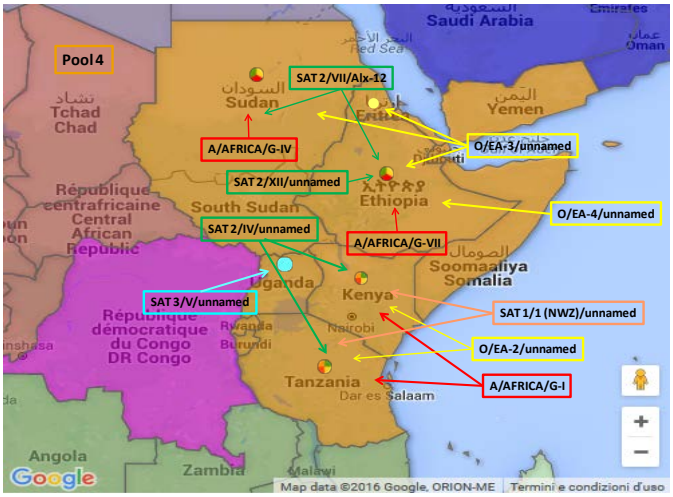
Djibouti	DISEASE ABSENT**	Not available	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	March 2016/A & Sat 2, April 2016/ O	Follow –up needed
Eritrea	2012/O, 2013/ DISEASE ABSENT 2014/ DISEASE PRESENT 2015/ NO DATA REPORTED	Jan 2012/O	Follow –up needed
Ethiopia	O**, 2012/A, 2012 & 2105/SAT 2, 2015**/SAT 1	Jan 2016/ O, May 2016/SAT 2, Jun 2014/A and SAT 1	See text
Kenya	A, O, SAT1, SAT2, 2012 – 2015 /NOT TYPED	July 2016/ A & SAT 1, June 2016/O , Oct 2015/ SAT 2,	See text
Libya	NO DATA REPORTED	Oct 2013/ O, Sat 2/Apr 2012	Follow-up needed
Mauritius	DISEASE ABSENT	Aug 2016/0	See text Follow-up
Rwanda	2012-2013/A, O, SAT1, SAT 2	Nov 2012/not typed	Typing required
Somalia	2012-2014/NOT SAMPLED 2013 – 2014/ NO DATA AVAILABLE	2011	Follow –up needed
Sudan	2013/SAT 2, 2012-2014/O & NOT TYPED 2015**/A & NOT SAMPLED	Dec 2013/ O & A, Jan 2014/SAT 2	Follow –up needed
South Sudan	2014/A, O SAT 1, SAT 2, SAT 3, 2012-2013 & 2015/ NO DATA REPORTED	2011	Follow –up needed
Tanzania	2012-2015/A, O, SAT 1, SAT 2	May 2015/O Apr2013/ A, SAT 1, SAT2	Follow –up needed
Uganda	2012/ SAT 1,2012, 2014/O, 2013/NOT TYPED 2015/NO DATA REPORTED	May 2014/O Nov 2014/SAT1, Jan 2015/A, and SAT 3, July 2015/ SAT 2 and untyped	Follow –up needed See text
Yemen	2012/O, 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA 2015/NO DATA REPORTED	2009/O	Follow –up needed

Map 14: FMD distribution by serotype and topotype for East Africa. 2011 – 2015 (EUFMD)

East Africa is known to be endemic for FMD, but currently available data are limited.

Conjectured circulating FMDV lineages in Pool 4 per 2015 2 [3, 17]:

- O (topotypes EA-2 (Kenya, Tanzania), EA-3 (Ethiopia, Eritrea, Kenya & Sudan) and EA-4 (Ethiopia).
- A/AFRICA (genotypes I (Kenya, Tanzania), IV (Sudan) and VII (Ethiopia))
- A/ASIA/Iran-05 BAR-08 sub-lineage (Egypt)
- SAT 1 (topotypes I (Kenya, Tanzania))
- SAT 2 (topotypes IV (Kenya, Tanzania), VII (Sudan, Ethiopia), XII (Ethiopia))
- SAT 3 (only detected in African buffalo in the south of the QENP, Uganda in 1970 & 1997 and recently in 2013)



E. POOL 5 – West / Central Africa

Cameroon [12]

LANAVET - Garoua, Cameroon detected antibodies against FMDV non-structural proteins (NSP) in 56 of the 90 bovine serum samples (62.2%) tested using the ELISA. The laboratory is limited in its activities as diagnostic kits continue to be out of stock. LANAVET is continuing its collaborative activities with the Ohio State University and Plum Island Laboratory, USA.

