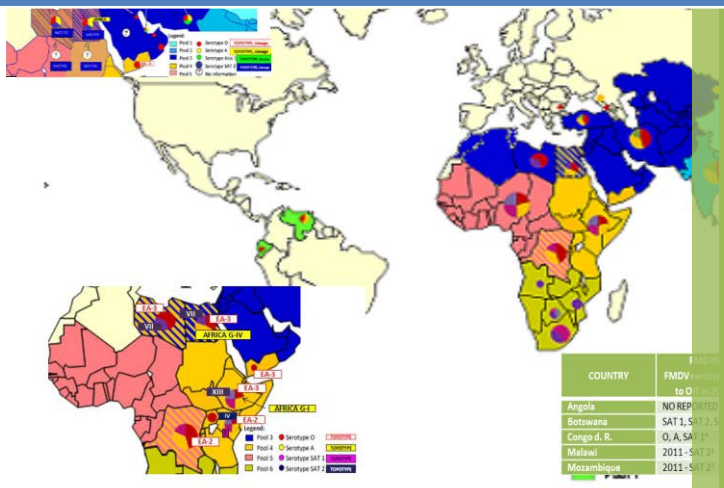
2017

Foot-and-Mouth Disease Situation
Monthly Report January 2017



COUNTRY	FMDV
Angola	NO REP
Botswana	SAT 1, SA
Congo d. R.	O, A, SA
Malawi	2011 - SAT 2
Mozambique	2011 - SAT 2

EuFMD

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

January 2017

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

Since its launch, in November 2011, the Monthly Global Foot & Mouth Disease Situation Report has become an applauded source of information for a globally dispersed public of faithful and eager users, in the public and private sectors. This incorporated State Veterinary Services, policy makers and policy performers, International agencies and NGO's engaged in rural development and animal health, researchers, diagnosticians and laboratory personnel, epidemiologists, economists, ecologists, veterinary practitioners, producers and animal-welfare protectors - all eager to obtain, from a reliable, professional source, their needed information at the earliest possible time.

Most of my professional career was spent in a national veterinary service, one of the main missions of which was combating FMD. I am grateful for being invited as guest editor of the January report, allowing a brief illumination of the issue from this angle.

State Veterinary Services are engaged with policymaking and its implementation, and with a scope of assorted related activities on the national and transboundary levels, including international trade. The value of reliable, accurate, science-based information on the global and regional FMD situation, changes, anywhere, of virus pathogenicity and of its infectivity, results of matching trials addressing internationally available vaccines, all as close to real time as possible – in short, the information provided by the EUFMD Monthly Report – were, and remain, conditio sine qua non for effective, balanced decision making.

The global FMD situation, presented in the January 2017 issue, has not undergone dramatic changes since December 2016. Two main observations deserve mentioning. On the one hand, the continued absence of FMD in South America (38 months since the last outbreak); a highly commendable achievement by the regionally cooperating countries. On the other end of the scale, the continued circulation of several serotypes in the territory designated "Pool 4" (East Africa). This area has become source of trans-pool movements of FMD virus into other pools, causing Egypt, Libya and Congo D. R. to become "multiple pool' countries (see map 1).

The following example may illustrate the significance of FMD-information availability.

FMDV serotype O, topotype EA-3 spread from East Africa to Egypt since 2012, becoming the most prevalent serotype circulating in this country. Matching tests conducted by WRLFMD on 2 field isolates collected in Egypt during 2015- 2016, revealed that two widely used vaccines did not protect; the third tested vaccine strain provided borderline protection. This information was included in the October 2016 issue of the Report.

The availability of a matching vaccine against FMDV-O/EA-3 has become a practical issue when, in early February 2017, a dairy cattle operation in Israel, 3 km from the demarcation line with the Gaza strip (Palestinian authority territory) was found infected. It became apparent that the outbreak started earlier in cattle and sheep in Gaza, on the border with Egypt. This evolving event is to be covered in the February issue of the Report.

Another noteworthy recent event is the recurrence of FMDV-O in South Korea (see page 5). In early February, another serotype, namely A, was detected in another location in South Korea. The circulation of two strains in S. Korea, the role of vaccination in their control and other steps undertaken will be discussed next month.

Another noteworthy point is the continued long-range spread of the strains O/ME-SA/Ind-2001d and A/ASIA/G-VII. In 2016, O/ME-SA/Ind-2001d reached the Islands of Rodrigues and Mauritius (two islands separated by 350 miles and located in the Indian Ocean), caused outbreaks in Myanmar and, recently, in the Far East of Russia.

In Europe, the greatest concerns relate to the emergence of the A/ASIA/G-VII lineage that has spread to the margins of Anatolian Turkey (close to FMD-free-with-vaccination Thrace). In vitro and in vivo data indicated that internationally available vaccines did not provide satisfactory protection against this strain.

The EUFMD/FAO personnel are commended for their effort in putting together the Monthly Report in a user-friendly format and for its timeliness.

I. GENERAL OVERVIEW

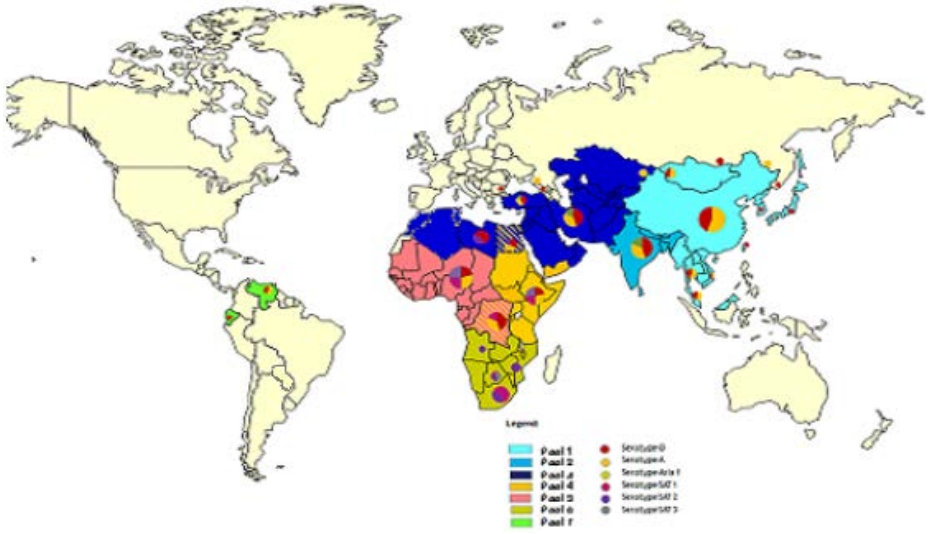
Pools represent independently circulating and evolving foot-and-mouth disease virus (FMDV) *genotypes; within the pools, cycles of emergence and spread occur that usually affect multiple countries in the region. In the absence of specific reports, it should be assumed that the serotypes indicated below 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, Mauritius, 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**, 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 2011-2016



II. HEADLINE NEWS

POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

China (People's Rep. of) [1] – a FMD outbreak caused by serotype O occurred on the 5th of January 2017, on a multispecies ruminant farm in Xinjiang.

Korea (Rep. of) [1] **–** following the last FMD outbreak reported in the country in April 2016, the disease has reoccurred on the 5th of February 2017, still caused by serotype O. The outbreak involved a cattle farm in Chungcheongbuk-Do, which is situated in the central part of the country.
Another FMD outbreak reported in Gyeonggi-Do, in the northern part of the country on the 8th of February 2017 in cattle was, this time, caused by serotype A.
Further details relative to these outbreaks will be included in the February issue of the present report.

Mongolia [1] **–** Three FMD outbreaks occurred between the 24th and 29th of January 2017, on multispecies ruminant farms respectively situated In Sukhbaatar and Dornod.

Vietnam [2] – FMDV serotypes A and O were detected by the WRLFMD among the thirty-five samples collected from different animal species and forwarded by the Regional Health Office of Vietnam. Viral lineages genotyped for the respective serotypes were A/ASIA/Sea-97, O/Cathay, O/SEA/Mya-98 and O/ME-SA/Ind2001d.
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 1st Quarterly (January-March 2017) WRLFMD Report.

