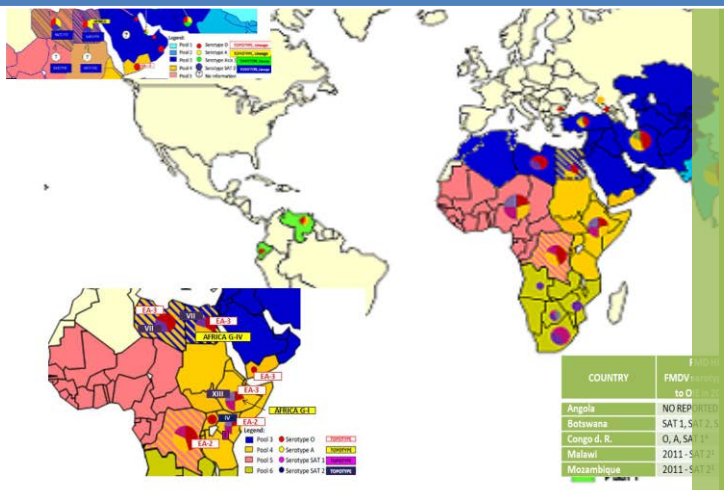
2016

Foot-and-Mouth Disease Situation
Monthly Report November 2016



EuFMD

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

November2016

Guest Editor
Dr. Kees van Maanen
Virologist GD Animal Health Service in the Netherlands
and EuFMD Animal Health Officer

#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

Dear All,

It is really a pleasure and a privilege for me to write the last editorial of 2016 for this monthly report. Despite the wish for a quieter 2016, expressed in the first editorial of this year, FMD seems very much alive and consequently there is clearly a need for real-time good quality information.

Also in 2016 there appears to have been an upsurge in long-distance trans-pool movements of FMD virus from Pools 1 and 2 (recent high-profile examples O/ME-SA/Ind-2001d and A/ASIA/G-VII). O/ME-SA/Ind-2001d seems a very fit virus strain as, after the unexpected FMDV outbreaks reported earlier this year on the Island of Rodrigues and Mauritius (two islands separated by 350 miles and located in the Indian Ocean), it continues to extend its geographic dispersion as proven by new outbreaks in Myanmar and the East of Russia (see present report).

In Europe, the greatest concerns currently relate to the emergence of the A/ASIA/G-VII lineage that has spread to the margins of Anatolian Turkey (close to the FMD-free [with vaccination] zone in Thrace) since in vitro and in vivo data indicates that internationally available vaccines (containing A-SAU-95 or A-Iran-05-like viruses) are unlikely to provide protection.

An important highlight in this report and a historical moment is the availability of new sequence data for FMDV serotype SAT 1 samples from Nigeria. The last characterized SAT1 isolate in Nigeria was from 1981 and the recent SAT1 isolates, defined as belonging to a new topotype FMDV SAT1 X, are highly divergent (77% identity based on VP1 sequences) as compared with the most closely related SAT1 sequences. This also illustrates the paucity of sample collection and highlights obvious gaps in our current knowledge regarding the epidemiology of FMD virus lineages that circulate in West Africa and other endemic countries in pool 5, and in other pools, as well as a lack of empirical evidence for the selection and use of vaccines in several regions.

End of November the 2016 annual meeting of the OIE/FAO FMD Reference Laboratories (RefLab) Network was hosted by the French Agency for Food, Environmental and Occupational Health & Safety (ANSES), at Maison Alfort, Paris, France. The principal objective of the meeting was to exchange information on the activities held by the various laboratories especially on the diagnostic aspects, including the production and distribution of reagents, training and research activities, as well as to discuss specific topics, review the work plan of the preceding year and define the work programme for the forthcoming year 2017.

Particular emphasis was put on the changing patterns of FMD virus circulation with the identification of new threats and recommendations for vaccines, verification of the adequacy of laboratory tests of international and national reference laboratories and recommendations on the development of local capabilities in support of regional control programmes. The RefLab global network was commended for all the good work but both FAO and EuFMD also underlined the need to support regional laboratory and epidemiology networks to fill the gaps in virological surveillance. Disease intelligence was also emphasized and the OIE/FAO FMD reference laboratories were encouraged to engage in regional networks and bring their expertise into regional and thematic networks and roadmap meetings. There are still many gaps in our understanding of the regional circulation and long distance movements of this virus and our surveillance databases for early warning of viral movement or emergence and just as importantly - but often overlooked - the disappearance of existing and previously dominant strains. Also new approaches to improve vaccine antigen prioritisation for vaccine banks (the PRAGMATIST tool) are much needed and highly relevant.

I would like to wish you all a Merry Christmas and a happy New Year!

Kees van Maanen, EuFMD

I. GENERAL OVERVIEW

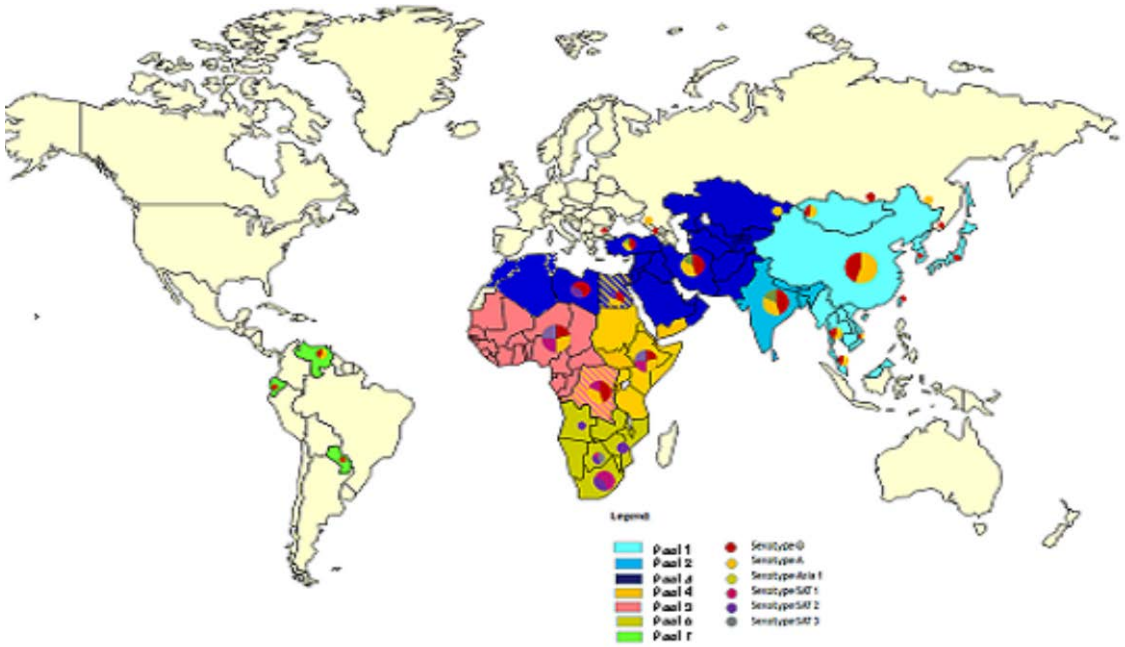
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below 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

