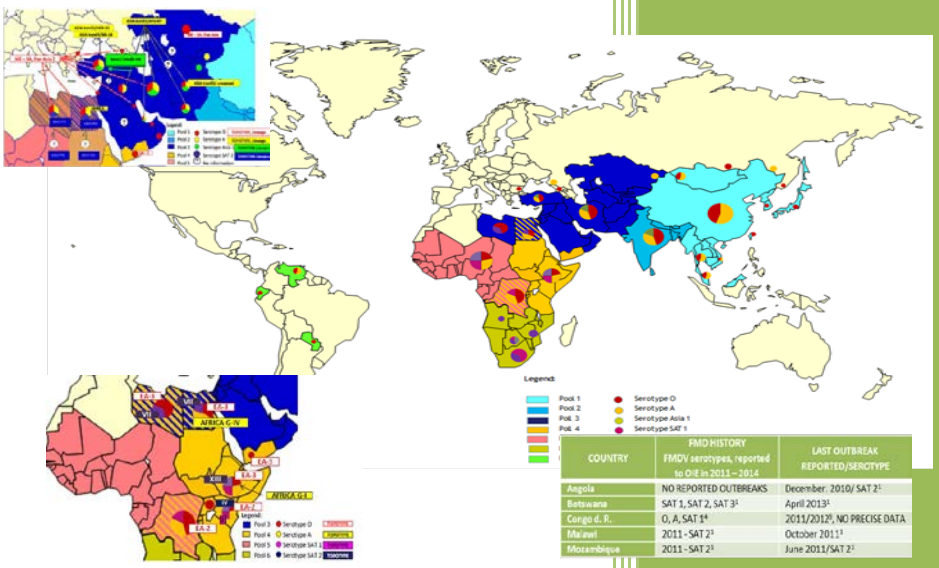
2015

Foot-and-Mouth Disease Situation
Monthly Report April 2015



COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2011 – 2014	LAST OUTBREAK REPORTED/SEROTYPE
Angola	NO REPORTED OUTBREAKS	December. 2010/ SAT 2[1]
Botswana	SAT 1, SAT 2, SAT 3[1]	April 2013[1]
Congo d. R.	O, A, SAT 1[4]	2011/2012[9], NO PRECISE DATA
Malawi	2011 - SAT 2[3]	October 2011[1]
Mozambique	2011 - SAT 2[3]	June 2011/SAT 2[1]

EuFMD

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european commission for the control of foot-and-mouth disease

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

April 2015

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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

I am pleased to be asked to write this short update for the EuFMD monthly report.

In March-April 2015 according to urgent notifications from countries to the OIE FMD was registered in China (Taiwan), South Korea, Mongolia, Botswana and Algeria.

As for May 20, 2015 the virus activity is observed in six out of seven eco-pools. The outbreaks are caused by almost all FMDV serotypes but C, which has not been registered since 2004.

Notwithstanding a complicated FMD situation many countries do not notify the outbreaks immediately but do it with a really great delay.

Southeast Asia countries remain FMD endemic. FMD situation in Eastern Asia is also challenging. Despite the fact that animals are vaccinated in South Korea, FMDV O/SEA/Mya-98 is still spreading. It is interesting that a very similar virus was isolated in the outbreak on a pig farm located in the RF Primorsky Krai in 2014.

In February-March FMDV type O outbreaks were registered in the territory of Khovd Aimak in Mongolia. Just as the Korean virus, the Mongolian isolates belonged to genetic lineage O/SEA/Mya-98, but to another sublineage. In May, FMD was registered in Sukhbaatar Aimak, Mongolia. The outbreaks were caused by the virus belonging to O-PanAsia genetic lineage.

There is a concern about the spill of FMDV (O/ME-SA/Ind-2001) from eco-pool 2 into the territory of North Africa and Middle East and about the fact that the number of FMD outbreaks in this region caused by this virus is growing and the virus is spreading in North African countries.

This is indicative of the fact that the increase in human and animal migration, movement of agricultural products including illegal trade operations under a weak veterinary surveillance and services and non-compliance with biosafety rules may result in the introduction of FMD virus into new territories and its spread in previously free regions.

I deem it necessary to note the positive experience of South America countries in FMD control as their regional program for FMD control coordinated by the OIE/FAO International Laboratory Panaftosa facilitated the solution of FMD control key issues and ensured FMD freedom in South American countries for three years.

I. GENERAL OVERVIEW

Pools represent independently circulating and evolving 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).

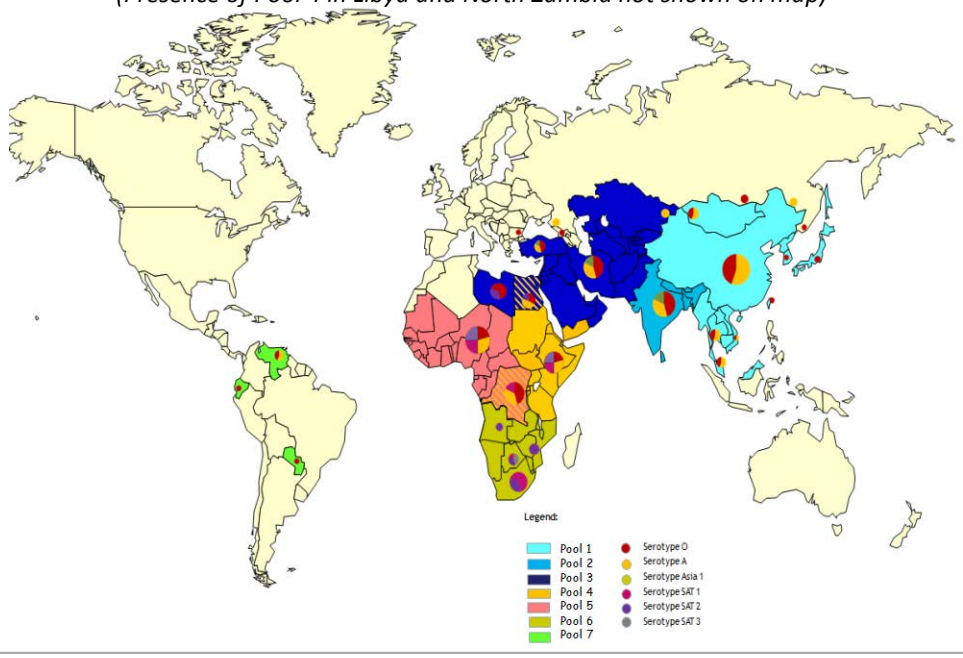
Table 1: List of countries representing each virus pool for the period 2010 – 2015

POOL	REGION/COUNTRIES – colour pools as in figure	SEROTYPES
1	**CENTRAL/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, Asia 1**
2	**SOUTH ASIA** Bangladesh, Bhutan, India, Nepal, Sri Lanka	**O, A, Asia 1**
3	**WEST EURASIA & MIDDLE EAST** Afghanistan, Algeria, Armenia, Azerbaijan, Bahrain, Bulgaria, **Egypt**, Georgia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, **Libya**, Oman, Pakistan, Palestine Autonomous Territories, Qatar, Saudi Arabia, Syrian Arab Republic, Tajikistan, Tunisia, Turkey, Turkmenistan, Uzbekistan	**O, A, 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, 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, SAT 2**
6	**SOUTHERN AFRICA** Angola, Botswana, **Congo D. R.,** Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe	**{O, A}*, SAT 1, SAT 2, SAT 3**
7	**SOUTH AMERICA** Ecuador, Paraguay, Venezuela	**O, 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

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

(Presence of Pool 4 in Libya and North Zambia not shown on map)



II. HEADLINE NEWS

POOL 1

China (Hong Kong, Sar)[1] – A sample from the last reported outbreak occurring in October 2014, sent for genotyping to the WRLFMD, was identified as FMDV serotype O, topotype Cathay, genotype unnamed.