Ghana [13] **and Senegal** [14]

No FMD outbreaks were reported for July 2016 by the ACCRA Veterinary Laboratory, Ghana and by the Laboratoire National de l'Elevage et de Recherches Vétérinaires. The latter laboratory has completed the testing of sera collected within a FAO-Tads TCP. The same laboratory also has on-going collaborations within the Defence Threat Reduction Agency Cooperative Biological Engagement Programme (DETRA/CBEP).

Table 15: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 15 below.

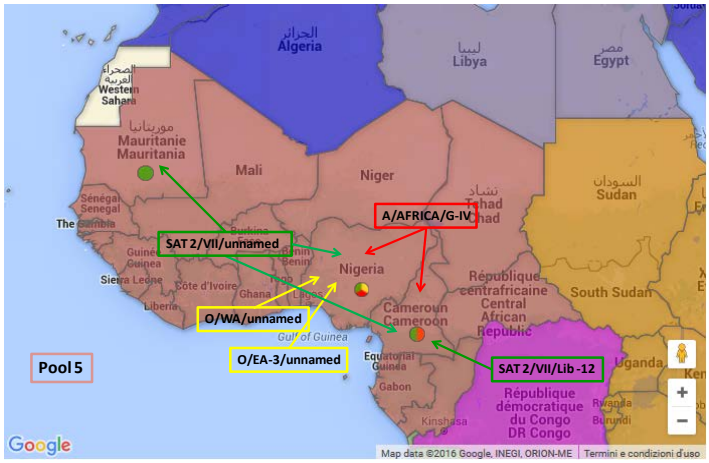
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT SEROTYPES NOT REPORTED	2013/ not available	Follow –up needed
Cameroon	DISEASE PRESENT SEROTYPES NOT REPORTED	Apr 2014/ A, Nov 2014/O, SAT 2, May 2014/SAT 1, Jun 2014, Jan 2015 and July-Aug 2015/untyped, Apr 2016/serotyping pending	See text Typing required
Cape Verde	NO DATA AVAILABLE	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed

Chad	2012 – 2013/SEROTYPES NOT REPORTED	Not available	Follow –up needed
Congo D. R.	2012 – 2015/A, O, SAT 1	Jun 2013/not typed	Typing required
Congo R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Cote D'Ívoire	2012, 2015/A, NOT SAMPLED 2013/ SEROTYPES NOT REPORTED	Jun 2013/not typed	Follow –up needed
Equatorial Guinea	2012 – 2013/DISEASE SUSPECTED 2014 – 2015/ NO DATA AVAILABLE	Not available	Follow –up needed
Gabon	NO DATA AVAILABLE	Not available	
Gambia	NO DATA AVAILABLE	2012/O	Follow –up needed
Ghana	2012 – 2015**/SEROTYPES NOT REPORTED	2014/not available	Follow –up needed See text
Guinea Biss.	2012-2013/DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED 2015/ Disease suspected	No data available	Follow –up needed
Guinea	2012-2013, 2015/ DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED	2014/not available	
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2012/ NO DATA AVAILABLE 2013/ SEROTYPES NOT REPORTED 2014-2015/SAT 2 2015/A, SAT 1	2011/2012, no precise data	
Mauritania	2012-2013/NO REPORTED OUTBREAKS 2014-2015**/SAT 2	Dec 2014/SAT 2	Follow –up needed
Niger	2012 – 2014/NOT SAMPLED	2014/not sampled, May 2015/O	Follow –up needed
Nigeria	2014-2015/O	Nov 2015/A and SAT 1, Sept 2014/0 and SAT 2	Genotyping required Follow –up needed See text
Sao Tome Principe	2012/DISEASE ABSENT, 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Senegal	2013/NO DATA AVAILABLE 2012, 2014-2015**/ NOT SAMPLED	2014/ SAT 1 Feb 2015/ A and O	Follow –up needed See text
Sierra Leone	DISEASE ABSENT	Oct 1958	Follow –up needed
Togo	O, SAT 1	2012/O	Follow –up needed

