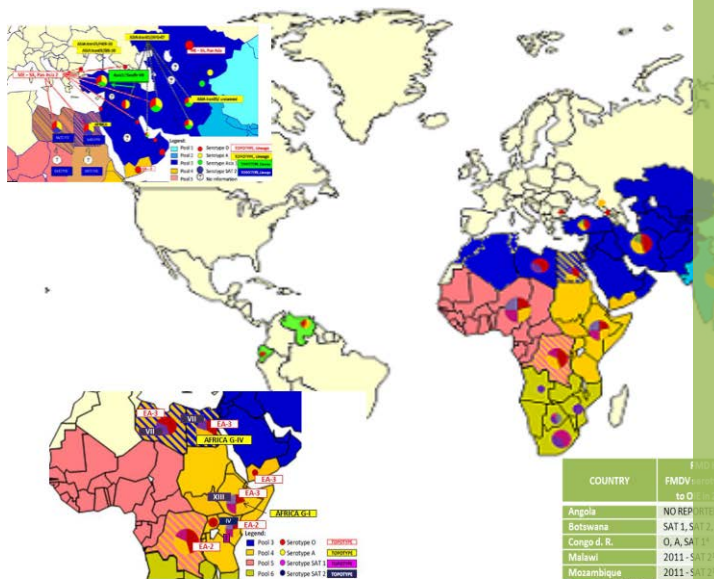


# 2016

## Foot-and-Mouth Disease Situation Monthly Report September 2016



**eofmd**  
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**

**September 2016**

**Guest Editor**  
**Don King**  
**WRLFMD, Pirbright**

**#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.*

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## Guest Editor's comments

This report serves as a useful reminder to emphasise gaps in our knowledge and intelligence of FMD epidemiology in different regions of the world. During September, I was fortunate to attend the very first FMD Road-Map Meeting for West Africa in Lomé, Togo. A major focus of the meeting was to discuss the specific challenges of FMD control in a region where only a small number of samples have been recently characterized by FMD Reference Laboratories (40 in 2013, 178 in 2014 and 147 in 2015). Of course, it is important to recognise that these samples represent only the “tip of the iceberg” of the true FMD cases that occur across West Africa. Based on data that *has* been collected, it is conjectured that FMD is endemic in all continental countries in West Africa, and that 4 different FMD virus serotypes (O, A, SAT 1 and SAT 2) circulate. For serotype O, two different topotypes have been detected: O/WA (West Africa) that is widely distributed across the region, and O/EA-3 (East Africa-3) that has been found in Nigeria and originates from East Africa. For serotype A, two genotypes (A/AFRICA/IV and A/AFRICA/VI) have been detected in West African countries and appear to be maintained within the region, and for SAT 2 (topotype VII) viruses recovered from field outbreaks in the region (and Mauritania) are closely related to sequences of viruses from East and North Africa. For SAT 1, there is even less data available since no isolates (or viral sequences) have been reported since 1981 – although subsequently a presentation at the EuFMD Open Session in Portugal (from CODA-CERVA, Belgium and NVRI, Nigeria) has provided important new sequence data for a new serotype SAT 1 sample from Nigeria. The paucity of sample collection and analysis highlights obvious gaps in our current knowledge regarding the epidemiology of FMD virus lineages that circulate in these endemic countries, as well as a lack of empirical evidence for the selection and use of vaccines in the region.

A lot has happened since my last contribution to the EuFMD monthly report in June 2016. During the summer, we have witnessed outbreaks of FMD in the Republic of Mauritius in the Indian Ocean (on two separate islands that are ~400km apart; Mauritius and Rodrigues). These new cases due to the O/ME-SA/Ind-2001d FMD virus lineage appear to be distinct to other FMD outbreaks that have occurred in North Africa, the Gulf States of the Middle East and Southeast Asia. Further description of these outbreaks can be found in previous EuFMD reports. More recently, new FMD cases in cattle were reported to the OIE on the 16<sup>th</sup> October from a farm in Vladimirskaya in the Russia Federation (see:

[http://www.oie.int/wahis\\_2/public/wahid.php/Reviewreport/Review?page\\_refer=MapFullEventReport&reportid=21307](http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=21307).