POOL 2 - SOUTH ASIA

Bhutan [2] **-** FMDV serotype O was detected by the WRLFMD among the fourteen bovine samples forwarded by the National Centre for Animal Health of Bhutan.

India [3] – The Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India continues to report even for the current month, the sole detection of FMDV serotype O.

Nepal [4] **–** the National Foot and Mouth Disease and TADS Laboratory also continues to report the unique circulation in the country of FMDV serotype O even for the current month.

SAARC Member States [5] – the 3rd FMD Roadmap Meeting for countries of the SAARC was held in Colombo, Sri Lanka 14-16 December 2016. A summary of the countries' presentations relative to the circulation of FMDV is reported in the section relative to the Pool to which the country belongs.

POOL 3 - WEST EURASIA & MIDDLE EAST

Egypt [6] **–** Twenty seven FMD outbreaks were reported on clinical basis in Egypt during July and August 2016.

Israel [1] **–** A FMD clinical outbreak due to serotype O was observed on the 4th of February 2017,on a dairy farm in the Kibutz Nir Yizhak, at Beer-Sheva, Hadarom. Further details relative to this episode will be provided in the next edition of this report.

Palestinian Auton. Territories [1] **-** A FMD clinical outbreak, also due to serotype O, was observed in the Gaza Strip on the 5th of February 2017 in calves between the age of 12 and 18 months. Further details relative to this episode will be available in next month's report.

Pakistan [7] - The Progressive Control of Foot and Mouth Disease Project reported that 220 FMD outbreaks occurred in the country during January 2017, prevalently caused by FMDV serotype O. Other serotypes detected were A and ASIA 1.

POOL 4 - EASTERN AFRICA

Kenya [8] - The National FMD Reference Laboratory Embakasi, Kenya reported for the present month the detection of FMDV serotypes A, O and SAT 1.

POOL 5 - WEST/CENTRAL AFRICA

Nigeria [2, 9] **–** the National Veterinary Research Institute Vom, Nigeria reported a putative FMD outbreak at Obudu, in Cross River. Sampling of the outbreak is difficult as the location where the event took place is distant from the laboratory.
is distant from the laboratory.
Genotyping of the 17 samples positive for FMDV serotype O identified viral lineages O/EA-3 and O/WA. FMDV field isolates detected during 2015 and 2016**,** belonging to serotypes O and SAT 1**,** were subjected to VSMD. Vaccine strains matching with good results were identified only for serotype O.

POOL 6 - SOUTHERN AFRICA

No reports on FMD circulation during January 2017 are available for this pool.

POOL 7 - SOUTH AMERICA

Latin America [1] – No FMD outbreaks were reported for this Region during January 2017. During the OIE/FAO FMD Laboratory Meeting, PANAFTOSA reported serological data for historical FMD outbreaks that occurred in Venezuela in 2013. These now represent the most recent confirmed FMD cases in South America.

COUNTER

****** 38 MONTHS SINCE THE LAST OUTBREAK IN SOUTH AMERICA WAS REPORTED***
****** 149 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED***

III. DETAILED POOL ANALYSIS

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

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

FMD, serotype O, occurred in the south-western part of Xinjiang, a Region that is close to the border, in the northwest area of the country. The disease was observed on the 5th of January 2017, in cattle of a small farm where sheep and goats were present. Laboratory diagnosis was confirmed by the Lanzhou Veterinary Research Institute, (National and OIE Reference Laboratory) using reverse transcription - polymerase chain reaction (RT-PCR) and virus isolation. Samples resulting positive were from cattle and from the small ruminants even if they did not show clinical disease. Summary of the animals involved and location of outbreak are reported in Table 2 and Map 2.

Source of outbreak is unknown and the following preventive measures were applied: movement control inside the country, disinfection, stamping out and zoning. Screening of animals for disease detection is also ongoing while vaccination is permitted in case an appropriate vaccine is available.

Before this outbreak, the country had already recently experienced a FMD outbreak on a cattle farm in the same province of Xinjiang, China (People's Rep. of) which took place in November 2016.

Table 2: summary of the animals involved in the FMD outbreak of the 5th January 2017 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	6	4	0	6	0	66.67%	0.00%	0.00%	100.00%
Sheep / goats	10	0	0	10	0	0.00%	0.00%	-	100.00%
Totals	**16**	**4**	**0**	**16**	**0**	**25.00%**	**0.00%**	**0.00%**	**100.00%**

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

Map 2: location of the FMD outbreak of the 5th January 2017 in Xinjiang, China (People's Rep. of).

Russian Federation [1, 10]

During January 2017, the Russian Federation Regional Reference Laboratory for FMD (ARRIAH, Russia) conducted serological examinations of 954 cattle samples for post vaccination monitoring purposes for the Republic of Iraq.

The laboratory provided support in the epidemiological investigations of FMD outbreaks. The FGBI-ARRIAH continues to provide 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.
Relative to the FMD outbreak caused by serotype O, reported on the 28th of November 2016 in Zabajkal`Skij Kray, the Russian veterinary authorities have carried out the vaccination of 6,042 cattle and 10,404 sheep and goats present in this area. The event was reported as resolved on the 23rd of January 2017.

Vietnam [2]

The Regional Health Office of Vietnam forwarded for further analysis to the WRLFMD, thirty-five samples collected between June 2015 and November 2016, from cattle, buffaloes and pigs. A summary of the samples relative to animal species origin, location and genotyping results are presented in Table 3 and Map 3.

Table 3: summary of the genotyping results of FMDV positive samples collected in different areas of Vietnam between June 2015 and November 2016.

Sample Identification	Species Origin	Location Origin	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species
VIT/9/2015	water buffalo	Son La	14/09/2015	A/ASIA/Sea-97	/	
VIT/10/2015	cattle		14/09/2015			
VIT/12/2015			28/10/2015		MYA/2/2015 (99.4 - 99,5)	cattle
VIT/13/2015			28/10/2015			
VIT/16/2015		Quang Tri	24/11/2015			
VIT/1/2016	water buffalo	Son La	28/01/2016			
VIT/14/2016	cattle	Tien Giang	12/06/2016			
VIT/16/2016	porcine		09/08/2016			
VIT/5/2015	cattle	Son La	02/06/2015	O/ME-SA/Ind2001d	LAO/2/2015 (98.6 - 99.5)	/
VIT/6/2015	cattle		02/06/2015			
VIT/7/2015	porcine	Bac Kan	06/06/2015			
VIT/8/2015	cattle	Lao Cai	10/07/2015			
VIT/14/2015	water buffalo	Lang Son	30/10/2015			
VIT/15/2015	water buffalo	Yen Bai	10/11/2015			
VIT/17/2015	porcine	Nghe An	01/12/2015			
VIT/18/2015	cattle	Yen Bai	02/12/2015		LAO/5/2015 (99,4)	
VIT/20/2016	cattle	Son La	23/09/2016		Zabaikalskiy/1/RUS/ 2016 (99.5)	cattle
VIT/11/2015	porcine	Yen Bai	16/10/2015	O/SEA/Mya-98	TAI/27/2015 (99.1)	cattle
VIT/3/2016	cattle	Quang Nam	29/02/2016		TAI/28/2015 (99,2 - 100)	
VIT/4/2016	porcine	Vinh Phuc	11/03/2016			
VIT/5/2016	cattle		11/03/2016			
VIT/7/2016	cattle	Vinh Long	24/03/2016			
VIT/9/2016	cattle	Tra Vinh	06/04/2016			
VIT/10/2016	cattle		12/04/2016			
VIT/11/2016	porcine	Bac Ninh	26/04/2016			
VIT/12/2016	porcine		05/05/2016			
VIT/15/2016	water buffalo		03/08/2016			
VIT/17/2016	cattle	Nghe An	25/08/2016			
VIT/8/2016	porcine	Vinh Long	28/03/2016	O/Cathay	SCGH/CHA/2016 (95.4)	porcine

Map 3: location of areas in Vietnam from where FMDV positive samples were collected between June 2015 and November 2016 for analysis by the WRLFMD.

Table 4: Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 4 below.