Map 15: FMD distribution by serotype and topotypes for West Africa, 2012 – 2015(EuFMD)

Conjectured circulating FMDV lineages in Pool 5 per 2015 [3, 17]

- Serotype O (topotypes WA, EA-3 (Nigeria))
- Serotype A (topotype AFRICA, genotypes IV)
- Serotype SAT 1 (?)
- Serotype SAT 2 (topotype VII/Lib-12 and unnamed genotypes)



F. POOL 6 – Southern Africa

Botswana [2]

FMDV serotypes SAT 1 and 2 were detected by WRLFMD respectively in four and one of the six epithelial samples collected from cattle between June and September 2015. Last genotypes detected for the same serotypes were SAT 1/III (WZ)/unnamed in 2015 and SAT 2/III/unnamed in 2014.

Mozambique [2]

FMDV serotype SAT 2 was detected by the WRLFMD in of the two bovine epithelial samples collected in November 2015 in Mozambique. Last genotype detected for the same serotype was SAT 2/I/unnamed in 2015.

RSA [15]

The ARC-Onderstepoort Veterinary Institute, Republic of South Africa examined 4,299 samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 73 samples using FMD NSP ELISA. The laboratory is collaborating with international organisations on research studies.

Zimbabwe [2, 3]

FMDV serotype SAT 2 was diagnosed by the WRLFMD in two of the four bovine epithelial samples collected in April and August 2015 in Zimbabwe. Last genotype detected for the same serotype was SAT 1/II/unnamed in 2015 and SAT 2/II/unnamed in 2015.

Due to the introduction of animals and/or contact with infected animals at grazing/watering, new outbreaks occurred on the 20th of June 2016 in involving cattle of varying age groups in a village in Matabeleland South, Zimbabwe. Although the diagnosis was carried confirmed on serological basis out by the Central Veterinary Laboratory on the 1st of July using NSP ELISA, the outbreak was however attributed to FMDV serotype SAT 2.

This event is part of a series of outbreaks that had started on the 14th of April 2014. Clinical cases before the present one were last observed a year ago in the Esigodini area, which is within the province of Matabeleland South. Only ring vaccination in response to these cases was carried out due to vaccine shortage and for this, animals inside the infected area remain to date unvaccinated. The latest cases are suspected to be due to animals presenting mild/sub-clinical cases. The area has been placed under quarantine and inspections are on-going.

Summary of the animals involved and location of outbreaks are respectively reported in Table 16 and Map 16. Control measures currently in place are movement control inside the country, vaccination in response to the outbreak, details of which are reported in Table 17, disinfection, quarantine, surveillance outside and within the containment and/or protection zone, control of wildlife reservoirs, zoning. Treatment of affected animals is not being provided.

Table 16: summary of the animals involved in the FMD outbreak that occurred in June 2016 in Matabeleland South, Zimbabwe.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	1600	17	0	0	0	1.06%	0.00%	0.00%	0.00%

*Removed from the susceptible population through death, destruction and/or slaughter

Map 16 Location of the FMD outbreak which occurred in June 2016 in Matabeleland South, Zimbabwe.

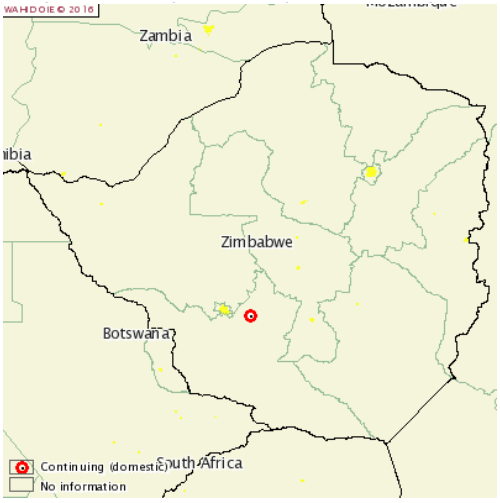


Table 17: Summary of the vaccination campaign reported in July 2016 carried out in different areas of Zimbabwe.