China (Taiwan Province) [2,3] - Positive non-structural protein (NSP) antibody reactions for FMDV were detected in two cattle on a farm in Kinmen County, on the 13th of April 2015. FMDV serotype A was confirmed by reverse transcription - polymerase chain reaction (RT-PCR) in one of the seropositive animals.

POOL 2

India[4] - The Project Directorate on Foot and Mouth Disease (PDFMD), Mukteswar, India, reported the detection of FMDV serotypes Asia 1 and O in the clinical samples tested.

POOL 3

Algeria[1] – Three FMD outbreaks caused by serotype O, involving mixed species (sheep, goat and bovine) farms, were reported between the 7th and 11th of April 2015, in the administrative unit of El Bayadh.

Egypt[1,5] –Two samples collected from cattle in 2012 and 2014, sent for genotyping to the WRLFMD, were both identified as FMDV serotype SAT 2, topotype VII, but belonging to different genotypes, Ghb-12 and Alx-12 respectively. Among the 111 samples collected between January and March 2015, FMDV serotypes A and O were detected by AHRI (Animal Health Research Institute), Virology Department, Cairo, Egypt**.**

Pakistan[6] - Seventy-five FMD outbreaks were reported during April 2015, throughout Pakistan, within the Progressive Control of Foot and Mouth Disease Project. Laboratory results confirmed the circulation of three FMDV serotypes A, Asia 1 and O, as already reported since the beginning of 2015.

POOL 4

Ethiopia[7] - The National Animal Health Diagnostic and Investigation Centre (NAHDIC), Ethiopia, detected FMDV serotype O in bovine samples collected from a FMD outbreak using FMD antigen (Ag) detection ELISA.

Kenya[8] - The Foot-and-Mouth Disease Laboratory, Embakasi, Kenya, diagnosed FMDV serotypes O and SAT 1 in clinical samples collected from cattle using FMD Ag detection ELISA and RT-PCR.

POOL 5

Cameroon[9] - The Laboratoire National Vétérinaire (LANAVET) – Garoua detected FMDV in 4 of the 50 bovine samples tested by pan FMD RT-PCR.

Mauritania[2] - A FMD outbreak occurred on the 21st of December 2014, in domestic cattle of a village in Kaedi and the serotype involved was FMDV SAT 2.

Nigeria[10] - The National Veterinary Research Institute detected FMDV serotypes A, O, Sat 1 and 2 in the clinical samples tested.

POOL 6

Botswana[2] - A FMD outbreak was confirmed on the 17th of April 2015, involving domestic cattle of a village in Ngamiland and the serotype causing the event is FMDV SAT 2.

Zimbabwe[2] **-** Four FMD outbreaks were confirmed between the 13th and 24th of April 2015, in cattle farms in Matabeleland North and South and the identification of the serotype is pending.

POOL 7

Latin America [2]- No outbreaks reported

COUNTER

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

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

III. DETAILED POOL ANALYSIS

A. POOL 1 – Central /East Asia

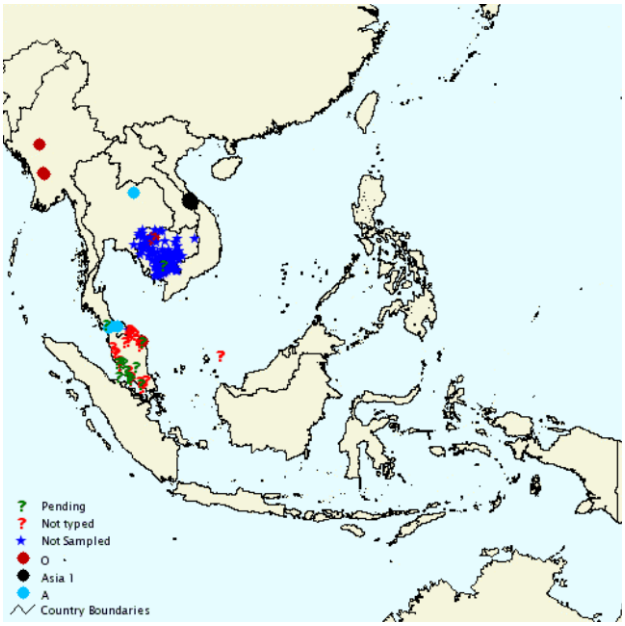
Southeast Asia [11]

No reports of FMD outbreaks were described during April 2015, in the countries reported in Table 2. Last reported outbreaks were in Viet Nam, in December 2014. The episodes ongoing from the previous months are 210 as registered in March. The circulating FMDV serotypes are A, Asia 1 and O. Location of outbreaks is presented in Map 2.

Table 2: FMD outbreaks reported as ongoing during April 2015 in the countries of the Southeast Asia area are listed below.

Country registering FMD outbreeaks	Prior outbreaks continuing
Cambodia	142
Myanmar	3
Malaysia	46
Thailand	4
Viet Nam	15
Total	**210**

Map 2: Location of FMD outbreaks reported as ongoing during April 2015 in the countries of the Southeast Asia area listed in Table 2 (SEAFMD).



China (Hong Kong, Sar)[1]

A sample collected from a pig during the last reported outbreak occurring in Sheung Shui, New Territories, in October 2014, sent for genotyping to the WRLFMD was identified as FMDV serotype O, topotype Cathay, genotype unnamed. The highest sequence identity of this strain was with the field strain O/HKN/11/2014 (99.22%) and with the reference virus O/Yunlin/TAW/97 (89.05%).

China (People's Rep. of)[2]

Two FMD outbreaks, respectively confirmed in April 2013 and 2014 in cattle in Yunnan, China and in Rikaze, Tibet caused by FMDV serotype A-SEA 97 G2 are reported as ongoing.

Another outbreak in pigs in Jiangsu, China, caused by FMDV serotype O, Myanmar 98 in November 2014, is also reported as continuing.
Control measures being applied in the abovementioned outbreaks are: stamping out, quarantine, movement control inside the country, screening, zoning, disinfection of infected premises/establishment(s), while treatment of affected animals is not being carried out. No vaccination has been adopted in the outbreak in Jiangsu.
The vaccination activity carried out in the other outbreaks is reported in Table 3.

Table 3: summary of the species and number of animals vaccinated in Yunnan and Tibet where FMDV outbreaks are being reported as ongoing.