Together, these two unrelated episodes provide further examples of the dynamic and unpredictable patterns of FMD virus movements in different parts of the world; points that were widely discussed at the Open Session of the EuFMD in Cascais, Portugal. In November, I am looking forward to meeting with colleagues from the OIE/FAO FMD Laboratory Network in Paris (at ANSES) to exchange laboratory and epidemiological data. After the meeting, we will prepare a report summarising the global FMD situation, which will be made available on our new Network website (<http://www.foot-and-mouth.org/>). We welcome any comments or suggestions about the format and content in these reports – feel free to drop me an email ([donald.king@pirbright.ac.uk](mailto:donald.king@pirbright.ac.uk)).

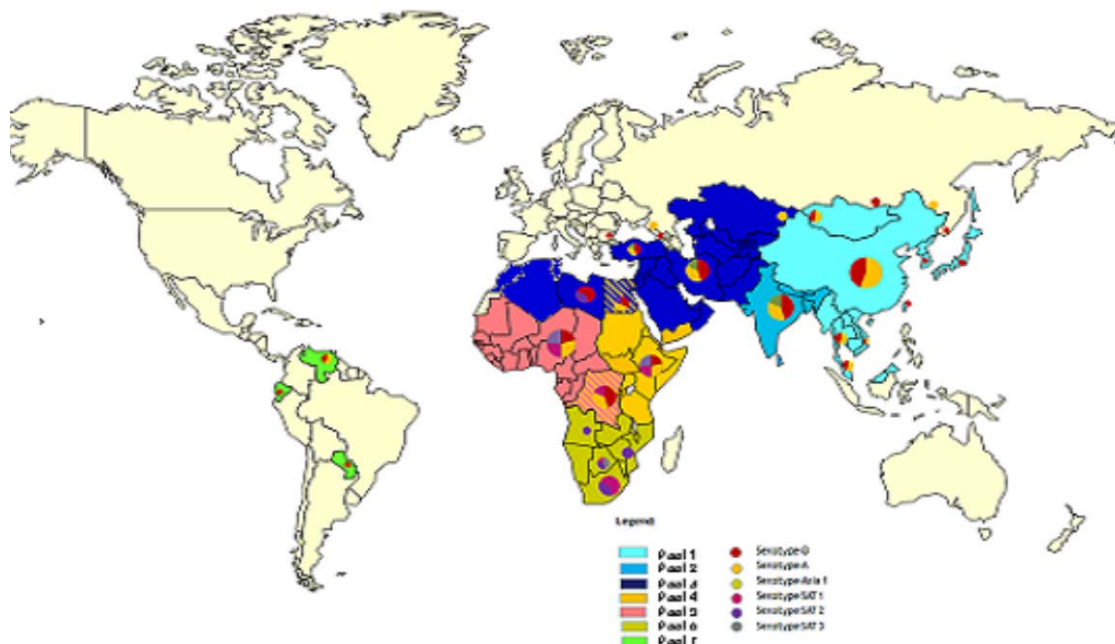
**I. GENERAL OVERVIEW**

*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                              |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>1</b> | <b>SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA</b><br>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                                                                                                                              | <b>O, A and Asia 1</b>                 |
| <b>2</b> | <b>SOUTH ASIA</b><br>Bangladesh, Bhutan, India, Nepal, Sri Lanka                                                                                                                                                                                                                                                                                                              | <b>O, A and Asia 1</b>                 |
| <b>3</b> | <b>WEST EURASIA &amp; MIDDLE EAST</b><br>Afghanistan, Algeria, Armenia, Azerbaijan, Bahrain, Bulgaria, <b>Egypt</b> , Georgia, Iran, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, <b>Libya</b> , Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Tajikistan, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan | <b>O, A and Asia 1</b>                 |
| <b>4</b> | <b>EASTERN AFRICA</b><br>Burundi, Comoros, <b>Congo D. R.</b> , Djibouti, <b>Egypt</b> , Eritrea, Ethiopia, Kenya, <b>Libya</b> , Mauritius, Rwanda, Somalia, Sudan, South Sudan, Tanzania, Uganda, Yemen                                                                                                                                                                     | <b>O, A, SAT 1, SAT 2 and SAT 3</b>    |
| <b>5</b> | <b>WEST/CENTRAL AFRICA</b><br>Benin, Burkina Faso, Cameroon, Cape Verde, Central Afr. Rep., Chad, <b>Congo D. R.</b> , Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea Biss., Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome Principe, Senegal, Sierra Leone, Togo                                                                         | <b>O, A, SAT 1 and SAT 2</b>           |
| <b>6</b> | <b>SOUTHERN AFRICA</b><br>Angola, Botswana, <b>Congo D. R.</b> , Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe                                                                                                                                                                                                                                                  | <b>{O, A}*, SAT 1, SAT 2 and SAT 3</b> |