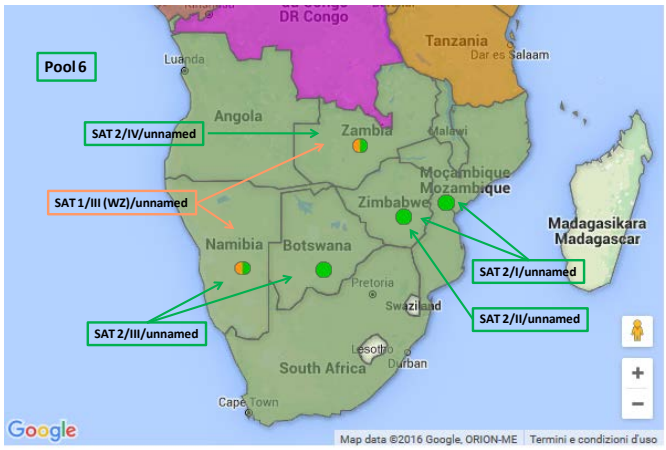
Administrative division	Species	Total Vaccinated	Details
Manicaland	Cattle	50,000	Routine vaccinations in the wildlife-livestock area
Masvingo	Cattle	26,992	First booster vaccination, 28 days after the initial vaccination of all properties within a 20-km-radius zone around the infected outbreaks. A turnout of 78% was recorded.

Table 18: Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map17 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013-2014/ DISEASE ABSENT 2015/ SEROTYPES NOT REPORTED	July 2015/ SAT 2 May 2016/typing pending	See text
Botswana	2012-2015/SAT 2 2014-2015/SAT 1	Jun 2015/typing pending July 2015/SAT 2, June 2015/SAT 1	Follow –up needed
Congo D. R.	2012 – 2015/A, O, SAT 1	Jun 2013/not typed	Follow –up needed
Malawi	2012/NO REPORTED OUTBREAKS 2013-2015/ NO DATA AVAILABLE	Oct 2011, Sep 2015/SAT 1	Follow –up needed
Mozambique	2012 -2013/DISEASE ABSENT, 2014/ SEROTYPES NOT REPORTED	July 2015/SAT 2, May 2015/ SAT 1	Follow –up needed See Text

	2015/ NO DATA AVAILABLE		
Namibia	2012-2014/SAT 1 2014-2015/SAT 2	May 2015/SAT 1, Jun 2015/SAT 2, July/typing pending	Follow –up needed
South Africa	2012-2015/SAT 2 2013/SAT 1 2015/SAT 3	Dec 2015/SAT 3, Nov 2014/ SAT 2, Aug 2013/SAT 1	See text Genotyping required
Zambia	2012/SAT 1, SAT 2 2013-2015/ NO DATA AVAILABLE	Jan 2013/SAT 1, SAT 2, Mar 2016/SAT 3	Follow –up needed
Zimbabwe	2012-2015**/SAT 2 2013/SAT 3 2014/SAT 1	July 2016/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	Follow –up needed

Map 17: FMD distribution by serotype and topotype for Southern Africa, 2012 – 2015 (EuFMD)



Swaziland and Lesotho are free from FMD without vaccination. There is a zone in both Botswana and Namibia, which has been FMD free without vaccination, since 2010 and 1997 respectively.

Conjectured circulating FMDV lineages in pool 6 per 2015 [3, 17]:

- Serotype SAT 1 (topotypes I(?), I(?)I and III)
- Serotype SAT 2 (topotypes I, II, III and IV)
- Serotype SAT 3 (?) (topotypes I, II and III)

G. POOL 7 – South America

South America [3, 16]