China (People's Rep. of) [1] - A FMD outbreak due to serotype O occurred on the 22nd of November 2016, in cattle in Xinjiang, China (People's Rep. of).

Malaysia [2] – Vaccine matching strain differentiation (VMSD) tests were conducted on bovine samples collected between 2014-2016, in which FMDV serotypes A and O were detected. Only vaccine strains for FMDV serotype O gave good matching results.
Details of the results of the cell culture/ELISA serotyping, genotyping of VP1 and 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 4th Quarterly WRLFMD Report (October-December 2016).

Mongolia [2, 3] – The VP1 sequences obtained from samples collected in Mongolia during 2016, forwarded to the WRLFMD by the Federal Governmental Institute Centre for Animal Health (FGI-ARRIAH), were genotyped as A/ASIA/Sea-97.

Myanmar [2] – A sample collected in Myanmar in 2016, forwarded to the WRLFMD by the Regional Reference Laboratory for FMD, Pakchoong, Thailand, was genotyped by the WRLFMD as O/ME-SA/Ind-2001d.

SEACFMD [4] **–** New FMD outbreaks were reported during October 2016 in Cambodia, Thailand and Vietnam.

Russian Federation [1,2,3]- A FMD outbreak due to serotype O occurred on the 22nd of November 2016, in cattle in Zabajkal`Skij Kray, Russian Federation. VP1 sequences provided by FGBI-ARRIAH to the WRLFMD of samples collected from this outbreak were identified as O/ME-SA/Ind-2001d, which confirm the results obtained by FGBI-ARRIAH.

Thailand [2] – Samples collected from cattle and pigs in Thailand during 2016, as also, VP1 sequences of field viruses isolated in 2016, were forwarded to the WRLFMD by the Regional Reference Laboratory for FMD, Pakchoong,

Thailand. FMDV serotypes A and O were detected that respectively belong to A/Asia/Sea-97 and O/SEA/Mya-98 and O/ME-SA/Ind-2001d viral lineages.

POOL 2 - SOUTH ASIA

India [5] – The Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India reported for November 2016 the detection of FMDV serotype O in bovine samples.

Nepal [6] – The National Foot and Mouth Disease and TADS Laboratory, Nepal reported for November 2016 that FMDV serotype O is still the only serotype being detected in the country.

POOL 3 - WEST EURASIA & MIDDLE EAST

Pakistan [7] - The Progressive Control of Foot and Mouth Disease Project reported 122 FMD outbreaks occurring in the country during November 2016 caused by FMDV serotypes A, Asia 1 and O.

Saudi Arabia [1, 2] - A FMD outbreak due to serotype A occurred on the 14th of October 2016, in cattle and sheep in Ar Riyad, Saudi Arabia**.** Samples collected on the same day of the start of FMD outbreak were sent to the WRLFMD by the Almaria Company, Izdahair District, Riyadh, Saudi Arabia were they were genotyped as for A/ASIA/G-VII and O/PanAsia 2.

POOL 4 - EASTERN AFRICA

Ethiopia [8]**-** The National Animal Health Diagnostic and Investigation Center (NAHDIC) detected FMDV in bovine samples.

Kenya [9] - The National FMD Reference Laboratory Embakasi, Kenya detected FMDV serotypes A, SAT 1 and SAT 2 in bovine samples.

Mauritius [1] – The country has finished the first round of booster vaccination and will complete the second one within the next six months.

POOL 5 - WEST/CENTRAL AFRICA

Cameroon [10]**-** The Laboratoire National Vétérinaire (LANAVET), Garoua detected FMDV in bovine samples.

Guinea Bissau [1] **–** A FMD outbreak for which typing is still pending was reported on the 2nd of December 2016 in cattle farm located in BAFATA, Guinea Bissau. Further details relative to the event will be provided in the December issue.

Nigeria [2] **–**FMDV serotypes O and SAT 1 were detected among the 22 bovine samples forwarded to the WRLFMD by the National Veterinary Research Institute Vom, Nigeria. Of note is that SAT 1 has not been detected in the country since 1981.

POOL 6 - SOUTHERN AFRICA

Republic of South Africa [11] **–** The ARC-Onderstepoort Veterinary Institute:Transboundary Animal Diseases Programme reported the detection of FMDV SAT 2.