| <b>7</b> | <b>SOUTH AMERICA</b><br>Ecuador, Paraguay, Venezuela                                                                                                                                                                                                                                                                                                                          | <b>O and A</b>                         |

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

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

## II. HEADLINE NEWS

### POOL 1- SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA

#### China (Hong Kong, SAR) <sup>1</sup>

FMDV serotype O was detected in pigs samples collected in August 2016. The virus was genotyped as O/CATHAY/unnamed.

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 3<sup>rd</sup> Quarterly WRLFMD Report (July-September 2016).

**Malaysia** <sup>1</sup> - FMDV serotypes A and O were detected in the bovine and pig samples collected between 2014 and 2016.

**Myanmar** <sup>1</sup> – FMDV type O VP 1 sequences were identified as O/ME-SA/Ind-2001d lineage, representing of this in Myanmar. The cases from which the samples were collected appear to represent a new introduction of this virus into Southeast Asia from the Indian Sub-continent. Further details of these findings will be discussed in the coming issue.

**SEACFMD** <sup>2</sup> – No new FMD outbreaks were reported in this Region for the current month while previous FMD events are ongoing in Cambodia, Malaysia, Myanmar, Thailand and Vietnam.

**Russia** <sup>6</sup> - On 20<sup>th</sup> October, an FMD outbreak was reported in cattle in Vyshmanovo, Sobinsky, VLADIMIRSKAYA OBLAST. The serotype was reported as Asia-1. Further details of this event will be included in the October issue of this report.

### POOL 2 - SOUTH ASIA

**India** <sup>3</sup> – The Indian Council of Agricultural Research - Project Directorate on Foot and Mouth Disease (ICAR-PDFMD), Mukteswar, India detected FMDV serotype O during September 2016 in bovine samples.

**Nepal**<sup>4</sup> – Circulation of FMDV serotype O continues to occur in the country.

### **POOL 3 - WEST EURASIA & MIDDLE EAST**

**Afghanistan**<sup>5</sup> – Bovine and ovine samples testing positive for FMDV, collected in 2016 were forwarded for genotyping to the WRLFMD.

**Armenia**<sup>6</sup> – While vaccination in cattle and sheep, using AG7 vaccine, is continuing, no other FMD outbreaks were reported further to that which occurred in January 2016.

**Egypt**<sup>7</sup> – FMDV serotypes O and SAT 2 were detected in samples collected during the 17 outbreaks notified in the country during May and June 2016.

**Pakistan**<sup>8</sup> – The Progressive Control of Foot and Mouth Disease Project reported 92 FMD outbreaks occurring in Pakistan during September 2016. FMDV serotype O is the prevalent cause of the outbreaks followed by serotypes Asia 1 and A.

### **POOL 4 - EASTERN AFRICA**

**Ethiopia**<sup>9</sup> – The National Animal Health Diagnostic and Investigation Center (NAHDIC) detected FMDV serotypes A and O in an outbreak occurring in cattle September 2016.