Administrative division	Species	Total Vaccinated
Yunnan	Sheep	37,928
	Cattle	14,1955
Tibet	Cattle	1,779

China (Taiwan Province)[2,3]

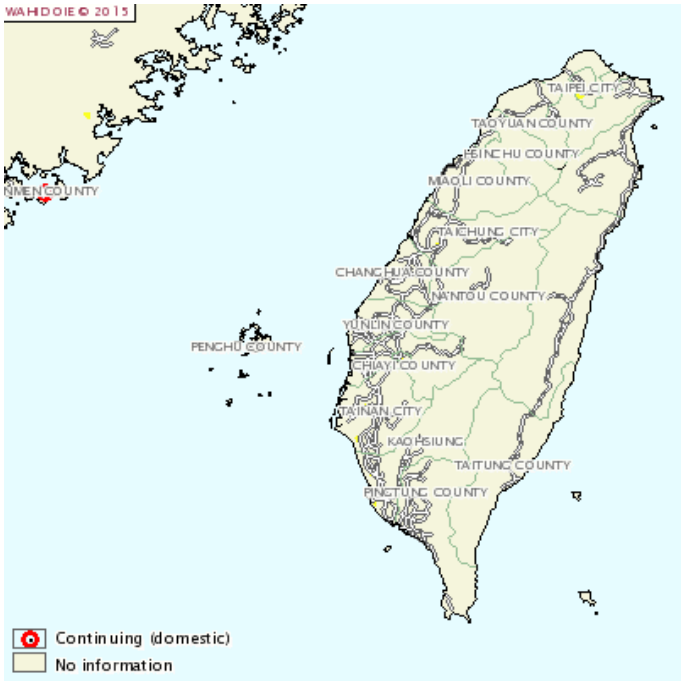
A FMD outbreak occurred in Kinmen County and the date of start of the event was 13th April 2015. The outbreak was detected during routine serological surveillance, with two cattle on a farm reacting positively for NSP antibodies for FMDV. The animals were traced back to their farm of origin by the local disease control center (LDCC) to adopt movement restrictions, and conduct clinical investigations and sampling of sera and oropharyngeal fluid for serological and virological tests. No clinical signs of FMD were found in any of the cattle within the index farm. On retesting on 1st of May 2015 for NSP antibodies, one of the reactive cattle was reconfirmed as positive and was subsequently culled as a precautionary measure. The animal showed a positive reaction to FMDV by PCR on the 8th of May 2015. Genotyping of the detected FMDV strain confirmed a sequence homology of 99% with the strain isolated in Guangdong Province of China in 2013. All the cattle on the infected farm, including 100 heads of cattle from neighbouring farms, will be culled and epidemiological investigations and surveillance of surrounding cloven-hoofed animal farms will be implemented.
Control measures being applied are: quarantine, movement control inside the country, screening, zoning, disinfection of infected premises/establishment(s), while treatment of affected animals and vaccination is not being carried out. Source of the outbreak or origin of infection is unknown or inconclusive.
A summary of the species involved in the event and the geographical location of the outbreak are respectively reported in Table 4 and Map 3.

Table 4: summary of the event that occurred in China (Taiwan Province) during April 2015.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	176	1	0	1	0	0.57%	0.00%	0.00%	0.57%

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

Map 3: Location of FMD outbreaks occurring during April 2015 in China (Taiwan Province).



Mongolia[2]

Following the FMD outbreaks reported in Khovd, in February and March 2015, the events are reported as continuing. The control measures being applied are: quarantine, movement control inside the country, screening, zoning, vaccination in response to the outbreaks with no treatment of affected animals. Details of the vaccination activity are presented in Table 5.

Table 5: summary of the number and species of animals vaccinated in April 2015 in Khovd, Mongolia.

Administrative division	Species	Total Vaccinated
Khovd	Goats	197,772
	Cattle	34,089
	Sheep	78,368
	Camelidae	2,436

Russian Federation [2, 12]

Post vaccination monitoring was carried out by examining 3792 sera. ARRIAH was involved in the provision of materials and advice 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.

The laboratory is continuing its studies on the antigenic relationship between epidemic isolates and vaccine strains of FMDV serotypes A and O. Research on FMDV is being conducted by ARRIAH and focuses on the immunobiological properties of serotype SAT2. Personnel from the laboratory attended the 41st General Session of the European Commission for Control of Foot-and-mouth Disease, held at FAO in Rome, Italy and the 6th Regional Meeting to review the progress of the West Eurasia FMD Roadmap, held in Almaty, Republic of Kazakhstan.

An outbreak caused by FMDV serotype A, that occurred in January 2014, in cattle and pigs in ZABAJKAL`SKIJ KRAY is reported by the World Animal Health Information Database as continuing. The control measures being applied are: quarantine, movement control inside the country, screening, modified stamping out and vaccination in response to the outbreaks, with the vaccination of 4,080 cattle while affected animals are not being treated. As

routine FMD vaccination is currently carried out in Russia, all susceptible animals will be vaccinated in the near future. Source of the outbreaks or origin of infection remains unknown or inconclusive.

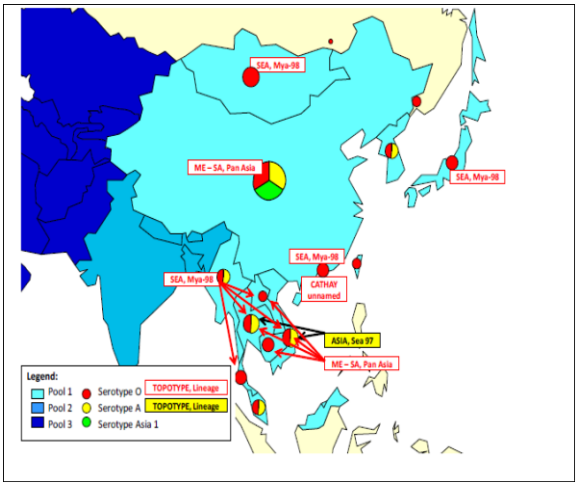
Table 6: Summary of the history of FMD Pool 1, 2012 – 2014, for geographic distribution see Map 4 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment
Cambodia	O, 2013-2014/NOT SAMPLED	Apr 2015/O, Aug 2014/ not typed	See text Typing required
China (People's Rep. of)	2012-2013/O, 2013/A,	Apr 2015/A and O	See text Genotyping available
China (Hong Kong, Sar)	O	Oct 2014/O	See text Genotyping available
China (Taiwan Province)	2012-2013/O,	Apr 2015/O	See text
Korea (DPR)	2012-2013/DISEASE ABSENT	May 2014/not confirmed, July 2014/O	
Korea (Rep. of)	2012-2013/DISEASE ABSENT	March 2015/O	
Laos PDR	2012/DISEASE PRESENT WITH QUANTITATIVE DATA BUT WITH AN UNKNOWN NUMBER OF OUTBREAKS	Mar 2013/O	
Malaysia	2012 –2013/O 2013/NOT TYPED	Apr 2015/O	See text Typing required
Mongolia	2013/A	Sept 2013/A, Apr 2015/O	See text Typing required
Myanmar	2012-2013/O	Apr 2015/O, July 2014/ not typed	See text Typing required
Russian Federation	2012/O, 2013/A	March 2015/O and A	See text
Thailand	O, A and NOT TYPED	Jun 2014 /A, Oct 2012/O, Sept 2014/not typed	See text Typing required
Vietnam	O, NOT SAMPLED 2013- 2014/A,	Apr 2015/A and Asia 1 Jun 2014/O, July 2014/not typed	See text Typing required

Map 4: FMD distribution by serotype and topotype in South East Asia, 2010 – 2014 (EuFMD).

Conjectured circulating FMD viral lineages in pool 1 per 2014 [19]:

- Serotype O: O/SEA/Mya-98, O/ME-SA/PanAsia, O/CATHAY
- Serotype A: A/ASIA/Sea-97
- Serotype Asia-1 (not detected in the region since 2005 (Myanmar) and 2006 (Vietnam, P.R. China)



B. POOL 2 – South Asia

India[5]

Fifty-nine clinical samples (45 from cattle and 14 from buffaloes) were tested by (PDFMD), Mukteswar, India for FMDV antigen and/or RNA and serotypes O and A were detected. A total of 37,660 serum samples were tested for FMDV antibodies for epidemiological studies. The indigenous diagnostic kits developed at PDFMD, Mukteswar were used for these tests.