POOL 7 - SOUTH AMERICA

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

COUNTER

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

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

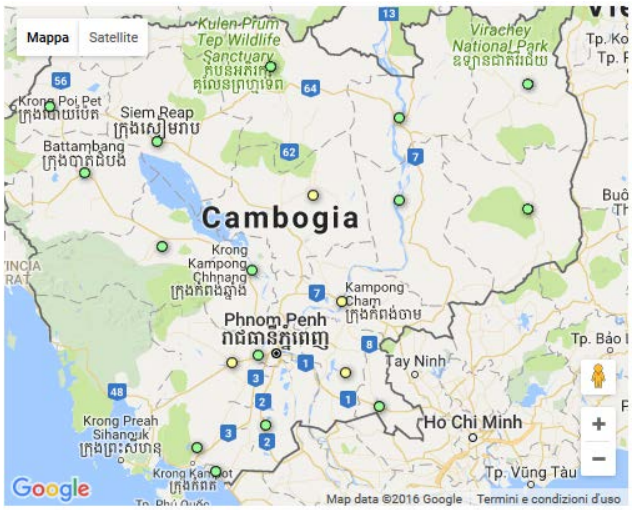
III. DETAILED POOL ANALYSIS

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

Cambodia[4]

Five new FMD outbreaks were reported in four different provinces of the country, which add to the 157 FMD events occurring in the country. Location of the outbreaks is represented in Map 2. Six of the outbreaks are due to FMDV serotype O while 141 outbreaks were not sampled and 10 outbreaks are pending for typing.
Most recent viral lineages identified in the country by the WRLFMD are O/ME-SA/PanAsia and A/Asia/Sea-97.

Map 2: location of FMD outbreaks reported as ongoing during October 2016 in Cambodia. Locations identified with yellow dots are the provinces with new FMD events.



China (People's Rep. of) [1]

A FMD outbreak due to serotype O occurred on the 22nd the November 2016, in a backyard farm of cattle in Xinjiang, China (People's Rep. of). The diagnosis was carried out by the Lanzhou Veterinary Research Institute (National and

OIE Reference Laboratory) on the 26th of November 2016 using reverse transcription - polymerase chain reaction (RT-PCR) and virus isolation. A summary of the animals involved and location of the outbreak are represented in Table 2 and Map 3. Source of outbreak is unknown. The following are the control measures adopted: screening, vaccination in response to the outbreak, disinfection, traceability, quarantine, stamping out official destruction of animal products and disposal of carcasses, by-products and waste, surveillance within containment and/or protection zone, zoning and no treatment of affected animals.
Last reported circulation in the country of the viral lineages relative to the serotype that caused the present outbreak were from 2010 and 2011 and these were respectively O/SEA/Mya-98 and O/ME-SA/PanAsia.

Table 2: summary of the animals involved in the FMD outbreak that occurred on the 22nd of November 2016 in Xinjiang, China (People's Rep. of).

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	22	22	0	22	0	100.00%	0.00%	0.00%	100.00%

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

Map 3: location of FMD outbreak, which occurred on the 22nd of November 2016 in Xinjiang, China (People's Rep. of).

Malaysia [2]
Field isolates A/MAY/15/2014 and O/MAY/17/2014, O/MAY/1/2015 and O/MAY/5 and 10/2016, respectively belonging to the following viral lineages A/ASIA/Sea-97 and O/SEA/Mya-98 were tested against the relative vaccine strains.
Good matching results were obtained for FMDV serotype O with 3039, O Manisa and O Tur 5/09 while for serotype A, none of the following vaccine strains gave good matching results: A IRN/2005, A/MAY/97, A/TUR/20/2006 and A22 IRQ/24/64.

Mongolia [2, 3]
FGI-ARRIAH forwarded to the WRLFMD the VP1 sequences obtained from three bovine samples collected during the outbreak that occurred in July 2016 in Govi-Sumber, Mongolia which were genotyped as A/ASIA/Sea-97. The most closely related FMD field virus not pertaining to the country is MYA/3/2015 with a sequence identity (seq id) of 98.6%.

Myanmar [2]
A sample collected in Myanmar in 2016 forwarded by the Regional Reference Laboratory for FMD, Pakchoong, Thailand to the WRLFMD was genotyped as O/ME-SA/Ind-2001d.

Further to the above genotype, A/ASIA/Sea-97 and O/SEA/MYA-98 are the other viral lineages that were detected in the country between 2009 and 2015.

SEACFMD [4]

The Organization reported new FMD outbreaks occurring during October 2016 in Cambodia, Thailand and Vietnam which are described in more detail in other parts of the present report. FMD ongoing outbreaks in the Region are currently occurring in Cambodia, Malaysia, Myanmar, Thailand and Vietnam. Distribution of these events among the different countries is reported in Table 3.

Genotypes detected by the WRLFMD in the above countries with ongoing outbreaks during 2015 and 2016 were A/ASIA/SEA-97 in Cambodia Malaysia, Myanmar, Thailand and Vietnam, O/ME-SA/PanAsia in Cambodia and Thailand, O/SEA/Mya-98 in Malaysia, Myanmar, Thailand and Vietnam and O/ME-SA/Ind-2001d in Myanmar and Thailand.

Table 3: Distribution of FMD outbreaks in the SEACFMD countries reported during November 2016.

SEACFMD countries reproting ongoing outbreaks	N° of outbreaks
Cambodia	157
Myanmar	3
Malaysia	48
Thailand	139
Viet Nam	26
Total	**373**

Russian Federation [1, 2, 3]

A FMD outbreak involving a farm of cattle, sheep and goats, due to serotype O occurred on the 22nd of November 2016, in Zabajkal`Skij Kray, Russian Federation. Diagnosis was confirmed by FGBI-ARRIAH, the OIE Reference Laboratory using antigen detection ELISA, RT-PCR and complement fixation test**.** A summary of the animals involved and location of the outbreak are represented in Table 4 and Map 4. Source of outbreak is unknown while control measures adopted are: movement control inside the country, screening, vaccination in response to the outbreak with the vaccination of 2,379 cattle and 2,231 small ruminants, disinfection, quarantine, surveillance outside/inside containment and/or protection zone, zoning. No treatment of affected animals is being carried out while modified stamping out will be adopted.