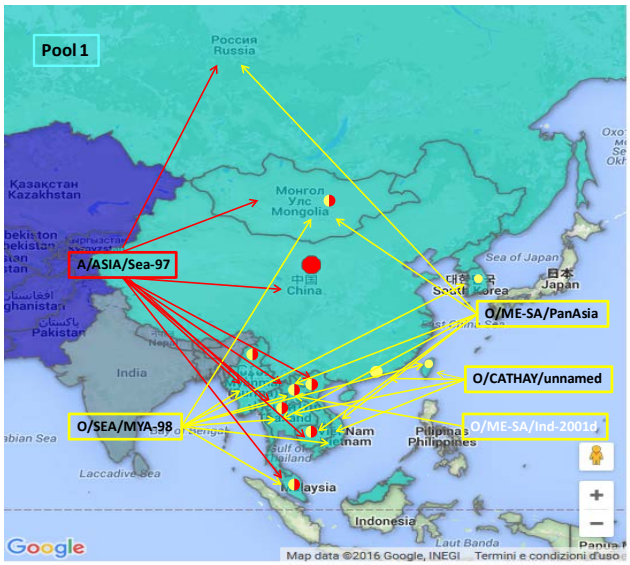
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Cambodia	O, 2013-2015/NOT SAMPLED	July 2016/ not typed or not sampled, Sep 2015/O and A, Aug 2014/ not typed, June 2014/not typed	Follow-up needed
China (People's Rep. of)	2012-2013/O, 2013 & 2015/A 2012 - 2014/NOT TYPED**	January 2017/O, May 2015/A	See text Follow-up needed
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	Follow-up needed
Mongolia	2013/A & NOT TYPED, 2014 & 2015**/O	July 2016/O, Sept 2013/A,	Follow-up needed
Myanmar	2012-2014/O, 2015/A & NOT TYPED	Aug 2016/O, July 2016/ not typed, Oct 2015/A	Follow-up needed
Russian Federation	2012, 2014 & 2015/O, 2013 - 2015/A	Dec 2016/O, Oct 2016/Asia 1, Jan 2016/ A	See text

Thailand	O, A NOT SAMPLED & NOT TYPED	Sep 2016 /A, Aug 2016/O June – July 2016/not typed	Follow-up needed
Vietnam	O, NOT SAMPLED, NOT TYPED 2013, 2014 & 2015/A,	November 2016/O, Feb 2016/A and not typed	See text Follow-up needed

Map 4: FMD distribution by serotype and topotype in South East Asia, 2012 – 2016 –white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

Conjectured circulating FMD viral lineages in Pool 1 per 2016 [1, 16]:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/CATHAY, O/ME-SA/Ind-2001d (new detection in Myanmar and Thailand during 2016)
- Serotype A: A/ASIA/Sea-97 and Iran-05[SIS10] sublineages
- Serotype Asia-1 has not been detected in the region since 2006 (Vietnam) and 2006 (China (People's Rep. of) and Vietnam)



B. POOL 2 – <u>South Asia</u>

Bhutan [2]

Molecular detection of FMDV serotype O was achieved in six of the fourteen bovine samples collected between August 2015 and June 2016 that were forwarded by the National Centre for Animal Health of Bhutan FMDV to the WRLFMD for further analysis, while viable virus was isolated only in one of the most recently collected samples i.e. that collected in September 2015.

A summary of the samples relative to location, date of collection and genotyping results are presented in Table 5. As can be noted, the most closely related viruses not belonging to the country, underscore the capability of FMDV in reaching neighbouring as well as distant countries.

Table 5: summary of the genotyping results of FMDV positive samples collected in different areas of Bhutan collected between August 2015 and June 2016.

Sample Identification	Location Origin	Date of collection	Genotype	Most Closely Related Viruses not belonging to the country (Seq id %)	Host species
BHU/2/2015	Zhemgamg	15/08/2015	O/ME-SA/Ind-2001d	SRL/1/2013 (98.3)	bovine
BHU/2/2016	Tshimasham	15/02/2016		BAN/NL/Lo-245/2015 (99,7)	
BHU/3/2016				SRL/1/2013 (98.6)	
BHU/8/2016		04/06/2016		NEP/6/2016 (99.4)	
BHU/9/2016				NEP/6/2016 (99.5)	
BHU/10/2016				BHU/9/2016 (99,7)	

India [4]

The ICAR-PDFMD, Mukteswar, India reported for the current month the following activities: detection of FMDV serotype O in the clinical samples of two cattle using FMDV antigen and/or RNA detection; four field isolates were genotyped for serotype O and four field viruses were subjected to vaccine matching exercise. Further to this, 1,512 serum samples were tested for FMDV antibodies within ongoing epidemiological studies. The FMD diagnostic kits used for these analyses were developed at ICAR-DFMD, Mukteswar.

The personnel of ICAR-PDFMD continue to be 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 research studies and collaborations with international organisations.

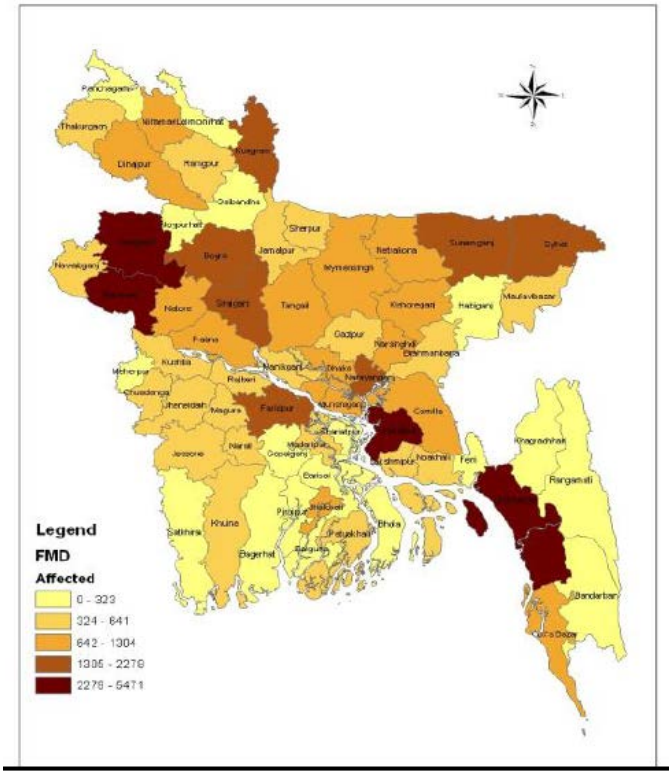
SAARC Member States [5]

Following is a summary of the countries' presentations relative to the circulation of FMDV as reported during the 3rd FMD Roadmap Meeting for countries of the SAARC which was held in Colombo, Sri Lanka 14-16 December 2016. The summary of the presentations held by Afghanistan and Pakistan will be presented within the section of the Pool to which the countries belongs.

Bangladesh [5]

The country reports that FMD is endemic, with the active circulation of the FMDV serotype A, ASIA 1 and O and the predominance of viral lineage O/ME-SA. In fact, samples that were last sent in 2009 to the WRLFMD, report the detection of O/ME-SA/Ind2001d. Cattle are the species mostly affected by FMD and according to data relative to 2012 (FAO) the country suffers an annual loss of 125 million dollars due to the presence of the disease. Map 5 reports the spatial distribution of the disease in the country (information relative to which time period this data refers is not reported)

Map5: FMD outbreaks in Bangladesh



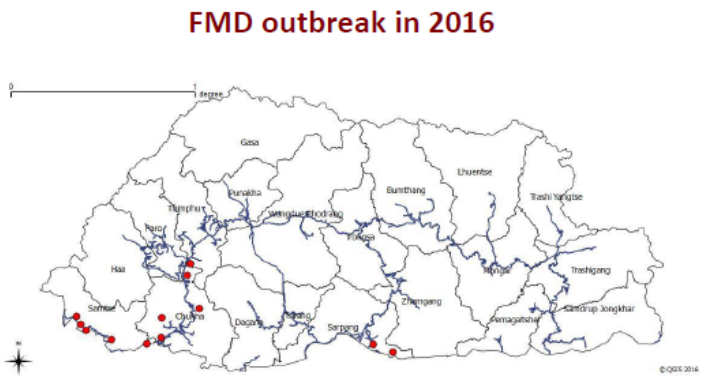
Bhutan [5]

The country is at present in Stage 2 of the Progressive Control Pathway (PCP) for FMD. Following are data from the surveillance activities carried out by the national, regional and local veterinary services:

- Forty-seven FMD outbreaks were reported between 2014 and 2016, all of which were attributed to FMDV serotype O, as confirmed by the detection of this serotype in the 22 clinical samples collected during the same period. Map 6 shows the location of outbreaks in the country during 2016 ,
- serosurveillance during animal importation using the non structural protein ELISA test detected a seroprevalence of 26.3% (535) of the 2030 samples examined between 2014 and 2016.