The laboratory personnel are continuously investigating FMD field outbreaks and are providing expert advice to Government, national/local authorities or to other services. The laboratory is also involved in research studies and collaborations with international organisations.

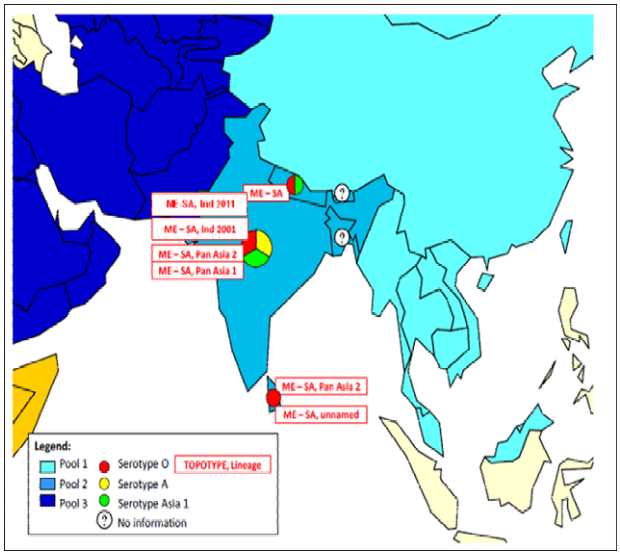
Table 7: Summary of the history of FMD Pool 2, 2012 – 2014, for geographic distribution see Map 5 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE between 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Bangladesh	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed
Bhutan	NOT TYPED, 2013/NOT SAMPLED 2013-2014/O	Not available	Follow –up needed
India	O, A, NOT SAMPLED 2012-2013/Asia 1 2013/NOT TYPED	Apr 2015/Asia 1 and O	See text
Nepal	O, 2012-2103/Asia 1	Apr 2014/O	
Sri Lanka	2012 – 2013/O	Sept 2014/O	

Map 5: FMD distribution by serotype and topotype in South Asia, 2011 – 2014 (EuFMD).

Conjectured circulating FMDV lineages in pool 2 per 2014 [19]:

- O/ME-SA/Ind-2001 (the O/ME-SA/Ind-2011 lineage that emerged during 2011 has not been recognized during 2012-13)
- O/ME-SA/PanAsia-2 (last detected in 2011 in Sri Lanka)
- A/ASIA/IND (genotype 18)
- Asia-1 (lineage C subdivided into Eastern and Western clusters)



C. POOL 3 – West Eurasia & Middle East

Algeria[2]

Three new FMD outbreaks, caused by FMDV serotype O, were reported between the 7th and 11th of April 2015, following the outbreaks that occurred in March, after an interruption of their occurrence in the country since October 2014. These outbreaks are still restricted to small ruminants.

Control measures being applied in El Bayadh wilaya are closing of livestock markets and ban on movement of animals. Movement of cattle in the other wilayahs is subject to a vaccination certificate. Other control measures applied in the country are quarantine, movement control inside the country, vaccination in response to the outbreak, details of which are reported in Table 8, disinfection of infected premises/establishments while treatment of affected animals is not being carried out. The present vaccination campaign is also involving small ruminants.
A summary of the animal species and administrative units involved in the outbreaks registered between March and April 2015, and the geographical location of those occurring in April 2015 are reported in Table 9 and Map 6, respectively.

Table 8: summary of the number and species of animals vaccinated during April 2015, in Algeria.

Administrative division	Species	Total Vaccinated
EL BAYADH	Cattle	1810
EL OUED	Cattle	367
EL BAYADH	Goats	8374
	Sheep	99407

Table 9: summary of the animal species and administrative units, involved in the twelve outbreaks registered in Algeria, between March and April 2015.

Administrative Unit	Observation Date	Species Description	Sum At Risk	Sum of Cases	Sum of Deaths	Sum of Destroyed	Sum Slaughtered
El Bayadh	11/04/2015	sheep and cattle	502	4	0	0	not reported
	09/04/2015	sheep, goats and cattle	206	10			0
	07/04/2015	sheep	2000	20			
Saida	31/03/2015		60	1			
Sidi Bel Abbes	30/03/2015		400	15			
El Bayadh	15/03/2015	sheep, goats and cattle	423	20			not reported
	15/03/2015	goats and sheep	260	15			
	12/03/2015		385	1			
			510	30			
	06/03/2015		270	2			
	02/03/2015		474	40			
El Oued		cattle	10	1		not reported	
		Totals	**5500**	**159**	**0**	**0**	**0**

Map 6: Location of FMD outbreaks occurring during April 2015 in Algeria.

Egypt[1,5]

Two samples collected from cattle in Dakahlia, in 2012 and in Kalubia, in 2014 were both identified by the WRLFMD as FMDV serotype SAT 2, topotype VII, but belonging to different genotypes, Ghb-12 and Alx-12 respectively. The highest sequence identity of the 1st strain was with field strain SAT2/EGY/28/2012 (99.85%) and with reference virus SAT2/SAU/6/2000 (89.49%) while for the 2nd strain, the highest sequence identity was with field strain SAT2/EGY/20/2014 (99.69%) and with reference virus SAT2/SAU/6/2000 (91.65%).

The AHRI received 111 samples for FMD diagnosis between the 1st of January and the 19th of March. The samples were collected from cattle (51), buffaloes (16), sheep (7), 1 goat; for 36 samples, species was not identified. The samples were examined by FMD Ag ELISA for serotypes A, O, SAT1 and SAT2. A total of 22 samples were detected as positive, of which 18 for FMDV serotype O and 4 for serotype A. The samples positive for serotype O were epithelial tissues collected from buffaloes (6), cattle (5) and species not identified (5) and cardiac tissues (1 cattle and 1 buffalo). The samples positive for FMDV serotype O were all epithelial tissues collected from cattle.

Pakistan[6, 13]

At the 6th Annual Meeting of the West Eurasia FMD Road Map held in Almaty, Kazakhstan from 28 – 30 April 2015, the Regional Advisory Group recognized Pakistan's status, upgraded from Stage 1 to Stage 2 within the FMD-Progressive Control Pathway. The financial assistance for the project was provided by the United States Department of Agriculture.

Within the abovementioned FMD Project, GCP/PAK/123/USA for the Development of a Technical Framework for the Progressive Control of the disease in Pakistan field veterinarians attended 75 FMD outbreaks, 60 of which occurred in Sindh. Vaccination was carried out in 25,464 animals and a summary of this is presented in Table 10.

Table 10: summary of the animals vaccinated in the different livestock production units, during April 2015, in Pakistan

Ring Vaccination	Dairy Colonies	Rural dairy production system	Cost sharing basis	Government Livestock Farms/ Yaks/ Cholistan desert farming system
157	9969	1000	13348	990

Since the beginning of the year, the circulating FMDV serotypes in Pakistan are A, Asia 1 and O. Six of the reported outbreaks were caused by mixed infections. Eight laboratories are undertaking serotyping of FMD from clinical

outbreaks and 31 samples were sent to WRLFMD for genotyping and vaccine matching for which results are pending. ELISA kits, other expendables and technical backstopping were provided to these laboratories.
An Awareness Seminar was organized in Dera Ismail Khan FATA with 53 farmers educated in the areas of prevention and control of FMD. Three Capacity Building Seminars were organized for 56 Veterinary Officers and 13 Field Assistants to which sample collection kits were also distributed.