**Kenya**<sup>10</sup> – The National FMD Reference Laboratory Embakasi, Kenya also detected FMDV serotypes A and O in the bovine samples examined during the present month.

**Mauritius**<sup>1,6</sup> – Four new FMD outbreaks occurred between the 9<sup>th</sup> of August and 5<sup>th</sup> of September 2016. Presence of FMDV serotype O was again confirmed in the bovine samples collected during the outbreaks that occurred during August 2016.

### **POOL 5 - WEST/CENTRAL AFRICA**

**Nigeria**<sup>11</sup> – FMDV serotypes O and SAT 1 were isolated in epithelial samples by the National Veterinary Research Institute, Vom, Plateau State, Nigeria. The field isolates will be forwarded to the WRLFMD for genotyping.

**Uganda**<sup>6</sup> – In September 2016, an increase in the incidence and morbidity due to FMD was notified to have occurred in the country.

### **POOL 6 - SOUTHERN AFRICA**

**Namibia**<sup>1</sup> – FMDV SAT2/III/unnamed was identified in a bovine sample collected in 2015.

**Zimbabwe**<sup>6</sup> – FMDV serotype SAT 2 was still responsible for 6 outbreaks affecting cattle, which occurred between the end of August and the beginning of September 2016.

### **POOL 7 - SOUTH AMERICA**

**Latin America**<sup>6</sup> – No FMD events were reported for this Region during September 2016.

### **COUNTER**

\*\*\* 57 MONTHS SINCE THE LAST OUTBREAK IN SOUTH AMERICA WAS REPORTED

\*\*\* 145 MONTHS SINCE THE LAST SEROTYPE C OUTBREAK WAS REPORTED

### III. DETAILED POOL ANALYSIS

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

##### **China (Hong Kong, SAR) <sup>1</sup>**

The six epithelial samples forwarded by the Tai Lung Veterinary Laboratory, Hong Kong that were collected on the 6<sup>th</sup> of August 2016 from the snout and coronary band of pigs owned by a private meat trader in Sheung Shui, New Territories were all positive for FMDV O. Genotyping identified the field isolates as O/CATHAY/unnamed. All the isolates had a high sequence identity (seq id), with other FMDV viruses circulating during the present year in the country, ranging from 99.5% to 100%.

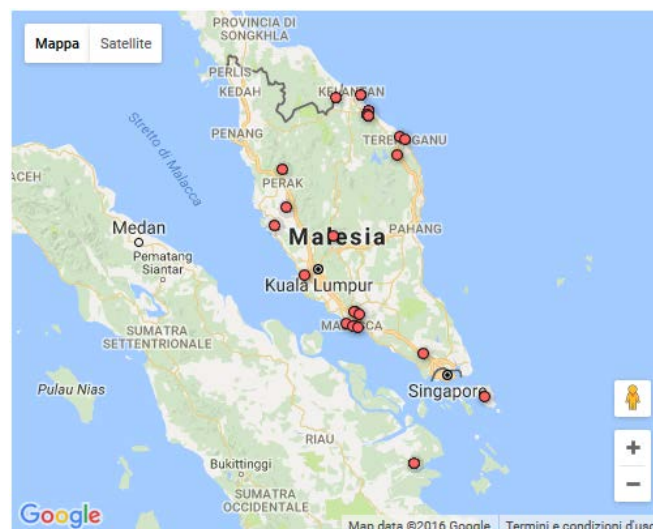
From 2005, O/CATHAY/unnamed was continuously detected in China (Hong Kong, SAR) with a limited incursion of O/SEA/Mya-98 in 2010. Since that year, no other FMDV serotypes were reported to have circulated in the country. Last VMSS tests conducted by the WRLFMD on field viruses isolated in pigs during 2015 gave poor matching results with vaccine strains O 3039, O Manisa, O/SKR/7/10, O/Russia/2000 and O/TUR/5/2009.