Table 4: summary of the animals involved in the FMD outbreak that occurred on the 22nd of November 2016 in Zabajkal`Skij Kray, Russian Federation.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	481	113	0		0	23.49%	0.00%	0.00%	**
Sheep / goats	260	0	0	0	0	0.00%	0.00%	-	0.00%
Totals	**741**	**113**	**0**	**0**	**0**	**15.25%**	**0.00%**	**0.00%**	**0.00%**

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

**Not calculated because of missing information

Map 4: location of FMD outbreak, which occurred on the 22nd of November 2016 in Zabajkal`Skij Kray, Russian Federation.

VP1 sequences provided by FGBI-ARRIAH to the WRLFMD of the FMDVs detected in two cattle samples collected from this outbreak were identified as O/ME-SA/Ind-2001d, confirming the results obtained by the former laboratory. The most closely related sequence of FMDV not pertaining to the country is TAI-225-2016R3 with a seq id of 99.2% to both field viruses.

The FMD outbreak due to serotype Asia 1 that occurred on the 16th of October 2016 on a mixed species farm of cattle, goat, sheep and pigs in Vyshmanovo, Sobinsky, Vladimirskaya Oblast is reported as resolved on the 11th of November 2016. Ongoing control measures are the same as those reported for the outbreak above with the vaccination of 18,309 cattle and 1,648 small ruminants. In both outbreaks, details on the type of vaccine used are unavailable.

Further to the above mentioned activities, FGBI-ARRIAH reported for the month of November the testing of 1,386 sera for post-vaccination monitoring. The laboratory personnel were involved in the epidemiological investigations of FMD outbreaks. The FGBI-ARRIAH provided 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. Experts from FGBI-ARRIAH attended the 11th OIE/FAO FMD Reference Laboratory Network Annual Meeting held at ANSES, Paris France held between the 30th November and the 2nd of December 2016.

Thailand [2, 4]

Samples collected from cattle and pigs in Thailand between March and August 2016, together with VP1 sequences of field viruses isolated in 2016 were forwarded to the WRLFMD by the Regional Reference Laboratory for FMD, Pakchoong, Thailand. FMDV serotypes A and O were detected which respectively belonged to A/Asia/Sea-97 and O/SEA/Mya-98 and O/ME-SA/Ind-2001d lineages. A summary of the FMDV positive samples is reported in Table 5.

Further to the genotyping results of samples directly send to the WRLFMD, the Reference Laboratory also submitted VP1 sequences of two field viruses isolated in 2016 that were genotyped as O/ME-SA/Ind2001d. The most closely related sequence of the field virus not pertaining to the country is that of O/NEP/6/2016 with a seq id of 98.6%.

Table 5: summary of the genotyping results of FMDV positive samples collected in different areas of Thailand between March and August 2016.

Sample Identification	Origin	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species
TAI/18/2016	Lamphun	09/03/2016	A/ASIA/Sea-97	/	/
TAI/19/2016	Ko Thuat	18/03/2016			
TAI/20/2016	Nakhon Si Thammarat	05/04/2016			
TAI/22/2016		08/04/2016			
TAI/23/2016	Lamphun	18/04/2016			
TAI/21/2016	Phatthalung	11/04/2016	O/SEA/Mya-98	MYA/1/2015 (98.7 - 99.4)	cattle
TAI/26/2016	Ratchaburi	25/05/2016			
TAI/30/2016	Ta	29/07/2016			
TAI/31/2016		29/07/2016			
TAI/32/2016	Mae Tha	29/07/2016			
TAI/33/2016	Rim Ping	29/07/2016			
TAI/34/2016	Ban Lueak	02/08/2016			
TAI/35/2016	Samran	02/08/2016			
TAI/37/2016	Tamnam	11/08/2016			

Thirty-one new FMD outbreaks were reported in Thailand during October 2016, with 139 outbreaks registered in the country, of which nine are caused by FMDV serotype A, 67 caused by serotype O while 10 outbreaks are listed as not sampled, three not typed and the remaining outbreaks with typing still pending. Location of the outbreaks is represented in Map5.

Map 5: location of FMD outbreaks reported as ongoing during October 2016 in Thailand. Locations identified with yellow dots are the provinces with new FMD events.

Vietnam [4]

Three new FMD outbreaks were reported in Vietnam during October 2016, with a total of 26 outbreaks registered in the country, of which one is caused by FMDV serotype O, six outbreaks are listed as not sampled, 15 not typed and the remaining with typing still pending. Location of the outbreaks is represented in Map 6.

Map 6: location of FMD outbreaks reported as ongoing during October 2016 in Vietnam.
Location identified with a yellow dot is the province with new FMD events.

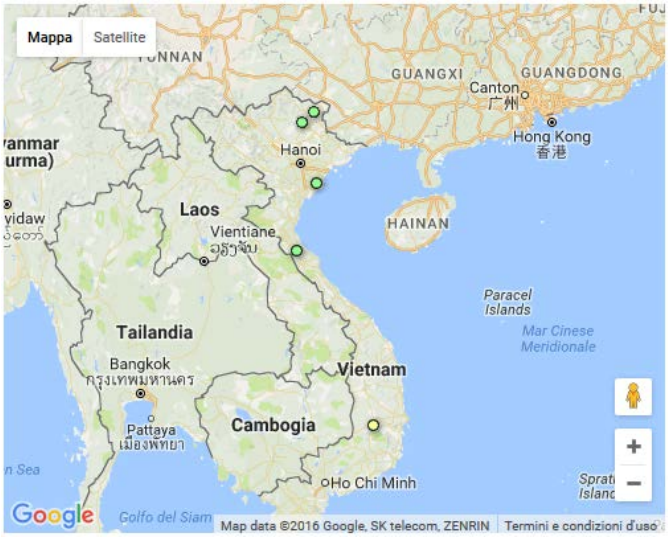


Table 6: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 7 below.