The country also reported a description of the vaccination programme it conducts that is organized in terms of frequency and period of vaccination, on the basis of the risk zone in which the animals live and their age, the occurrence of outbreaks (barrier/ring/corridor) and migration of animals.

Map 6: location of FMD outbreaks in Bhutan which occurred during 2016



India [5]

The country is presently in Stage 3 of the PCP for FMD and in view of the ongoing FMD control plan, India has currently established three FMD free zones with vaccination (see Map 7). Between 2014 and June 2016, India experienced 453 FMD outbreaks due to serotypes A, Asia 1 and O . The number of samples that were submitted during the same period for full characterization was 853, of which 67.77% (578) were FMDV positive, of which 97.4% (563/578) positive for serotype O, 1.9% (11/578) positive for serotype A and 0.69% positive for ASIA 1 (Table 6). Details of the viral lineages responsible for the outbreaks per year are reported in Table 7. The results of the active and passive serosurveillances are reported in Table 8.

The country carries out vaccinations of all eligible cattle and buffaloes on six-monthly basis using an inactivated trivalent (O, A and Asia1) vaccine. Vaccine strains used are those reported in Table 9.

Map 7: location of FMD free zones with vaccination in India.

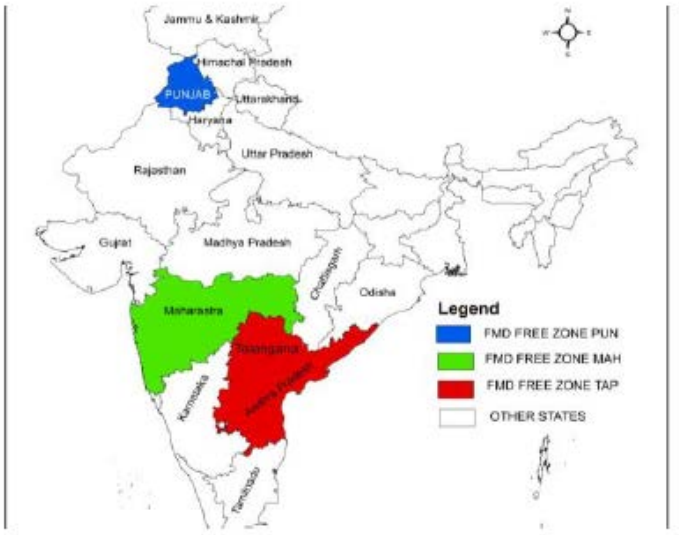


Table 6: number of FMD positive samples submitted for full viral characterization between 2014 and 2016

Year	Number of samples received	O	A	Asia1
2014-15	182	114	-	01
2015-16	671	449	11	3

Table 7: FMD viral lineages involved in outbreaks that occurred in India between 2014 and 2016

Year	O	A	Asia1
2014-15	1. O/ME-SA/Ind2001d 2. O/ME-SA/PanAsia	-	1. As/sub-lineage CII (Group VIII)
2015-16	1. O/ME-SA/Ind2001d	1. Genotype 18/VP359-deletion lineage /Clade18c	1. As/sub-lineage CII (Group VIII)

Table 8: results of the active and passive surveillance held in India during 2014 - 2016

Antibody prevalence against NSP on random samples

Year	Total samples tested	Total positive	% DIVA reactors
2014-15	68,948	16,139	23.41
2015-16	62,605	14112	22.54
Country Avg	3,41,309	88,504	25.93

Antibody prevalence against SP on random samples

Name of place/State	Total no. of samples	%Protective Titre ≥1.8		
		O	A	Asia1
2014-15	46893	26527 (56.6)	25543 (54.5)	28581 (61.0)
2015-16	48992	30906 (63.1)	30496(62.2)	33291 (68.0)

Table 9: current vaccine strains used in India within the FMD Control Vaccination Programme.

Serotype	Strain used	Genotype/Lineage
O	INDR2/1975	ME-SA/Lineage B
A	IND40/2000	Genotype18/non-deletion
Asia1	IND63/1972	Sub-lineage CII

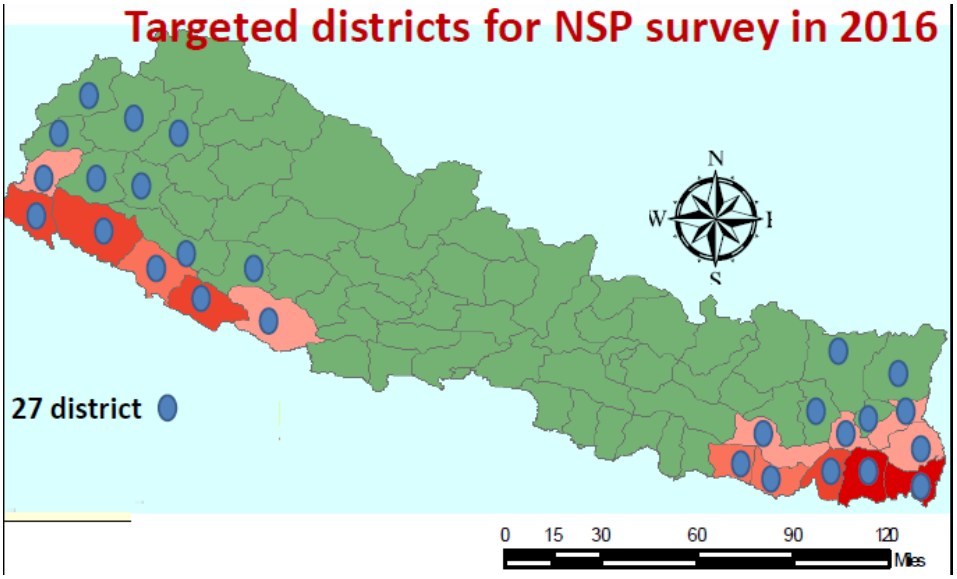
Nepal [4, 5]

As for the previous months, the National Foot and Mouth Disease and TADS Laboratory confirmed the exclusive circulation of FMDV serotype O for January 2017. FMD outbreaks detected in the country from 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.

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.

The country which at present is in PCP Stage 1, registered from 2014 to 2016, 153 FMD outbreaks, location of which is reported in Map 8, with 46,061 animals affected of which 2.51% (992) died. All the outbreaks were caused by FMDV serotype O and the viral lineages involved are ME-SA/ PanAsia-2^{KAT-15} and Ind-2001d with the predominance of the latter. During the same period, a NSP serosurveillance conducted on 2,386 samples detected a positivity level of 13.6%. During 2016, vaccination was carried out in specific areas of the country and was limited to some of the districts along the southern border of the country where targeted NSP surveillance will also be conducted as represented in Map 8. These areas are in fact subject to an intensive animal trade exchange with neighbouring countries.

Map 8: districts highlighted in different shades of red are those in which vaccination was carried out, while those with ovals are where targeted NSP controls were conducted.



Sri Lanka [5]

The country reported as being in Stage 2 of the PCP for FMD and has registered 266 outbreaks between 2014 and 2016 as represented in Map 9. The number of clinical cases registered in this three-year period was 73,01 with 2.89% (2,027) FMD fatal cases. The number of samples submitted from the outbreaks was 82 (30.82%) with all of them confirmed as being caused by serotype O. The last submission of field viruses for genetic characterization was in 2014 and the lineage identified was ME-SA/Ind2001d. Vaccination in the country is ongoing in endemic areas and being administered twice each year.