##### **Malaysia <sup>1</sup>**

The Regional laboratory of Kota Bharu Malaysia forwarded 26 samples for FMDV diagnosis, consisting of either epithelia or cell cultural isolates, collected between July 2014 and August 2016, from 25 cattle and one pig. FMDV serotypes A, in one bovine sample, and O, in 12 bovine samples, were detected. Further details on the genotyping of these viruses will be presented in the October issue of this report. Location of sample collection is represented in Map 2.

September 2016

**Map 2:** location of FMD samples collected in Malaysia between 2014 and 2016 and submitted to the WRLFMD.



### Russian Federation <sup>12</sup>

The Russian Research Institute for Animal Health (FGBI-ARRIAH) did not detect any FMDV viruses during September 2016. The FMD related activities reported by the laboratory consisted in the screening of 1,573 sera for monitoring purposes and immunological studies on the properties of FMDV serotype A.

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.

### SEACFMD <sup>2</sup>

On-going FMD outbreaks are currently occurring in Cambodia, Malaysia, Myanmar, Thailand and Vietnam, but as for the month of August, no new FMD outbreaks were reported in this Region during September 2016.. Distribution of these events among the different countries is reported in Table 2.

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

**Table 2:** Distribution of FMD outbreaks among the SEACFMD countries reported during September 2016.

| Countries    | Number of FMD outbreaks |
|--------------|-------------------------|
| Cambodia     | 132                     |
| Malaysia     | 48                      |
| Myanmar      | 3                       |
| Thailand     | 52                      |
| Viet Nam     | 22                      |
| <b>Total</b> | <b>257</b>              |

**Table 3:** Summary of the history of FMD Pool 1, 2012 – 2016, for geographic distribution see Map 3 below.

September 2016

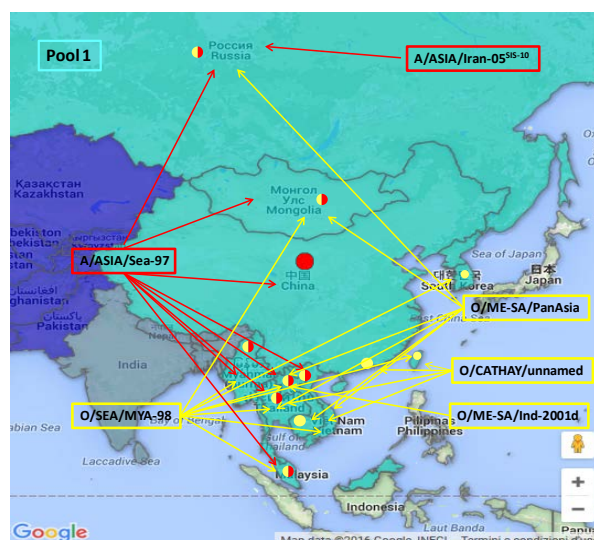
| COUNTRY                            | FMD HISTORY<br>FMDV serotypes, reported to<br>OIE between 2012 – 2015<br>**(1 <sup>st</sup> semester)                  | LAST OUTBREAK<br>REPORTED/SEROTYPE<br># see pg. 1                                                           | Comment                      |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

**Map 3:** FMD distribution by serotype and toptype in South East Asia, 2012 – 2015.

September 2016

Conjectured circulating FMD viral lineages in Pool 1 per 2015<sup>1,17</sup>:

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



## B. POOL 2 – South Asia

### India<sup>3</sup>

During September 2016, the ICAR-PDFMD, Mukteswar, India reported the detection of FMDV serotype O among the seven bovine samples examined using FMDV antigen and/or RNA detection. Four field isolates were genotyped and subjected to vaccine matching tests. The laboratory screened for the presence of FMD antibodies 2,520 serum samples for within epidemiological purposes. The laboratory tests were carried out using diagnostic kits developed at ICAR-PDFMD.