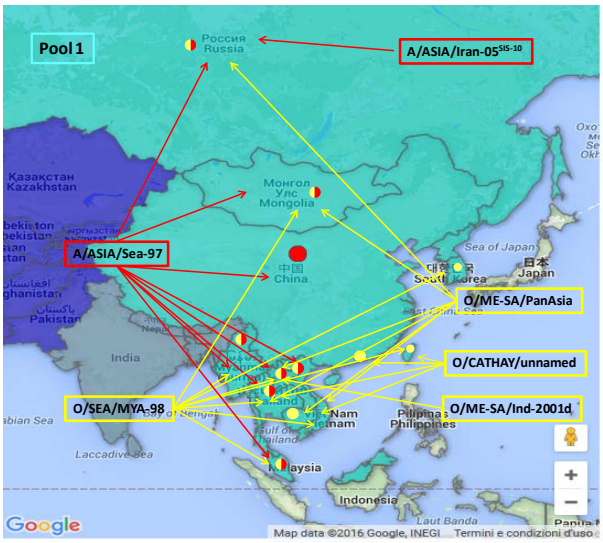
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	O, 2013-2015/NOT SAMPLED	July 2016/ not typed or not sampled, Sep 2015/O and A, Aug 2014/ not typed, June 2014/not typed	See text Typing required
China (People's Rep. of)	2012-2013/O, 2013 & 2015/A 2012 - 2014/NOT TYPED**	May2016/O, May 2015/A	See text
China (Hong Kong, Sar)	O**	Aug 2015/O	Follow-up needed
China (Taiwan Province)	2012-2013/O, A/2015**	Jun 2015/A	Follow-up needed
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,	Follow-up needed
Malaysia	2012 –2015/O 2013 & 2015/NOT TYPED	August 2016/A & O	See text Follow-up needed
Mongolia	2013/A & NOT TYPED, 2014 & 2015**/O	July 2016/O, Sept 2013/A,	See text
Myanmar	2012-2014/O, 2015/A & NOT TYPED	Aug 2016/O, July 2016/ not typed, Oct 2015/A	See text

Russian Federation	2012, 2014 & 2015/O, 2013 - 2015/A	Oct 2016/Asia 1, Jan 2016/ A and Dec 2015/O	See text
Thailand	O, A NOT SAMPLED & NOT TYPED	Sep 2016 /A, Aug 2016/O June – July 2016/not typed	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 [1, 16]:

- 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]

The ICAR-PDFMD, Mukteswar, India detected FMDV serotype O among the six bovine samples examined during November 2016 using FMDV antigen and/or RNA detection. Five field samples belonging to serotype O were genotyped and subjected to vaccine matching tests. In support of ongoing epidemiological investigations, 2,215 serum samples were tested for FMDV antibodies.

The personnel of ICAR-PDFMD were as for the previous months also involved in the field investigation of FMD outbreaks and in providing expert advice to the Government and to the National and Local authorities. The institution is continuing its research studies and collaborations with international organisations.

Nepal [6]

The TADS Laboratory in Nepal reported for November 2016 the detection of FMD outbreaks due to serotype O. Serological analyses for FMD were also carried out. The laboratory personnel were involved in outbreak investigations and in the provision of expert advice to the Government and to the National and Local authorities.

FMD outbreaks registered in the country since 2009 to 2016 were all due to serotype O, with the respective circulation of the following lineages: O/ME-SA/PanAsia-2 and O/ME-SA/Ind-2001d.

Table 7: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 8 below.

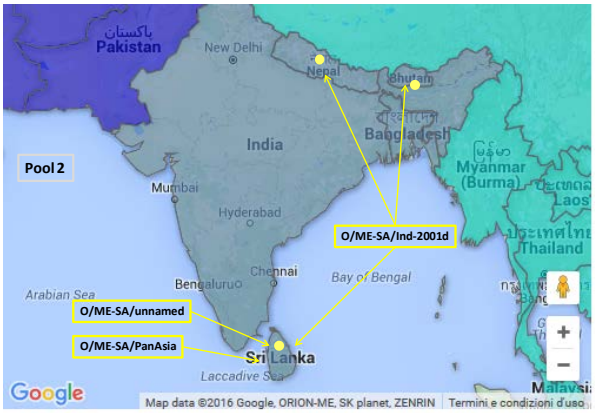
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment

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	Oct 2016/O, Apr 2015/A Apr 2015/Asia 1	See text
Nepal	O, 2012-2103/Asia 1	OCT 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 [1, 15]:

- 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 – <u>West Eurasia & Middle East</u>

Pakistan [7]

The Progressive Control of Foot and Mouth Disease Project reported 122 FMD outbreaks occurring in Pakistan during November 2016 caused by FMDV serotypes A, Asia 1 and O. A summary of their distribution is represented in Table 8. The outbreaks were principally caused by FMDV serotype O (54.1 %), followed by A (9%) and Asia 1 (6.6%) while 3.3 % of the outbreaks were due to more than one serotype and 27% of the outbreaks were untyped. Location of districts with reported FMD outbreaks is presented in Map 9.

Viral lineages detected in samples collected in 2015 and sent for genotyping to the WRLFMD were A/ASIA/Iran-05, ASIA 1/ASIA/Sindh-08, O/PanAsia-2 and O/ME-SA/pak-98.

Ring vaccination and vaccination was performed on cost sharing basis, involving a contribution from the farmers, with the administration of 32,730 vaccine doses during November 2016. A summary of the number of interventions carried out in the different provinces is presented in Table 9.

During the same month, the PC-FMDP also conducted Capacity Building training course in Khyber Pakhtunkhwa attended by 20 Veterinary Officials to which sample collection kits were distributed.

Table 8: FMD outbreaks with relative serotypes that occurred during November 2016 in the different areas of Pakistan.