Table 11: Summary of the history of FMD Pool 3, 2012 – 2014, for geographic distribution see Map 7 below.

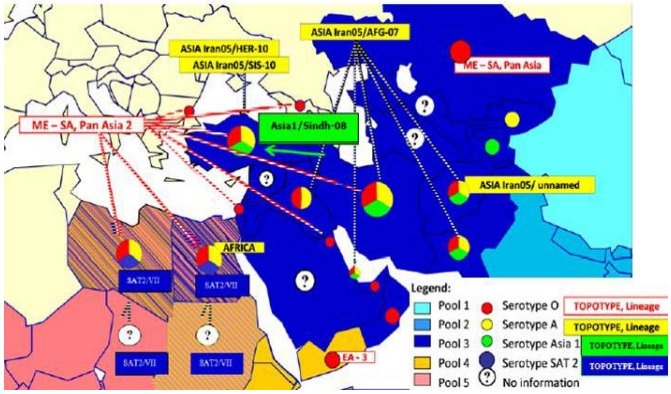
COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment (Genotyping or vaccine matching tests needed for this pool)
Afghanistan	2013/O, A, Asia 1, NOT TYPED 2012/SEROTYPE NOT REPORTED	2014/A, Asia 1, O	Genotyping required
Algeria	2014/O	Apr 2015/O	See text
Armenia	2012-2013/DISEASE ABSENT	Not available	Follow –up needed
Azerbaijan	DISEASE ABSENT	Jun 2001	Follow –up needed
Bahrain	2012 /O	Oct 2014/O	
Egypt	2012, 2014/SAT 2 2012 - 2014/O, A	April 2014/Sat 2, Jan-Mar 2015/A & O	See text Genotyping available
Georgia	DISEASE ABSENT	2002	Follow –up needed
Iran	O, A, 2012-2013/Asia 1	Jun 2013/Asia 1, Apr 2014/O, A	
Iraq	2012-2013/O, A	Dec 2013/A, O	Follow –up needed
Israel	2012-2013/O	Nov 2013/O	Follow –up needed
Jordan	DISEASE ABSENT	2006	Follow –up needed
Kazakhstan	2012/O 2012 –2013/A	Aug 2012/O, Jun 2013/ A	Follow –up needed
Kuwait	2012/O 2013 – 2014/ DISEASE ABSENT	Jan 2012/O	Follow –up needed
Kyrgyzstan	2012-2013/O, A	Apr 2013 /O, A, Aug 2014/NOT TYPED	Typing required
Lebanon	DISEASE ABSENT	2010	Follow –up needed
Libya	NO DATA AVAILABLE	Oct 2013/O	Follow –up needed
Oman	2012-2013/O	Dec/2013	
Pakistan	DISEASE LIMITED TO ONE OR MORE ZONES	Apr 2015 / A, Asia 1, O	See text - genotyping required for most recent isolates
Autonomous Territories Palestine	O, 2012-2013 - SAT 2	Mar 2013/Sat 2, Nov 2014/O	
Qatar	2012-2013/O	Dec 2013/O	Follow –up needed
Saudi Arabia	2013/O	Nov 2013/O	
Syrian Arab Republic	DISEASE ABSENT	Mar/2002	Follow –up needed
Tajikistan	2012/NOT TYPED 2013/DISEASE ABSENT	Nov 2011/Asia 1, Nov 2012/ NOT TYPED	
Tunisia	2014/O	Oct 2014/O	
Turkey	Asia 1, A, O, NOT TYPED	Nov 2014/O, Feb 2015/ A and Asia 1	

Turkmenistan	NO DATA AVAILABLE	Not available	Follow –up needed
Uzbekistan	NO DATA AVAILABLE	Not available	

Map 7: FMD distribution by serotype and topotype for West Eurasia and Middle East, 201 – 2014 (EuFMD).

Conjectured circulating FMDV lineages in pool 3 per 2014 [19]:

- O/ME-SA/PanAsia-2 (predominantly from ANT-10 and FAR-09 sub-lineages)
- O/ME-SA/Ind-2001 (recent incursion per 2013 from the Indian sub-continent)
- A/ASIA/Iran-05 (from SIS-12, SIS-10, FAR-11 and BAR-08 sub-lineages)
- Asia-1 (Sindh-08 lineage).



D. POOL 4 – Eastern Africa

Ethiopia[7]

The NAHDIC detected FMDV serotype O in 10 bovine tissue samples, using FMD antigen (Ag) detection ELISA. The NAHDIC will be forwarding these samples to the WRLFMD for genotyping. Of the 27 serum samples tested by NSP 3ABC ELISA, 12 samples scored positive.

Of the 16 samples sent to the WRLFMD, FMDV genome was detected in 8 samples and the six samples with Ct values below 27 were subjected to type specific PCRs for FMDV types O, A, SAT 1 and SAT 2. Two samples were identified as positive for FMDV serotype O. One sample ETH/6/2014 collected in February 2014 in Oromia, Ethiopia produced a sequence suitable for genotyping and was identified as FMDV serotype O, Topotype: EA-3, genotype/strain unnamed. The highest sequence identity of the strain was with field strain O/ETH/45/2009 (99.03%) and with reference virus O/ETH/1/2007 (93.11%).

Kenya[8]

The Foot-and-Mouth Disease Laboratory, Embakasi, Kenya detected FMDV serotype O and SAT2 in two bovine clinical samples tested using FMD antigen (Ag) detection ELISA and RT-PCR. The laboratory also carried out post vaccination monitoring for FMD.

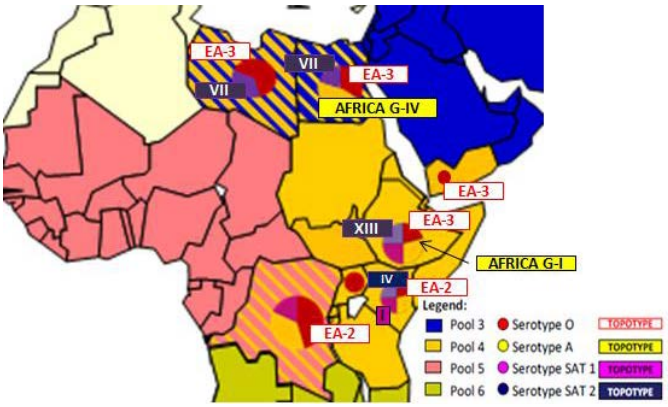
Table 12: Summary of the history of FMD Pool 4, 2012 – 2014, for geographic distribution see Map 8 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 - 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Burundi	NO DATA AVAILABLE	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 - 2014/O, A	April 2014/Sat 2, May 2014/A, Oct 2014/O	See text
Eritrea	2012/O	Jan 2012/O	Follow –up needed
Ethiopia	O, 2012/A, SAT 2	Jun 2014/A, Apr 2015/O, Jan 2015/confirmation pending, March 2015/SAT 2,	See text Genotyping required for most recent isolates
Kenya	O, SAT1, SAT2, 2012 – 2013/A,	Mar 2015/ A, Apr 2015/O and SAT 2	See text Genotyping required