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

### Nepal<sup>4</sup>

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

Since 2007, O/ME-SA/Ind-2001d is the only viral lineage circulating in the country, with sporadic incursions of O/ME-SA/PanAsia-2 in 2007-8. Field isolates of the former genotype collected in 2015 subjected to VMST tests obtained good matching results with vaccine strains O 3039, O Manisa and O/TUR/5/2009.

**Table 4:** Summary of the history of FMD Pool 2, 2012 – 2016, for geographic distribution see Map 4 below.

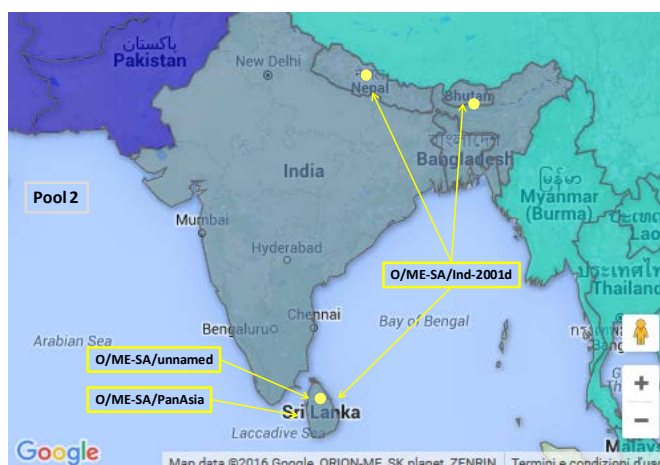
| COUNTRY    | FMD HISTORY<br>FMDV serotypes, reported to<br>OIE between 2012 – 2015<br>**(1 <sup>st</sup> semester) | LAST OUTBREAK<br>REPORTED/SEROTYPE<br># see pg. 1 | Comment           |
|------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------|
| Bangladesh | DISEASE PRESENT BUT<br>WITHOUT QUANTITATIVE DATA                                                      | Not available                                     | Follow –up needed |

|                  |                                                         |                                           |                                 |
|------------------|---------------------------------------------------------|-------------------------------------------|---------------------------------|
| <b>Bhutan</b>    | NOT TYPED,<br>2013 & 2014/NOT SAMPLED<br>2013-2015/O    | Not available                             | Follow –up needed               |
| <b>India</b>     | O, A, NOT SAMPLED<br>2012-2014/Asia 1<br>2013/NOT TYPED | Sep 2016/O, Apr 2015/A<br>Apr 2015/Asia 1 | See text<br>Genotyping required |
| <b>Nepal</b>     | O,<br>2012-2103/Asia 1                                  | Sep 2016/O                                | See text                        |
| <b>Sri Lanka</b> | 2012 – 2014/O,<br>2015/NO DATA REPORTED                 | Sept 2014/O                               | Follow-up needed                |

**Map 4:** FMD distribution by serotype and toptype in South Asia, 2012 – 2015 (EuFMD).

Conjectured circulating FMDV lineages in Pool 2 per 2015<sup>1, 17</sup>:

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



### C. POOL 3 – West Eurasia & Middle East

#### Afghanistan<sup>5</sup>

The Central Veterinary Diagnostic and Research Laboratory (CVDRL) in Kabul, Afghanistan detected FMDV in 27 samples (25 from cattle and two from sheep) collected between May and July 2016 using ELISA and RT-PCR. Sample location is represented in Map 5. Preliminary results of the samples, which were forwarded to the WRLFMD for genotyping, report positivity for FMDV serotypes A, Asia 1 and O. Details of their serotyping and genotyping will be reported in the next issue of this Report. FMDV serotypes prevalently detected in the country by the WRLFMD since 2010 are A, Asia 1 and O, with the circulation for the latter serotype of O/ME-SA/PanAsia-2<sup>ANT-10</sup>. Latest VMSSD test for field isolates of the same genotype collected in the country in 2014 obtained borderline to good matching results with vaccine strains tested that were O 3039, O Manisa and O/TUR/5/2009.