Map 9: location of FMD outbreaks in Sri Lanka between 2014 and 2016.

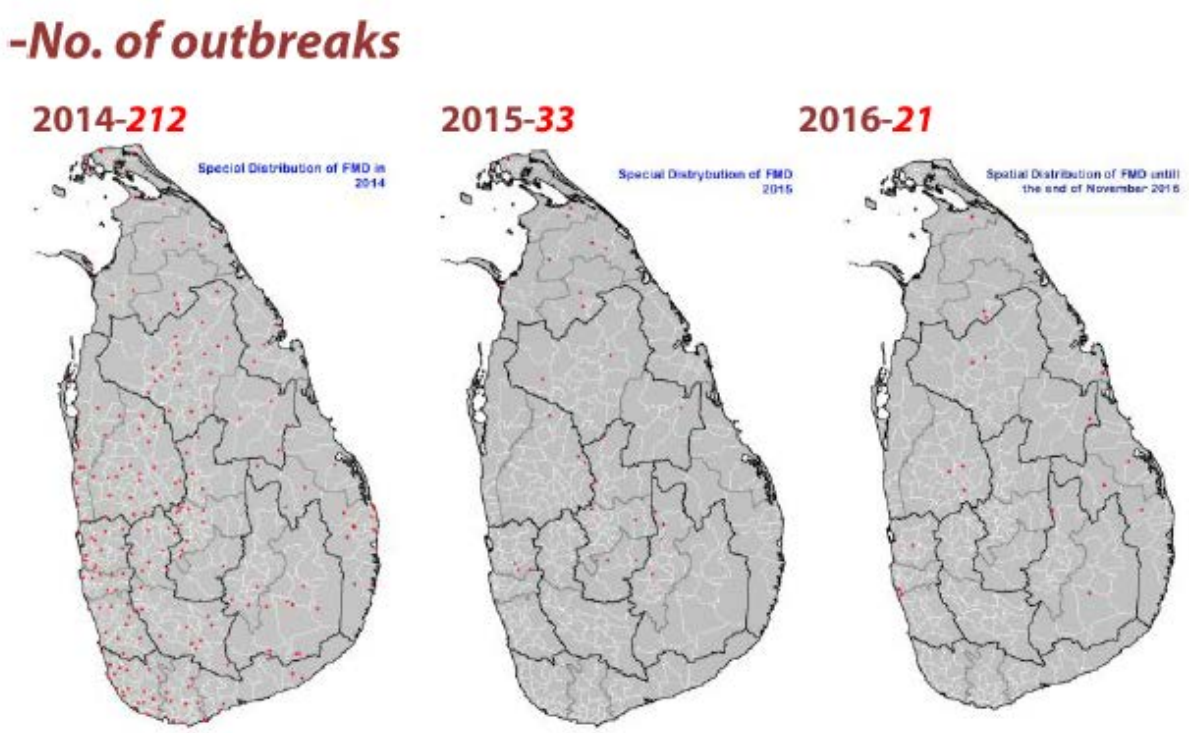


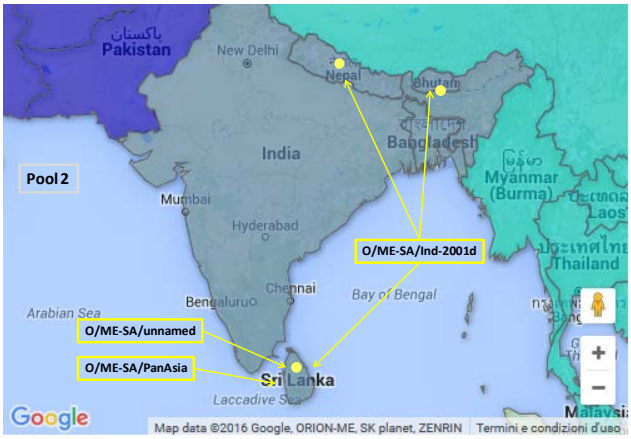
Table 10: Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 10 below.

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	See text Follow –up needed
Bhutan	NOT TYPED, 2013 & 2014/NOT SAMPLED 2013-2015/O	Not available	See text Follow –up needed
India	O, A, NOT SAMPLED 2012-2014/Asia 1 2013/NOT TYPED	Dec 2016/O, Apr 2015/A Asia 1	See text
Mauritius	DISEASE ABSENT	Sep 2016/0	Follow-up needed
Nepal	O, 2012-2103/Asia 1	Dec 2016/O	See text
Sri Lanka	2012 – 2014/O, 2015/NO DATA REPORTED	2016/O	See text Follow-up needed

Map 10: FMD distribution by serotype and topotype in South Asia, 2012 – 2016 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2016 [1, 16]:

- O/ME-SA/Ind-2001d predominates (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been recognized during 2012-15)
- Outbreaks of O/ME-SA/Ind-2001d detected in Mauritius during 2016 (**not reported in Map**)
- 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>*

Afghanistan [5]

Following is a summary of the information presented by Afghanistan during the 3rd FMD Roadmap Meeting for countries of the SAARC. The outbreaks experienced by the country between January and October 2016 are represented in Graph 1. During this period 159 samples were submitted to the Central Veterinary Diagnostic and Research Laboratory of which 122 (76.73%) were diagnosed as positive for the following serotypes: 82 (67.21%) for serotype O, 31 (25.41%) for Asia 1, four (3.28%) for serotype A and five (4.1%) untyped. Twenty-seven of these samples were sent to the WRLFMD and the viral lineages detected were the following, O/ME-SA/PanAsia2[ANT-10], A/ASIA/Iran05[FAR-11] and Asia1/ASIA/Sindh08.

In a recent serological survey for NSP antibodies conducted between spring and summer 2016, the percentage of positive samples was found to increase with the age of the animal as represented in Table 11.

Graph 1: outbreaks experienced by Afghanistan between January and October 2016.

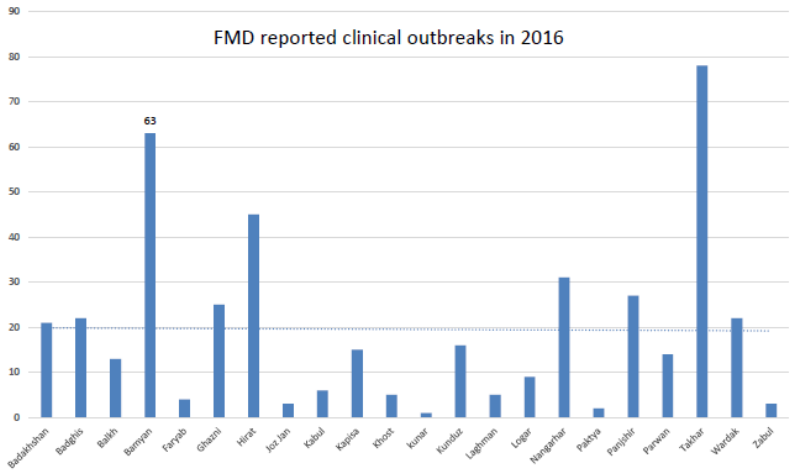


Table 11: Proportion of NSP positive animals by age group.

Age-group	N. tested	Average age	NSP pos	Proportion of NSP positive
0-12 M	163	6.2 M	33	20.2%
12-24 M	132	19.3 M	27	20.4%
>24 M	148	47.2 M	68	45.9%

Egypt [6]

Twelve villages in Egypt reported twenty-seven FMD clinical outbreaks during July and August 2016. Sixty-three % of the outbreaks registered occurred in the Delta Region. The outbreaks were observed in cows (80%), buffaloes (7%) and mixed rearing units (3%) where large and small ruminants were present, while for 10% of the outbreaks the information was missing. Seventy-six% of the cases occurred in animals of more than two years old. Of the 21 samples received only one resulted positive for FMDV for which typing is pending.

Relative to vaccination, coverage for cow and buffaloes was on average of 16% in July and August 2016, with low vaccination coverage of these species in most of governorates. Total vaccination coverage of sheep and goats was even lower and was on average around 5% for the same period.