	2012/NOT TYPED		
Libya	NO DATA AVAILABLE	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/NOT SAMPLED 2013 – 2014/ NO DATA AVAILABLE	2011	Follow –up needed
Sudan	O, 2013/SAT 2, 2013-2014/NOT TYPED	2013/O, SAT2	Follow –up needed
South Sudan	NO DATA AVAILABLE	2011	Follow –up needed
Tanzania	2012/O 2012-2013/A, SAT 1, SAT 2,	Mar 2013/O Apr2013/ A, SAT 1, SAT2	
Uganda	2012/O, SAT 1 2012-2013/NOT TYPED	May 2014-Jan 2015/O, A, SAT1, 2 and 3	Genotyping required
Yemen	2012/O 2013 – 2014/ DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	Follow –up needed

Map 8: FMD distribution by serotype and topotype for East Africa. 2011 – 2014 (EUFMD)

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



Conjectured circulating FMDV lineages in pool 4 per 2014 [19]:

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

E. POOL 5 – <u>West / Central Africa</u>

Cameroon[9]

LANAVET detected FMDV in 4 of the bovine 50 samples tested by pan FMDV RT-PCR. The laboratory has also conducted serosurveys. Serological diagnosis is at the present on hold as the laboratory is out of stock for serological kits for FMD.

LANAVET is continuing with its research collaborative projects with Plum Island Animal disease Centre and Ohio State University, USA.

Ghana[14]

ACCRA veterinary laboratory tested serum samples collected from suspected FMD outbreak areas earlier in the year and 12 bovine and 2 sheep samples reacted positive for antibodies against FMDV serotype A.

An update of the FMD situation for the first quarter of 2015 for the RESOLAB-FMD West Africa area (pool 5) was provided by Dr. J. Awuni, the Regional Coordinator, and is presented in Table 13.

Table 13: update on the FMD situation for the 1st Quarter of 2015 for RESOLAB area (pool 5)

COUNTRY	Serotypes detected in previous outbreaks	FMD Outbreaks Reported in 1st Quarter 2015
BENIN	O, A, SAT 1, SAT 2	No outbreak reported
BURKINA FASO	A, O, SAT 2	No Information received
CAMEROON	A, O, SAT 2	**Outbreaks reported and samples taken but no virus**
CAPE VERDE	No Information	No Information received
CENTRAL AFRICAN Republic	No Information	No Information received
CHAD	A, SAT 1	No Information received
CONGO Democratic Republic	A, O, SAT1	No Information received
CONGO REPUBLIC	No Information	No Information received
COTE D'IVOIRE	A, O, SAT2	No Information received
EQUITORIAL GUINEA	No Information	No Information received
GABON	No Information	No Information received
GAMBIA	A, O, SAT2	No Information received
GHANA	A, O, SAT 1, SAT 2	**Three outbreaks, no virus**
GUINEA BISSAU	No Information	No Information received
GUINEA	No Information	**Health crisis**
LIBERIA	A, SAT 2	**Health crisis**
MALI	O, A, SAT 1, SAT2	No Information received
MAURITANIA	No Information	No Information received
NIGER	O, A, SAT1, SAT 2	**231 sera and 39 tissue samples collected in 2014 not analysed. No outbreaks in 2015**
NIGERIA	A, SAT1,	Total number of outbreaks not known but FMDV serotype A detected in two samples
SAO TOME PRINCIPE	No Information	No Information received
SENEGAL	O, A, SAT2	Serotypes O and A detected from 12 outbreaks
SIERRA LEONE	No Information	**No outbreak reported**
TOGO	O, SAT1	No Information received

Mauritania[1, 2]

A FMD outbreak occurred on the 21st of December 2014, in domestic cattle of a village in Kaedi and the serotype involved was SAT 2, as confirmed by the WRLFMD. The outbreak was resolved on the 7th of February 2015. Source of the outbreak or origin of infection is unknown or inconclusive. Control measures applied were the following: quarantine, movement control inside the country, disinfection of infected premises. Treatment of affected animals is being adopted while no vaccination is being applied.

Summary of the features of the event and geographical location are respectively reported in Table 14 and Map 9.

Table 14: summary of the species involved in the event that occurred in Kaedi, Mauritania during April 2015.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	1200	5	0	0	0	0.42%	0.00%	0.00%	0.00%

Map 9: Location of FMD outbreak occurring during April 2015 in Mauritania.

Nigeria[10]

The National Veterinary Research Institute detected the following FMDV in five clinical samples serotypes A (1), O (2), SAT1 (1) and SAT2 (1). The laboratory personal was involved in the investigation of FMD outbreaks in the field and in providing expert advice to Government services national/local authorities and other services and collaborates with OIE.

Senegal[15]

ISRA/LENVR carried out FMD serological testing on 433 small ruminant sera with 34 reacting positive for serotype O (11), serotype A (20) and untyped (3). The laboratory is also involved in field investigations during which 3000 samples have been collected that are awaiting testing.

Table 15: Summary of the history of FMD Pool 5, 2012 – 2014, for geographic distribution see Map 10 below.

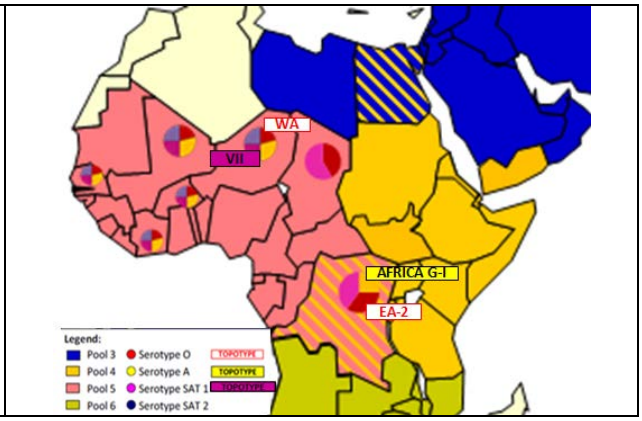
Country	FMD history FMDV serotypes, reported to OIE in 2012 – 2014	Last outbreak reported/serotype[#]	Comment (Genotyping would be useful for this region)
Benin	A, O, SAT 1, SAT 2	Jun 2014/O, A, SAT 1, SAT 2	
Burkina Faso	SEROTYPES NOT REPORTED	2013/ not available	Follow –up needed
Cameroon	SEROTYPES NOT REPORTED	Apr 2014/ A, Nov 2014/O, SAT 2, May 2014/SAT 1, Jun 2014, Jan 2015/untyped	See text Genotyping required for most recent isolates

Cape Verde	NO DATA AVAILABLE	Not available	Follow –up needed
Central Afr. Rep.	DISEASE PRESENT BUT WITHOUT QUANTITATIVE DATA	Not available	
Chad	2012 – 2013/SEROTYPES NOT REPORTED	Not available	
Congo D. R.	2012 – 2013/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/A, NOT SAMPLED 2013/ SEROTYPES NOT REPORTED	Jun 2013/not typed	
Equatorial Guinea	DISEASE SUSPECTED BUT NOT CONFIRMED	Not available	Follow –up needed
Gabon	NO DATA AVAILABLE	Not available	
Gambia	NO DATA AVAILABLE	2012/O	
Ghana	2012 – 2014/SEROTYPES NOT REPORTED	2014/not available	See text Identification required Follow –up needed
Guinea Biss.	DISEASE ABSENT	No data available	Follow –up needed
Guinea	2012-2013/ DISEASE ABSENT	2014/not available	
Liberia	NO DATA AVAILABLE	Not available	Follow –up needed
Mali	2012/DISEASE ABSENT 2013/ SEROTYPES NOT REPORTED	2011/2012, no precise data	
Mauritania	2012-2013/NO REPORTED OUTBREAKS	Dec 2014/SAT 2	See text
Niger	2012 – 2014/NOT SAMPLED	2014/not sampled	Identification required
Nigeria	2012 – 2014/NOT SAMPLED	Sept 2014/0, SAT 1 and SAT 2, Feb 2015/ A	Genotyping required Follow –up needed
Sao Tome Principe	2012/DISEASE ABSENT, 2013/NO DATA AVAILABLE	Not available	Follow –up needed
Senegal	2012, 2014/NO DATA AVAILABLE 2013/DISEASE ABSENT,	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, 2013/NOT TYPED	2012/O	Follow –up needed