Location of outbreaks and N° ()		N° of Outbreaks (%) per FMDVs Serotype(s)				
Province	**District**	**'O'**	**'A'**	**'Asia-1'**	**'Mixed'**	**Un-Typed**
Sindh (52)	Karachi (15)	11	2	-	-	2
	Thatta (5)	4	-	-	-	1
	Matiari (32)	23	1	-	-	8
Khyber Pakhtunkhwa (1)	Swat (1)	--	--	--	--	1
Azad Kashmir (8)	Bhimber (3)	--	--	--	--	3
	Mirpur (5)	4	--	--	--	1
Punjab (61)	Chakwal (2)	--	--	--	--	2
	Okara (8)	3	1	3	--	1
	Attock (3)	--	--	1	--	2
	Lahore (4)	1	1	--	1	1
	Gujranwala (4)	1	--	2	--	1
	Kasur (2)	--	1	--	--	1
	Rawalpindi (3)	1	--	--	--	2
	Multan (4)	3	1	--	--	--
	Khanewal (10)	6	--	--	1	3
	Faisalabad (11)	5	1	1	1	3
	Mianwali (1)	--	1	--	--	--
	Shaikhupura (3)	1	1	1	--	--
	Bahawalpur (1)	--	--	--	--	1
	Layyah (4)	3	1	--	--	--
	Vehari (1)	--	--	--	1	--
Totals	**122**	**66 (54.1)**	**11 (9)**	**8 (6.6)**	**4 (3.3)**	**33 (27)**

Map 9: Location of the Districts where FMD outbreaks occurred in Pakistan during November 2016.

Table 9: Vaccination activities carried out during November 2016 in the various Provinces of Pakistan.

	N° of Doses		
Province	**Ring Vaccination**	**Cost sharing basis**	
Sindh	4,700	3,630	
Balochistan	--	2,100	
Khyber Pakhtunkhwa	--	275	
Punjab	1,750	17,650	
Azad Kashmir	625	--	
Federally Administered Tribal Areas	--	--	
Gilgit	200	--	
Islamabad Capital Territory	--	1,800	
Totals	**7,275**	**25,455**	**32,730**

Saudi Arabia [1, 2]

A FMD outbreak due to serotype A occurred on the 14th of October 2016, in cattle and sheep in Ar Riyad, Saudi Arabia. Diagnosis was confirmed on the 20th of October 2016 by Riyadh National Veterinary Diagnostic Laboratory examining bovine and sheep samples using real-time PCR. A summary of the animals involved in the outbreak and location of the event are respectively presented in Table 10 and Map 10.

The first outbreak was detected in Aldanah farm of Almarai Company on the 14th of October 2016, with a second outbreak then detected in Alfanar Farm belonging to the same company. The source of these outbreaks is unknown. Active surveillance revealed FMD cases in two other farms (4 and 2 km respectively to the north of Alfanar farm) and for this the following control measures were adopted: movement control inside the country, vaccination in response to the outbreaks, disinfection, quarantine and surveillance within the containment and/or protection zone. Three bovine samples collected on the same day of the beginning of the FMD outbreak were sent to the WRLFMD by the Almaria Company, Izdahair District, Riyadh, Saudi Arabia with two samples resulting positive for A/ASIA/G-VII and one sample for O/PanAsia 2. Most closely related sequence of field viruses not pertaining to country for A/ASIA/G-VII is represented by PD78/IND/2015 with a seq id of 97.5% and by BAR/1/2014 for O/PanAsia 2with a seq id of 97.9%.

Table 10: summary of the animals involved in the FMD outbreak that occurred on the 14nd of October 2016 in Ar Riyad, Saudi Arabia.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	60,817	**1,020**	0	0	0	1.68%	0.00%	0.00%	0.00%
Sheep	250	2	0	0		0.80%	0.00%	0.00%	0.00%
Totals	**61,067**	**1,022**	**0**	**0**	**0**	**1.67%**	**0.00%**	**0.00%**	**0.00%**

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

Map 10: location of FMD outbreak, which occurred on the 14nd of October 2016 in Ar Riyad, Saudi Arabia..

Table 11: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 11 below.

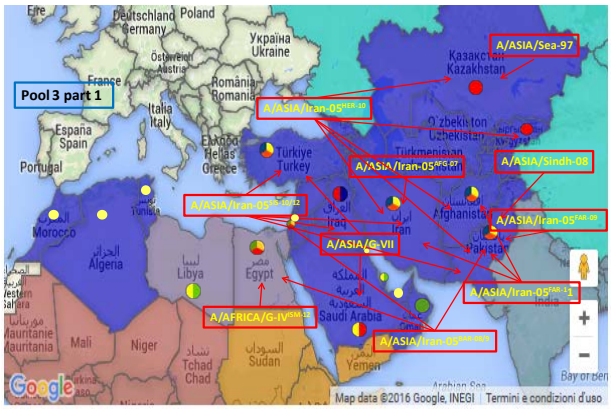
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2015**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	May 2016/A, Jun 2016/Asia 1, Jul 2016/O	Follow –up needed
Algeria	2014 -2015**/O	Apr 2015/O	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, May-Jun 2016/ O & Sat 2	Follow –up needed
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	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,2012 –2013/A 2014-2015**/ DISEASE ABSENT	Aug 2012/O, Jun 2013/ A	Follow –up needed
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	2010/not typed	Follow –up needed

	2015/ NO DATA REPORTED		
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	Oct 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	Follow –up needed
Uzbekistan	2012,2013 & 2015/NO DATA REPORTED 2014/DISEASE ABSENT	Not available	Follow –up needed

Map 11: FMD distribution by serotype and topotype for West Eurasia and Middle East, 2012 – 2015 (EuFMD).

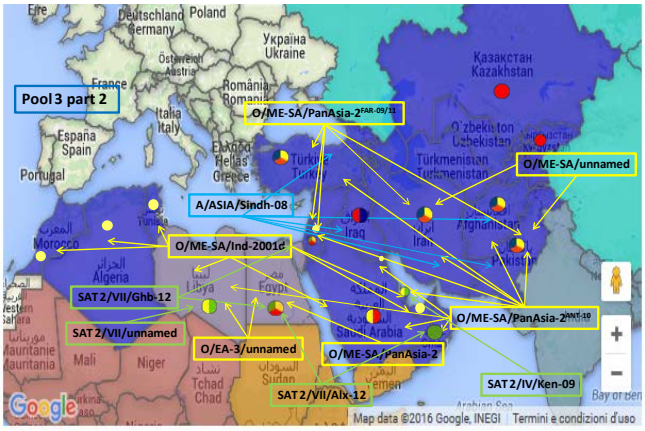
Conjectured circulating FMDV lineages in Pool 3 per 2015 [1, 15]:

- 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 incursions 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 [8]

The NAHDIC detected FMDV in four bovine samples for which typing is ongoing. The laboratory personnel were also involved in the investigation of outbreaks and in the provision of advice to field veterinarians and farmers on the type of vaccine to employ.