Pakistan [5, 7]

The Progressive Control of Foot and Mouth Disease Project reported FMD outbreaks occurring in Pakistan during January 2017 caused by FMDV serotypes A, Asia 1 and O. A summary of their distribution is reported in Table 12. Location of districts with reported FMD outbreaks is presented in Map 11.

In response to FMD outbreaks, vaccinations were performed during January 2017 on cost sharing basis, involving a financial contribution from the farmers. The total number of vaccine doses administered was 95,200. A summary of the number of interventions carried out in the different Provinces is presented in Table 13.

Map 11: Location of the Districts where FMD outbreaks occurred in Pakistan during January 2017.

Table 12: Province and district distribution of FMD outbreaks with relative serotypes that occurred in Pakistan during January 2017.

Location of outbreaks and n°()		Number (%) of Outbreaks due to FMD Virus Serotype(s)				
Province	**District**	**'O'**	**'A'**	**'Asia-1'**	**'Mixed'**	**Un-Typed**
Sindh (33)	Karachi (18)	12	1	0	0	5
	Matiari (15)	10	0	0	0	5
Khyber Pakhtunkhwa (34)	Abbottabad (4)	3	--	--	--	1
	Charsadda (1)	1	--	--	--	--
	Mansehra (11)	11	--	--	--	--
	Peshawar (13)	7	--	--	2	4
	Swabi (2)	2	--	--	--	--
	Swat (1)	1	--	--	--	--
	Tank (2)	2	--	--	--	--
Azad Kashmir (3)	Mirpur (3)	3	--	--	--	--
Punjab (150)	Bahawalpur (1)	--	--	--	1	--
	TT Singh (2)	2	--	--	--	--
	Faisalabad (13)	11	--	--	--	2
	Khanewal (11)	8	--	--	--	3
	Sargodha (2)	--	--	--	1	1
	Gujrat (10)	8	--	--	--	2
	Okara (1)	1	--	--	--	--
	Attock (1)	1	--	--	--	--
	Rawalpindi (16)	11	2	--	--	3
	Sahiwal (9)	6	1	--	--	2
	Hafizabad (9)	--	--	2	--	7
	Lahore (13)	9	--	--	--	4
	Sheikhupura (13)	8	--	--	--	5
	Layyah (9)	4	--	--	--	5
	Bhakkar (5)	5	--	--	--	--
	Bhawalnagar (8)	7	--	--	1	--
	Chakwal (7)	3	--	--	--	4
	Nankana (4)	3	--	--	--	1
	Mianwali (1)	--	--	--	--	1
	Pakpattan (7)	6	--	--	--	1
	Gujranwala (2)	1	--	--	--	1
	Jhang (5)	5	--	--	--	--
	Kasur (1)	--	--	1	--	--
Total (220)		**151 (68.64)**	**4 (1.82)**	**3 (1.36)**	**5 (2.27)**	**57 (25.91)**

Table 13: Vaccination activities carried out during January 2017 in the various Provinces of Pakistan.

Region	Number of vaccine doses administered		
	Cost sharing basis	**Outbreak handling**	**Total doses**
Azad Kashmir	500	1,725	2,225
Balochistan	100	0	100
Punjab	6,125	10,500	16,625
Sindh	250	75,000	75,250
Islamabad Capital Territory	675	325	1,000
Grand Total	**7,650**	**87,550**	**95,200**

During the 3rd FMD Roadmap Meeting for countries of the SAARC which was held in Colombo, Sri Lanka 14-16 December 2017, Pakistan presented in summary the following information. The country which is at present in Stage 2 of the PCP for FMD presented data on the circulation of FMD relative to 2014 to 2016 with serotype O being prevalent for the first two-year period to be then replaced by ASIA 1 during 2016 as reported in Table 14. Location of outbreaks, only relative to 2015 is presented in Map 12. Results of the 114 samples sent to the WRLFMD are presented in Table 15, together with relative matching vaccine strain.
The country at present has two ongoing projects respectively for the development of a National Control Program and a Risk based Strategy for FMD.

Table 14: FMD outbreaks and serotypes circulating between 2014 and 2016 in Pakistan.

Year	Total outbreaks	FMDV Serotypes Identified Percent Positive of Total				ELISA Negative
		O	A	Asia-I	Mixed	
2014	2813	58	6.7	7	4.3	24
2015	1055	32	31	7.3	13.4	15.8
2016 (Jan-Sept)	1126	27.4	16	30.7	2.4	23.5
Annual Average %	4,994*	39.3	18	15	6.7	21

*3 Years Total

Map 12: Location of FMD outbreaks that occurred in Pakistan during 2015.

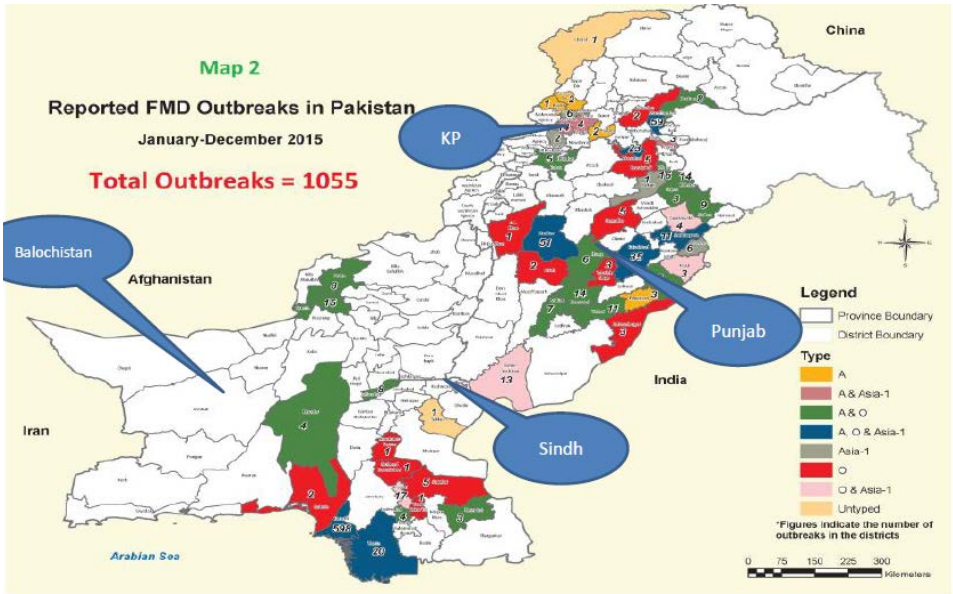


Table 15: genotyping results of field isolates forwarded by Pakistan for further analysis to the WRLFMD with relative matching vaccine strain.

Genotypes Identified	2012	2013-2014	2015
Serotype O	PanAsia-2^{ANT-10} Unnamed(3)	PanAsia-2^{ANT-10} Unnamed(1)	PanAsia-2^{ANT-10}
Serotype A	Iran-05^{SIS-12} Iran-05^{FAR-11}	Iran-05^{SIS-12} Iran-05^{FAR-11} Iran-05^{FAR-09}	Iran-05^{FAR-11} Iran-05^{FAR-09}
Serotype Asia-1	Sindh-08	Sindh-08	Sindh-08

Vaccine Required	2012	2013-2014	2015
Serotype O:			
sub-type	PanAsia-2	PanAsia-2	PanAsia-2
concentration	> 6 PD_{50}	> 6 PD_{50}	> 6 PD_{50}
Serotype A:			
sub-type	Iran 5	Turkey 06	Kabardino-Balkaria-2013
concentration	> 6 PD_{50}	> 6 PD_{50}	> 10 PD_{50}
Serotype Asia-1:			
sub-type	Shamir	Sind 08	Sind 08
concentration	> 6 PD_{50}	> 6 PD_{50}	> 6 PD_{50}

Table 16: Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 13 below.