Map 10: FMD distribution by serotype and topotypes for West Africa, 2011 – 2014 (EuFMD)

Conjectured circulating FMDV lineages in pool 5 per 2014 [19]:

- Serotype O (topotypes WA, EA-3 (Nigeria))
- Serotype A (topotype AFRICA, genotypes IV and VI)
- Serotype SAT 1
- Serotype SAT 2 (topotype VII)



F. POOL 6 – SOUTHERN AFRICA

Botswana[2]

Following the FMD outbreaks that occurred during the previous month, a new event was reported on the 17th of April 2015 in Ngamiland involving the domestic cattle of a village. The affected cattle are again those grazing in a communal area.

The present outbreak was detected in an adjacent crush near the original outbreak at Maxebo during ongoing mass vaccination campaign. Epidemiological investigations are still continuing and weekly reports will be submitted. In this outbreak serotyping was not done but is believed to be again caused by SAT 2, as for the previous outbreaks that occurred in the same area.

Containment and preventive measures applied are control of wildlife reservoirs, zoning, and vaccination in response to outbreaks and movement control inside the country.

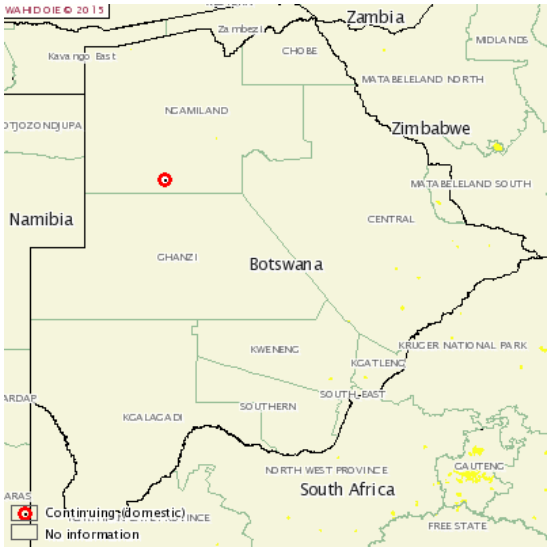
Mass vaccination is being carried out with trivalent SAT 1, 2 and 3 vaccine of all cattle in zone 2 of Ngamiland (33,020 cattle have been vaccinated until now). A summary of the outbreak is reported in Table 16 and the location of the outbreaks is presented in Map 11.

Table 16: summary of the number of cattle involved in the FMD outbreak reported in Ngamiland, Botswana during April 2015.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	191	8	0	0	0	4.19%	0.00%	0.00%	0.00%

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

Map 11: Location of FMD outbreaks reported in Ngamiland, Botswana during April 2015.



Zimbabwe[2]

Four FMD outbreaks were observed between the 13th and 24th of April 2015, in cattle farms in Matabeleland North and South. The events occurred in four different farms affecting cattle of different age groups. The Botswana Vaccine Institute Laboratory (OIE's Reference Laboratory) is carrying out diagnosis by virus isolation on cattle

samples and confirmation is pending. Source of the outbreak or origin of infection is through illegal movement of animals and contact with infected animal(s) at grazing/watering points.
The disease was initially observed during routine farm inspections on a farm that had, 2 weeks earlier, received animals from an auction sale in Bulawayo city. In trace-back inspections of all holdings, that had sent animals to this sale, the disease was revealed at one of the source farms and at two neighbouring properties, one of which is a feedlot that has also has an abattoir on the same property. Inspection of records revealed that cattle originating in the infected zone, from Mwenezi district, that were meant for direct slaughter, were illegally diverted into the feedlot and are suspected to have introduced infection into the herd. No other property that had sent cattle to the Bulawayo auction sale presented FMD. Trace-forward inspections of all properties that received cattle from the auction sale revealed infection at four different sites and all of them had moved animals out after the date they received cattle from the auction. Containment and preventive measures applied are quarantine, movement control inside the country, screening, zoning, vaccination in response to the outbreaks and disinfection of infected premises. Affected animals will not be treated.
A summary of the outbreak is reported in Table 17 with location of outbreak is presented in Map 12.

Table 17: summary of the number of cattle involved in the FMD outbreak reported in Matabeleland North and South, Zimbabwe, during April 2015.

Species	Susceptible	Cases	Deaths	Destroyed	Slaughtered	Apparent morbidity rate	Apparent mortality rate	Apparent case fatality rate	Proportion susceptible animals lost*
Cattle	16595	115	0	6	0	0.69%	0.00%	0.00%	0.04%

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

Map 12: Location of FMD outbreaks reported in, Matabeleland North and South, Zimbabwe during April 2015.

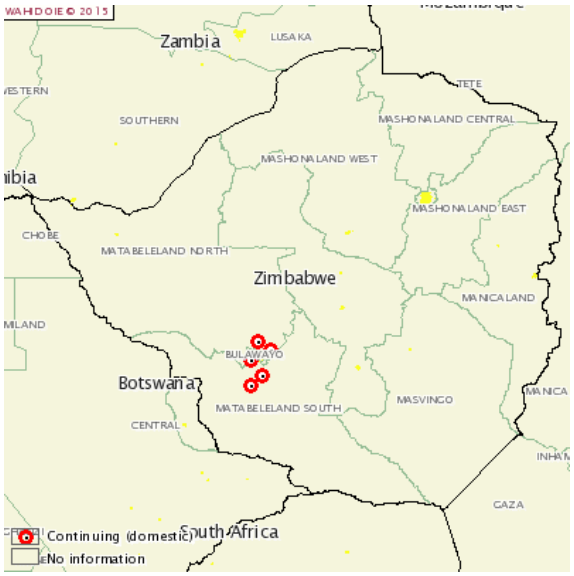
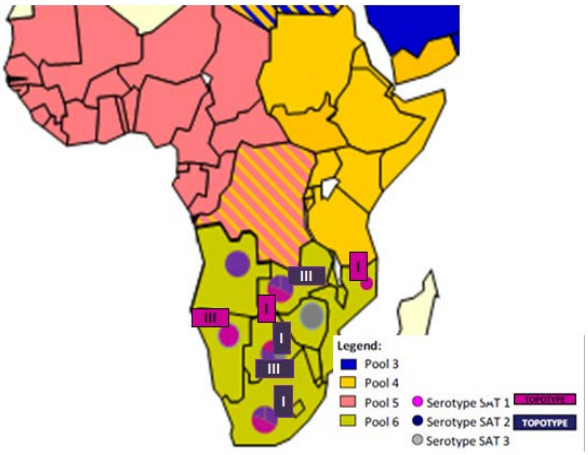


Table 18: Summary of the history of FMD Pool 6, 2012 – 2014, for geographic distribution see Map 13 below.