September 2016

**Map 5:** location of FMD samples collected in Afghanistan during 2016 and submitted to the WRLFMD.



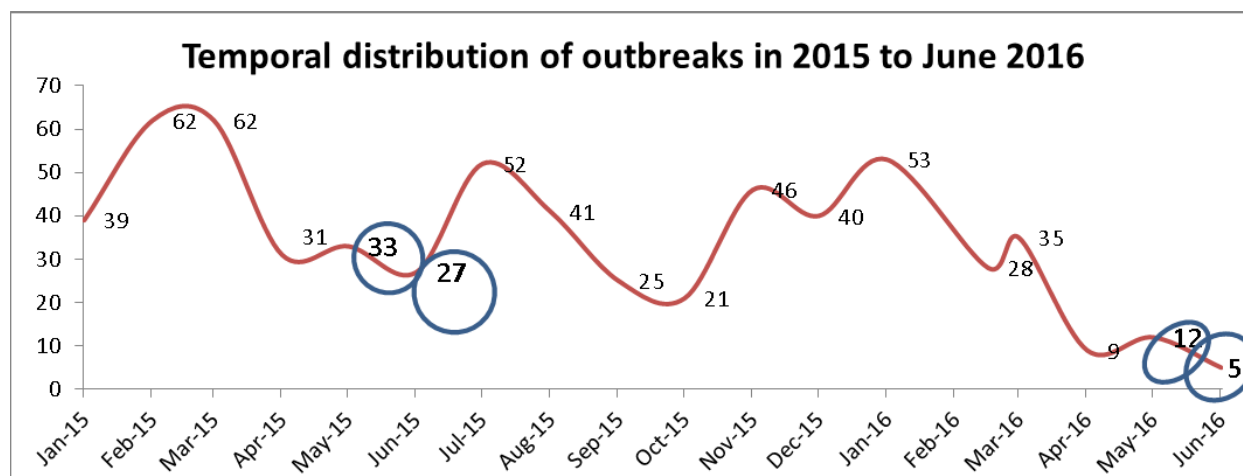
#### Armenia <sup>6</sup>

While vaccination in cattle and sheep, containing AG7, is continuing, no other FMD outbreaks were reported further to the one which occurred in December 2015 in Armavir caused by FMDV A/ASIA/G-VII.

#### Egypt <sup>7</sup>

Seventeen outbreaks due to FMDV serotypes O and SAT 2 were notified in the country during May and June 2016. The number of outbreaks reported in these two months is lower than those reported monthly since the beginning of 2015, confirming the decrease in the trend of the temporal distribution of FMD outbreaks notified in this country as can be seen from Table 5. The outbreaks were mostly located in the Nile Delta and were more frequent in animals with more than two years of age in household herds of mixed species. Of the 17 outbreaks, 13 were sampled and examination of these confirmed the presence of FMDV serotype A and O, while for two positive samples it was not possible to type the virus. Geographical distribution of the villages with FMD outbreaks is shown in Map 6.

**Table 5:** Temporal distribution of FMD outbreaks notified in Egypt between January 2015 and June 2016.





**Table 6:** FMD outbreaks with relative serotypes that occurred during September 2016 in the different Districts of Pakistan.

| Number Outbreaks           |                  | Number of Outbreaks (% of totals)<br>due to FMDV Serotype(s) |         |           |         |           |
|----------------------------|------------------|--------------------------------------------------------------|---------|-----------|---------|-----------|
| Province                   | District         | 'O'                                                          | 'A'     | 'Asia-1'  | 'Mixed' | Un-Typed  |
| Sindh (72)                 | Karachi (68)     | 42                                                           | 6       | 7         | 2       | 11        |
|                            | Thatta (4)       | 3                                                            | -       | -         | -       | 1         |
| Khyber Pakhtunkhwa (5)     | Peshawar (5)     | -                                                            | 3       | 1         | -       | 1         |
| Azad Jammu and Kashmir (6) | Mirpur (2)       | -                                                            | -       | 2         | -       | -         |
|                            | Muzaffarabad (4) | 4                                                            | -       | -         | -       | -         |
| Punjab (9)                 | Jhelum (4)       | -                                                            | -       | 2         | -       | 2         |
|                            | Sargodha (3)     | -                                                            | -       | 1         | -       | 2         |
|                            | Sheikhupura (2)  | -                                                            | -       | 1         | -       | 1         |
| 92                         |                  | 49 (53.3)                                                    | 9 (9.8) | 14 (15.1) | 2 (2.1) | 18 (19.6) |
|                            |                  | Totals                                                       |         |           |         |           |