An expert from the NAHDIC attended the 11th OIE/FAO FMD Reference Laboratory Network Annual Meeting held at ANSES, Paris France held between the 30th November and the 2nd of December 2016.

Most recent viral lineages identified, belonging to detected serotypes, are relative to samples collected during 2015 and these are respectively A/AFRICA/G-VII and O/EA -3/unnamed and O/EA-4/unnamed. VMSD tests conducted on these serotypes did not give good matching results with the vaccines strains employed represented by A22 IRQ, A IRN 05 and A/TUR/20/2006 for serotype A, while for serotype O, good vaccine matching results were obtained for O 3039 and 0/TUR/5/2009, but not with O Manisa.

Kenya [9]

The National FMD Reference Laboratory Embakasi, Kenya detected FMDV serotypes A and SAT 1 and SAT 2 in bovine samples. The laboratory personnel were involved in the Real Time FMD Training held in October 2016 in Nakuru, Kenya. The laboratory has ongoing collaborations with FAO and EuFMD.

Samples last forwarded by the country to the WRLFMD for genotyping was in 2013. The genotypes detected in relation to the serotypes reported this month were A/AFRICA/G-1 and SAT 2/IV/unnamed from samples respectively collected in 2013 and 2012.

Mauritius [1]

While no further FMD outbreaks were reported to those that occurred in September 2016, the country, adopting the OIE protocol has completed the first round of booster vaccination and will finish the second one within the next six months. Information on the type of vaccine employed is not available. Control measures are still in force in the country represented by movement control inside the country, disinfection, traceability, quarantine, surveillance outside containment and/or protection zone, stamping out, official destruction of animal products, carcasses, by-products and waste, surveillance within containment and/or protection zone and zoning.

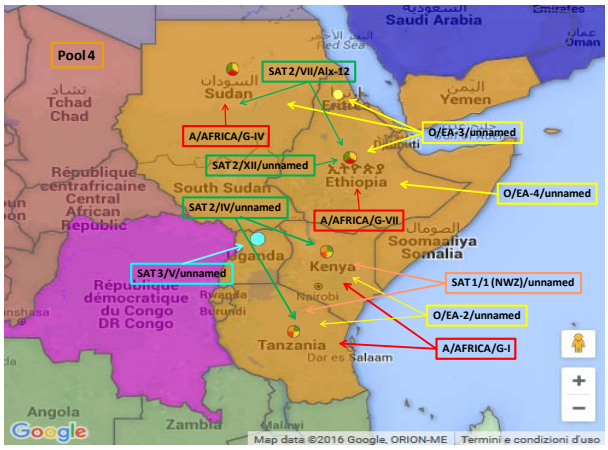
Table12: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 12 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
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, May-Jun 2016/ O & Sat 2	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	Oct 2016/ A & O, May 2016/SAT 2, Jun 2014/ SAT 1	See text
Kenya	A, O, SAT1, SAT2, 2012 – 2015 /NOT TYPED	Oct 2016/ A & SAT 1,Sep 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	Sep 2016/0	See text Follow-up needed
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
Yemen	2012/O, 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA 2015/NO DATA REPORTED	2009/O	Follow –up needed

Map 12: FMD distribution by serotype and topotype for East Africa. 2011 – 2015 (EUFMD)

East Africa is known to be endemic for FMD, but available data is at present limited.
Conjectured circulating FMDV lineages in Pool 4 per 2015 2 [1, 15]:

- 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]

As diagnostic reagents are still out of stock, LANAVET, Garoua carried out only non-serotype specific PCR examing 90 bovine samples of which 30 (30%) were positive for FMDV.
LANAVET has ongoing collaborative activities with the Ohio State University and Plum Island Laboratory, USA.
Last genotypes identified in the country were represented by A/AFRICA/G-IV and SAT 2/VII/Lib-12 in samples collected in 2013 for which VMSD tests are not available.

Nigeria [2, 12]

The National Veterinary Research Institute Vom, Nigeria examined 402 serum samples with 35 positive (8.71%) for NSP 3ABC ELISA. The laboratory was involved in providing support on the control of FMD to local farmers. The laboratory is continuing with the OIE twinning programme with CODA CERVA, Belgium.
FMDV serotype O and SAT1 were detected by the WRLFMD respectively in seventeen and three of the twenty bovine samples collected between February 2015 and September 2016. In particular, SAT 1 has not been detected in the country since 1981.
The most recent genotypes isolated in the country are from samples collected between 2011 and 2014 and are represented by A/AFRICA/G-IV, O/EA-3/unnamed and SAT 2/VII/unnamed.
The VMSD tests conducted for each relative circulating serotype gave good matching results with the following vaccine strains: A ERI/98 and A TUR/06, O 3039 and O TUR/5/09, and SAT 2 ERI and SAT 2 ZIM.

Ghana, Senegal [13, 14]

No FMD outbreaks and activities were reported by the ACCRA Veterinary Laboratory, Ghana and the Laboratoire National de l'Elevage et de Recherches Vétérinaires (ISRA/LNERV), Senegal for November 2016.