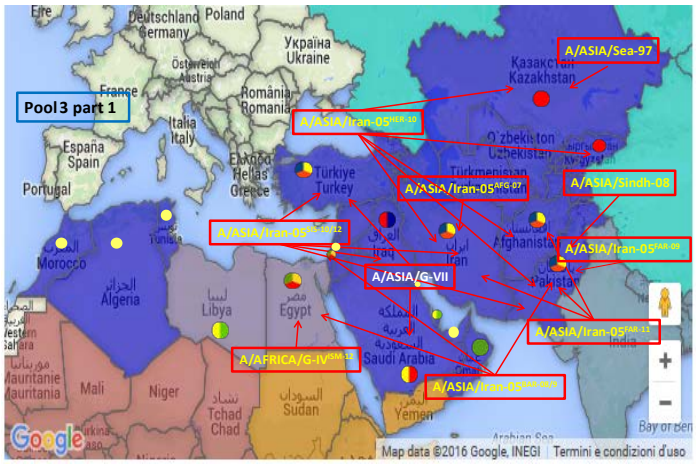
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE # see pg. 1	Comment
Afghanistan	2013-2015**/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	Jul 2016/O, Jun 2016/Asia 1 & May 2016/A,	See text
Algeria	2014 -2015**/O	Apr 2015/O	Follow –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	May-Jun 2016/ O & Sat 2, March 2016/A	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	Jun 2013/ A & Aug 2012/O	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	Aug 2014/not typed & Apr 2013 /O, A,	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	Dec 2016/A, Asia 1 & 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	Oct 2016/A & April 2016/O	Follow –up needed
Syrian Arab Republic	DISEASE ABSENT**	2002/ A & O	Follow –up needed
Tajikistan	2012- 2013/NOT TYPED 2014-2015**/DISEASE ABSENT	Nov 2012/ not typed & Nov 2011/Asia 1,	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

Map 13: FMD distribution by serotype and topotype for West Eurasia and Middle East, 2012 – 2016 (EuFMD) - white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

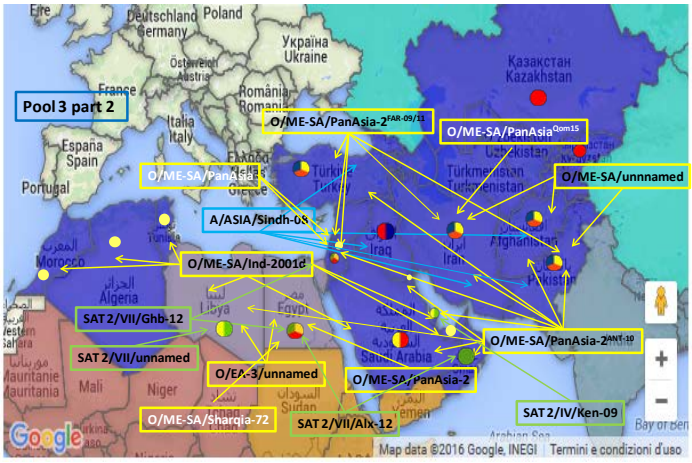
Conjectured circulating FMDV serotype A lineages in Pool 3 per 2016 [1, 16]:

- 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 (detected also in Iran in 2016)
- Asia-1 (Sindh-08 lineage).



Conjectured circulating FMDV serotype O and SAT 2 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)
- New detection during 2016 of O/ME-SA/Sharqia-72 in Egypt and of O/ME-SA/PanAsia-2QOM-15 in Iran
- O/EA-3/unnamed in Egypt and Lybia
- SAT 2/IV/Ken-09
- SAT 2/VII/Alx-12 and Ghb-12 sublineages



D. POOL 4 – Eastern Africa

Kenya [8]

The National FMD Reference Laboratory Embakasi, Kenya detected FMDV serotypes A (three), O (three) and SAT 1 (two), in the bovine samples examined. The FMD diagnostic methods used were antigen detection Elisa, Real time PCR and virus isolation using LFBK cells.

The laboratory personnel were involved in the epidemiological investigations of outbreaks and in the provision of advice to field veterinarians and farmers on the type of vaccine to employ.

The laboratory personnel will also be involved in the Real Time FMD Training organized by EuFMD, which will be held in February 2017 in, Kenya. 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.

Table 17: Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 14 below.

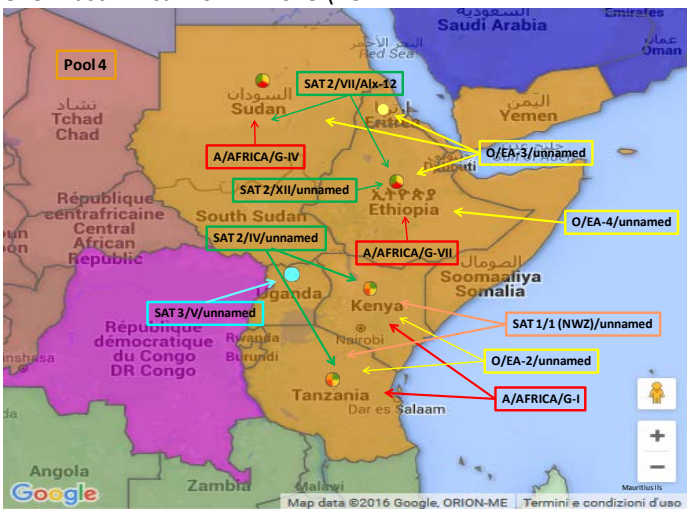
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Burundi	DISEASE PRESENT	Aug 2013 / not available	Typing required
Comoros	NO DATA AVAILABLE	2010	Follow –up needed
Congo d. R.	NO DATA AVAILABLE	Jun 2013/not typed	Typing required
Djibouti	DISEASE ABSENT**	Not available	Follow –up needed
Egypt	2012, 2014/SAT 2 2012 – 2015**/O, A	March 2016/A, 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	Dec 2016/ A, O & SAT 1 May 2016/SAT 2	Follow –up needed

Kenya	A, O, SAT1, SAT2, 2012 – 2015 /NOT TYPED	Dec 2016/O & SAT 1, Oct 2016/ A, Oct 2015/ SAT 2	See text
Libya	NO DATA REPORTED	Oct 2013/ O, Sat 2/Apr 2012	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 14: 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, 16]:

- 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 – <u>West / Central Africa</u>

Nigeria [2, 9]

The National Veterinary Research Institute Vom, Nigeria reported the suspicion of an FMD outbreak at Obudu, in Cross River. Sampling of the outbreak is difficult as the location where the event took place is distant from the laboratory. Other diagnostic activities are on hold as kits are out of stock.

Genotyping of the seventeen cattle samples positive for FMDV serotype O, collected between June and September 2016 respectively identified in one sample and O/EA-3 in the remaining sample panel. Sample location is not reported and O/WA was the only genotype with the most closely related sequences not pertaining to a virus isolated

in the country, which was represented by field strain TOG/1/2004, isolated in cattle, detected in Togo that is not a neighbouring country with Nigeria.
Field strains O/NIG/1/2016 and O/NIG/4, 12 and 19, respectively genotyped as O/WA and O/EA-3 were employed in VMSD tests, with the former genotype obtaining good matching results with only O Tur 5/09, while the latter obtained good matching results also with O3039 and O Manisa. Other field strains, SAT 1/NIG/1 and 2/2016, belonging to the novel genotype SAT 1/X did not obtain matching results with SAT105 RHO.

Cameroon [11]
The LANAVET, Garoua detected non-structural protein antibodies in 41 of the 57 (71.92%) bovine samples tested in the serological ELISA.
LANAVET continues its 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.

Ghana [12] **Senegal** [13]
No FMD outbreaks and activities were reported for January 2017 respectively by the LANAVET, Garoua, Careroon, the Laboratoire National de l'Elevage et de Recherches Vétérinaires, Senegal and the ACCRA Veterinary Laboratory, Ghana, except for technical advice offered by ISRA/LNERV for the organization of vaccination programmes to the local veterinary services.

Table 18: Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 15 below.