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 – 2014	LAST OUTBREAK REPORTED/SEROTYPE[#]	Comment
Angola	2012/DISEASE SUSPECTED BUT NOT CONFIRMED 2013/DISEASE ABSENT 2014/NO DATA AVAILABLE	Dec 2010/ SAT 2	Follow –up needed
Botswana	2012-2014/SAT 2 2014/SAT 1	Mar 2015/SAT 2, Apr 2015/typing pending Oct 2014/SAT 1	See text Typing required
Congo D. R.	2012 – 2013/A, O, SAT 1	Jun 2013/not typed	Follow –up needed
Malawi	2012 -2013/NO REPORTED OUTBREAKS	Oct 2011	Follow –up needed
Mozambique	2012 -2013/DISEASE ABSENT, 2014/NO DATA AVAILABLE	Oct 2014/SAT 2	Genotyping required
Namibia	2012-2013/SAT 1	Dec 2014/SAT 2, Jan 2015/typing pending	Typing required
South Africa	2012/SAT 2 2013/SAT 1	Aug 2013/SAT 1, Nov 2014/ SAT 2	See text Genotyping required
Zambia	2012/SAT 1, SAT 2	Jan 2013/SAT 1, SAT 2	Follow –up needed
Zimbabwe	2012-2013/SAT 2 2013/SAT 3 2014/SAT 1	Jun 2013/SAT 3, Sept 2014/SAT 1, Feb 2015/SAT 2, Apr 2015/Typing pending	See Text Typing required

Map 13: FMD distribution by serotype and topotype for southern Africa, 2011 – 2014 (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 2014 [19]:

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

G. POOL 7 – South America

South America [2,16]

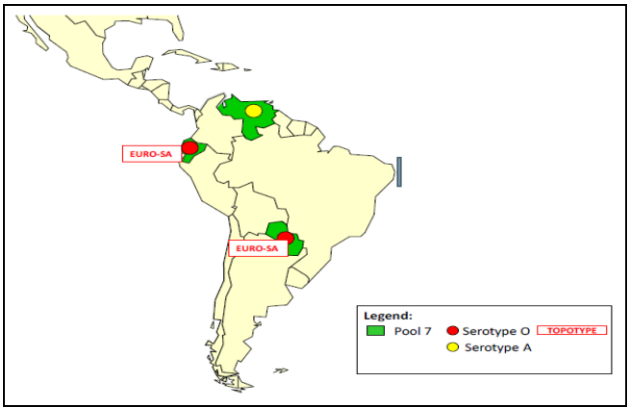
During the 42a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa held in Quito, Ecuador, 16-17 April, 2015 it was reported that during 2014,the FMD situation in South America remained unchanged compared to 2013 and the countries of South America and Panama have maintained their status as free of foot mouth disease without vaccination. Furthermore, during the reporting period there was no record in the Continental Surveillance System of FMD outbreaks in the countries of South America.
The OIE FMD status of the countries by April 2015 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 (Table 19 and Map 14). The FMD history between 2011 –2013 given in Table 19.

Table 19: Summary of the history of FMD Pool 7, 2012 – 2014, for geographic distribution see Map 14 below

COUNTRY	FMD HISTORY FMDV serotypes, reported to OIE in 2012 2014	LAST OUTBREAK REPORTED/SEROTYPE#	Comment
Ecuador	DISEASE ABSENT	Aug 2011/O	
Paraguay	DISEASE ABSENT	Dec 2011/O	
Venezuela	DISEASE ABSENT	2011/O, A	National situation needs verification

Map 14: FMD distribution by serotype and topotype for South America, 2011 – 2013 [19] (EuFMD).



Map 15: OIE FMD status by April 2015

Fuente: Informe de los países a COSALFA 42
Elaboración: Unidad de Epidemiología, PANAFTOSA-OPS/OMS.

Centro Panamericano de Fiebre Aftosa
PANAFTOSA - Salud Pública Veterinaria

IV. OTHER NEWS:

[17]The 41st Session of The European Commission for the Control Of Foot-And-Mouth Disease (EUFMD) was held on 23rd-24th April 2015 at FAO in Rome, Italy.
The agenda of the event is available at http://www.fao.org/fileadmin/user_upload/eufmd/docs/AGA-701-agenda-eFINAL.pdf.
In particular the following Side events/demonstration were held within during the meeting:

- The Training Menu, e-learning and knowledge base for contingency planning,
- The prototype FMD Impacts calculator,
- Modelling livestock movements
- The updated FMD risk to Europe
- The 13 Components of the EuFMD Workplan –poster Session.

[18]The WRLFMD Quarterly Report January to March 2015 has published the following table that contains a list of FMDV strains for FMD-Free countries antigen banks. The discussion of this table is within the report. The WRLFMD is at present working to adopt a risk-based approach for identifying FMDV lineages and relate these to priority vaccines for use in Europe and other FMD-free settings.

RECOMMENDATIONS FROM WRLFMD® ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS (FOR FMD-FREE COUNTRIES) – March 2015

Note: Virus strains are NOT listed in order of importance

High Priority	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

V. REFERENCES - Superscripts

1. World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD), www.wrlfmd.org
2. WAHID Interface – OIE World Animal Health Information Database http://web.oie.int/wahis/public.php?page=home
3. FAO EMPRES-AH, http://www.fao.org/ag/againfo/programmes/en/empres/home.asp
4. Project Directorate on Foot and Mouth Disease (PD-FMD), Indian Council of Agricultural Research, Mukteswar, India (*Dr B. B. Dash*) FAO
5. AHRI (Animal Health Research Institute), Cairo, Egypt (*Dr.Eman Bastawesy* - Head of Virology Department)
6. Progressive Control of Foot and Mouth Disease in Pakistan, GCP/PAK/123/USA - (*Dr. Manzoor Hussain*, National Project Director and *Dr. Muhammad Afzal*, Project Coordinator)
7. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - (*Dr. Daniel Gizaw*)
8. National FMD Reference Laboratory, Embakasi, Kenya - (*Dr. Abraham Sangula*)
9. Laboratoire National Vétérinaire (LANAVET) -Garoua, Cameroon - (*Dr. Simon Dickmu Jumbo*)
10. FMD Research Centre, Virology Research Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria - (Dr. Ularamu Hussaini)
11. SEAFMD, http://www.arahis.oie.int/reports.php?site=seafmd
12. Regional Reference Laboratory for FMD (ARRIAH, Russia) - (Dr. Svetlana Fomina)
13. http://www.fao.org/pakistan/news/detail-events/en/c/285422/
14. ACCRA Veterinary Laboratory, Ghana - (*Dr. Joseph Adongo Awuni)*
15. Laboratoire National de l'Elevage et de Recherches Vétérinaires (LNERV, Senegal) – (Dr Modou Moustapha Lô – Miss Mariame Diop)
16. 42a Reunión Ordinaria de la Comisión Sudamericana para la Lucha contra la Fiebre Aftosa held in Quito, Ecuador, 16-17 April, 201.http: //ww2.panaftosa.org.br/cosalfa42/
17. Forty First Session of The European Commission for the Control Of Foot-And-Mouth Disease (EUFMD) http://www.fao.org/fileadmin/user_upload/eufmd/docs/AGA-701-agenda-eFINAL.pdf.
18. WRLFMD Quarterly Report January to March 2015: www.wrlfmd.org
19. OIE/FAO FMD Reference Laboratory Network, Annual Report 2013