Table 13: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map.13 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

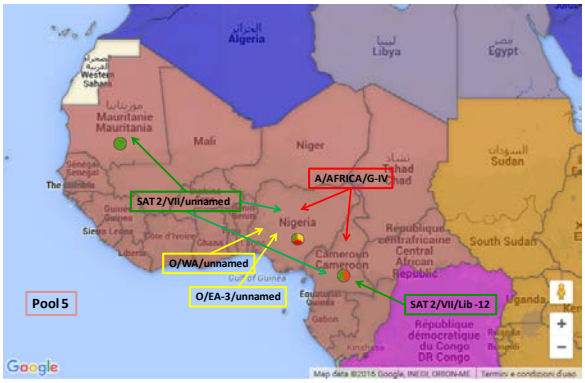
Cameroon	DISEASE PRESENT SEROTYPES NOT REPORTED	Apr 2014/ A, Nov 2014/O, SAT 2, May 2014/SAT 1, Jun 2014, Jan 2015 and July-Aug 2015/untyped, Apr & Aug 2016/serotyping pending	See text Typing required
Cape Verde	NO DATA AVAILABLE	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT 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	See text Follow –up needed
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	Sept 2016/ O & SAT 1 Nov 2015/A, Sept 2014/ SAT 2	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	See text Follow –up needed
Sierra Leone	DISEASE ABSENT	Oct 1958	Follow –up needed

Togo	O, SAT 1	2012/O	Follow –up needed

Map13: FMD distribution by serotype and topotypes for West Africa, 2012 – 2015(EuFMD)

Conjectured circulating FMDV lineages in Pool 5 per 2015 [1, 15]

- 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

RSA [11]

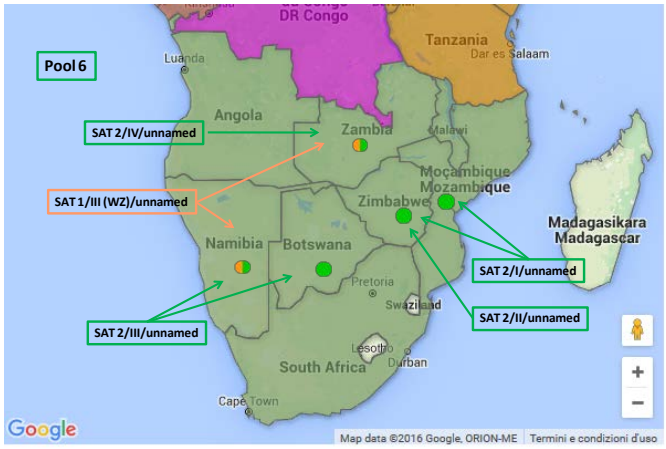
The ARC- Onderstepoort Veterinary Institute, Republic of South Africa reported the detection of FMD serotype SAT 2 in two samples examined using antigen ELISA and PCR. Details on the origin of the samples is not available The same laboratory also examined 3,485 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes O and SAT 1, SAT 2 and SAT 3 and 610 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects.

Table 14: Summary of the history of FMD Pool 6, 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
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013-2014/ DISEASE ABSENT 2015/ SEROTYPES NOT REPORTED	July 2015/ SAT 2 April 2016/typing pending	Follow –up needed
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 2015/ NO DATA AVAILABLE	Sep 2016/ Typing pending, July 2015/SAT 2, May 2015/ SAT 1	Follow –up needed
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 Follow –up needed
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	Sep 2016/SAT 2, Aug 2015/ SAT 1, Jun 2013/SAT 3	Follow –up needed

Map 14: 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 [1, 15]:

- 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 [1, 0] The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 15.

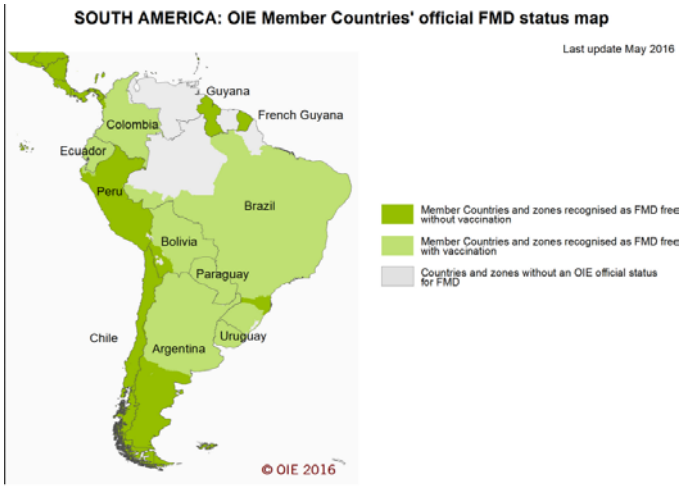
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the 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 15). The FMD history between 2012 –2015 is reported in Table 15.

Table 15: Summary of the history of FMD Pool 7, 2012 – 2015, 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
Paraguay	DISEASE ABSENT	Dec 2011/O	
Venezuela	DISEASE ABSENT**	2011/O, A	National situation needs verification

Map 15: FMD status for South America [1]



IV. OTHER NEWS:

The 11th OIE/FAO FMD Reference Laboratories Network Annual Meeting was held at ANSES, Paris on 30th November to 2nd December 2016. The network has the objective to ensure that the most relevant data regarding FMD outbreaks and surveillance is reported. Minutes of the meeting will be available at http://www.foot-and-mouth.org/oiefao-fmd-reference-laboratory-network/oiefao-fmd-reference-laboratory-network-annual-meeting.

[1]The 3rd WRLFMD Quarterly Report for the period July – September 2016 published the table below (Table 16) 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 16: Recommendations from WRLFMD® on FMD virus strains to be included 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. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
2. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org.
3. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana Fomina*.
4. SEACFMD, http://www.arahis.oie.int/reports.php?site=seafmd.
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. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
8. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw.*
9. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.
10. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - *Dr. Simon Dickmu Jumbo.*

11. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini*
12. ACCRA Veterinary Laboratory, Ghana - *Dr. Joseph Adongo Awuni*
13. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – Miss Mariame Diop and Dr. Moustapha Lô
14. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr LE Heat - Ms E Kirkbride*
15. OIE/FAO FMD Reference Laboratory Network, Annual Report 2014
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/