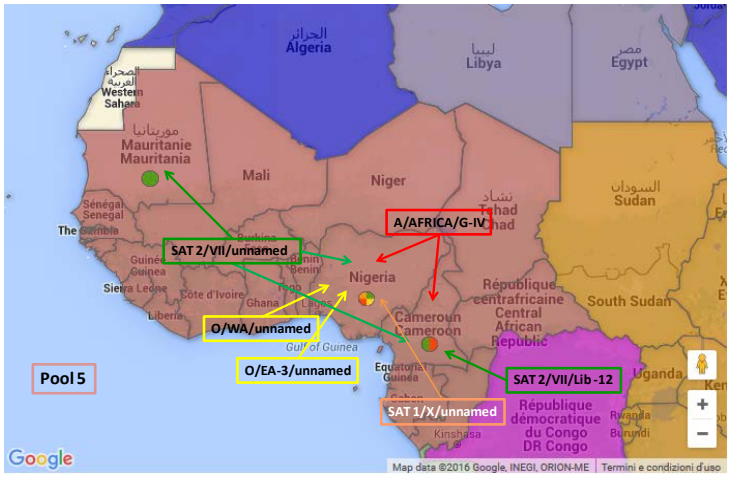
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	Last outbreak reported/serotype #see pg. 1	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	Follow –up needed
Burkina Faso	DISEASE PRESENT SEROTYPES NOT REPORTED	2013/ not available	Follow –up needed
Cameroon	DISEASE PRESENT SEROTYPES NOT REPORTED	Apr -Dec 2016/serotyping pending, Jun 2014, Jan 2015 and July-Aug 2015/untyped, Nov 2014/O, SAT 2, May 2014/SAT 1, Apr 2014/ A	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	Dec 2016/ O & SAT 2 2014/not available	See text Follow –up needed
Guinea Biss.	2012-2013/DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED 2015/ Disease suspected	Dec 2016/SAT1 &SAT 2	Follow –up needed
Guinea	2012-2013, 2015/ DISEASE ABSENT 2014/ SEROTYPES NOT REPORTED	2014/not available	Follow –up needed
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 2, 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

Map 15: FMD distribution by serotype and topotypes for West Africa, 2012 – 2015 (EuFMD) - white script in map refers to new introduction of viral lineage in pool or country of the pool during 2016.

Conjectured circulating FMDV lineages in Pool 5 per 2016 [1, 16]

- Serotype O (topotypes WA, EA-3 (Nigeria))
- Detection of a new viral lineage, SAT 1/X/unnamed in 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 [14]

The ARC- Onderstepoort Veterinary Institute did not detect FMDV among the seven samples examined using RT-PCR. The laboratory examined 2,337 serum samples using liquid-phase blocking ELISA for the detection of FMDV serotypes SAT 1, SAT 2 and SAT 3 and 107 sera using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is continuing its collaboration with international organisations on research projects. The FMD research group, led by Dr Francois Maree is involved in two international research projects: the first is a collaborative research project between the USDA-ARS, ARC-OVI and Makerere University in support of the national FMD control program in Uganda while the other is on the persistence of a highly contagious pathogen: ecological and evolutionary mechanisms in foot-and-mouth disease virus. The laboratory has received funding from the National Research Foundation of South Africa to develop a phage display buffalo antibody library. The laboratory also has collaborations within the Global FMD Research Alliance (GFRA) and is member of the OIE/FAO FMD Network.

Table 19: Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map 16 below.

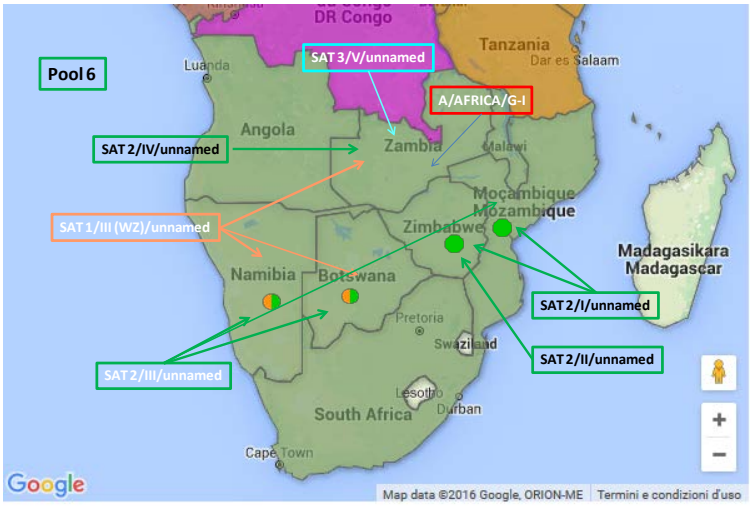
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2015 **(1st semester)	LAST OUTBREAK REPORTED/SEROTYPE #see pg. 1	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013-2014/ DISEASE ABSENT 2015/ SEROTYPES NOT REPORTED	July 2015/ SAT 2 April 2016/typing pending	Follow –up needed
Botswana	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	Dec 2016/SAT 2, Sep 2016/ Typing pending, 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 16: 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 circula6:

- Serotype SAT 1 (topotypes I(?), I(?)I and III) – new detection of SAT 1/III (WZ)/unnamed in Botswana during 2016
- Serotype SAT 2 (topotypes I, II, III and IV) - new detection of SAT 2/III/unnamed in Namibia
- Serotype SAT 3 (?) (topotypes I, II and III) – new detection of SAT 3/V/unnamed in Zambia during 2016



G. POOL 7 – South America

South America [1, 16]

The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 17.

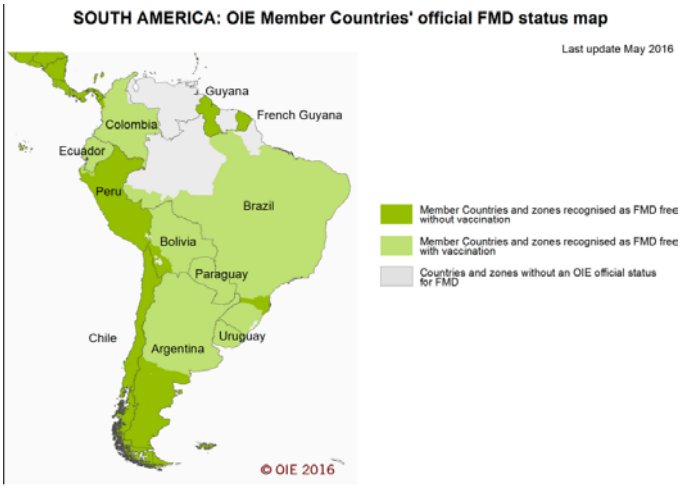
Most South American countries are FMD free with vaccination (Uruguay) or without vaccination (Chile, Guyana) or with free zones with vaccination (Argentina, Bolivia, Brazil, Colombia, Peru and continental Ecuador) or without vaccination (Argentina, Bolivia, Brazil, Colombia, Peru) as described by the 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 17). The FMD history between 2012 –2015 is reported in Table 20. In fact, during the OIE/FAO FMD Laboratory Meeting held in November 2016, PANAFTOSA reported data for historical FMD outbreaks that occurred in Venezuela in 2013, these now represent the most recent confirmed FMD cases in South America.

Table 20: Summary of the history of FMD Pool 7, 2012 – 2015, for geographic distribution see Map 17 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 2013/ A	National situation needs verification

Map 17: FMD status for South America [1]



IV. OTHER NEWS:

[2]The 4th WRLFMD Quarterly Report for the period October – December 2016 published the table below (Table 21) 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 21: Recommendations from WRLFMD® on FMD virus strains to be included in FMDV antigen banks (for FMD-free countries) - October 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/Sakolnakom/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

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. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (Dr B. B. Dash) FAO.
4. National Foot and Mouth Disease and TADS Laboratory, Nepal - *Dr. Sharmila Chapagain*.
5. 3rd FMD Roadmap Meeting for countries of the SAARC was held in Colombo, Sri Lanka 14-16 December 2016
6. FMD Monthly Report for Egypt (July and August 2016) - *Dr. Sherif Abd Elkhalik*, Head of Epidemiology Dept. and Dr. Mohamed Atea, Head of Central Administration of Preventive
7. Progressive Control of Foot and Mouth Disease in Pakistan, - *Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator.
8. National FMD Reference Laboratory, Embakasi, Kenya - *Dr. Abraham Sangula, Dr. Kenneth Ketter*.
9. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - *Dr. Ularamu Hussaini*
10. Regional Reference Laboratory for FMD (ARRIAH, Russia) - *Dr. Svetlana Fomina*.
11. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - Dr. Simon Dickmu Jumbo.
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 Francois -Maree*
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/