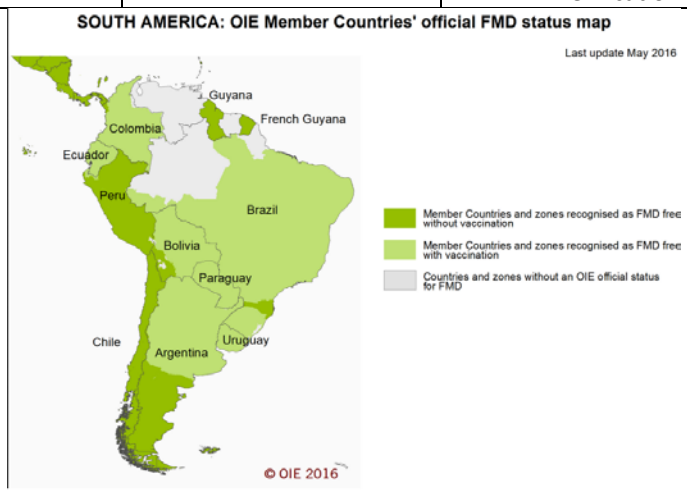
The OIE FMD status of the countries in South America as reported in May 2015 is presented in Map 18.
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the OIE maps (see: http://www.oie.int/en/animal-health-in-the-world/official-disease-status/fmd/en-fmd-carte/).
Small areas of the continent may still be considered as endemic but clinical cases are rare (Map 18). The FMD history between 2012 –2014 is reported in Table 19.

Table 19: Summary of the history of FMD Pool 7, 2012 – 2015, for geographic distribution see Map 18 below

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2015**(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment

Paraguay	DISEASE ABSENT	Dec 2011/O	
Venezuela	DISEASE ABSENT**	2011/O, A	National situation needs verification

Map 18: FMD status for South America [3].



IV. OTHER NEWS:

[2]The 2nd WRLFMD Quarterly Report for the period April – June 2016 published the following table (Table 20) that contains a list of recommended FMDV strains for antigen banks of FMD-Free countries. The discussion of this table is within the report.
The WRLFMD is at present working to adopt a risk-based approach for identifying circulating FMDV lineages and relate these to priority vaccines for use in Europe and other FMD-free settings.

Table 20: Recommendations from WRLFMD® on FMD virus strains to be included in IN FMDV antigen banks (for FMD-free countries) - June 2016
Note: Virus strains are NOT listed in order of importance

High Priority	A/ASIA/G-VII(G-18)* O Manisa O PanAsia-2 *(or equivalent)* O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 *(or A TUR 06)* A22 Iraq SAT 2 Saudi Arabia *(or equivalent i.e. SAT 2 Eritrea)*
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 (or Thai equivalent such as A/Sakolnakorn/97) A Argentina 2001 O Taiwan 97 *(pig-adapted strain or Philippine equivalent)*
Low Priority	A Iran '96 A Iran '99 A Iran 87 or A Saudi Arabia 23/86 *(or equivalent)* A15 Bangkok related strain A87 Argentina related strain C Noville SAT 2 Kenya SAT 1 Kenya SAT 3 Zimbabwe

NB: Discussions are currently underway to adopt a risk-based approach for different FMD viral lineages to identify priority vaccines for use in Europe and other FMD-free settings.

*Recent *in vitro* data from WRLFMD for serotype A viruses from Saudi Arabia and Iran highlights an apparent gap in vaccine coverage. Work is urgently required to evaluate whether there is adequate *in vitro* match with Indian vaccine strains (A/IND/40/2000), or whether *in vivo* protection may be provided by high potency international vaccines.

V. REFERENCES - Superscripts

1. SEACFMD, http://www.arahis.oie.int/reports.php?site=seafmd
2. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org
3. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
4. South Asia Weekly Animal Disease E-Information - Regional Support Unit for South Asian Association for Regional Cooperation (RSU-SAARC) www.saarc-rsu-hped.org
5. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (Dr B. B. Dash) FAO
6. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*
7. FMD Monthly Report for Egypt (February and March 2016) - *Dr. Sherif Abd Elkhalik*, Head of Epidemiology Dept. and Dr. Mohamed Atea, Head of Central Administration of Preventive
8. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator
9. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*
10. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana Fomina*
11. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw*
12. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - *Dr. Simon Dickmu Jumbo*
13. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni*
14. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – Miss Mariame Diop and Dr. Moustapha Lô
15. ARC-Onderstepoort Veterinary Institute, Republic of South Africa - *Dr LE Heat - Ms E Kirkbride*
16. 43a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa, Punta del Este, Uruguay, 7-8 April, 2016. http://www.panaftosa.org/cosalfa43/
17. OIE/FAO FMD Reference Laboratory Network, Annual Report 2014