**Map 7:** Location of the Districts where FMD outbreaks occurred in Pakistan during September 2016.**Table 7:** Vaccination activities carried out during September 2016 in the various Provinces of Pakistan.

| Province               | Ring Vaccination | Cost sharing basis (Doses) |
|------------------------|------------------|----------------------------|
| Sindh                  | 3,600            | 15,799                     |
| Baluchistan            | -                | 2,000                      |
| Khyber Pakhtunkhwa     | 200              | -                          |
| Punjab                 | 100              | 8,400                      |
| Azad Jammu and Kashmir | 500              | -                          |
| ICT                    | 600              | 575                        |
| <b>Total</b>           | <b>5,000</b>     | <b>26,774</b>              |
|                        |                  | <b>31,774</b>              |

**Table 8:** Summary of the history of FMD Pool 3, 2012 – 2016, for geographic distribution see Map 8 below.

| COUNTRY              | FMD HISTORY<br>FMDV serotypes, reported to OIE in<br>2012 – 2015<br>**(1 <sup>st</sup> semester) | LAST OUTBREAK<br>REPORTED/SEROTYPE<br># see pg. 1 | Comment           |
|----------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------|
| Afghanistan          | 2013-2015**/O, A, Asia 1, NOT<br>TYPED<br>2012/SEROTYPE NOT REPORTED                             | 2014/A, Asia 1, O                                 | See text          |
| Algeria              | 2014 -2015**/O                                                                                   | Apr 2015/O                                        | Follow –up needed |
| Armenia              | 2012-2014/DISEASE ABSENT<br>2015/A                                                               | Dec 2015/A                                        | Follow –up needed |
| Azerbaijan           | DISEASE ABSENT**                                                                                 | 2007/O                                            | Follow –up needed |
| Bahrain              | 2012, 2014 & 2015 /O                                                                             | Oct 2014/O                                        | Follow –up needed |
| Egypt                | 2012, 2014/SAT 2<br>2012 – 2015**/O, A                                                           | March 2016/A,<br>May-Jun 2016/ O & Sat 2          | See text          |
| Georgia              | DISEASE ABSENT                                                                                   | 2001/ASIA 1                                       | Follow –up needed |
| Iran                 | 2012-2014/A,<br>Asia 1 & O<br>2015**/SEROTYPE NOT REPORTED                                       | July 2016/A & O,<br>2013/Asia 1                   | Follow –up needed |
| Iraq                 | 2012-2013/O,<br>2012-2014/A<br>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<br>2012 –2013/A<br>2014-2015**/ DISEASE ABSENT                                            | Aug 2012/O, Jun 2013/ A                           | Follow –up needed |
| Kuwait               | 2012/O<br>2013 – 2014/ DISEASE ABSENT                                                            | Jan-Feb 2016/O                                    | Follow –up needed |
| Kyrgyzstan           | 2012-2014/O, A<br>2015/ NO DATA REPORTED                                                         | Apr 2013 /O, A, Aug<br>2014/not typed             | Follow –up needed |
| Lebanon              | DISEASE ABSENT<br>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<br>2015/ NO DATA REPORTED                                                            | May 2015/SAT 2                                    | Follow –up needed |
| Pakistan             | 2012 & 2015/ NO DATA REPORTED<br>2013-2014/A, ASIA 1 & O                                         | Sep 2016/A, Asia 1 and O                          | See text          |
| Palestine            | O,<br>2012-2013/SAT 2                                                                            | Dec 2015/O<br>Mar 2013/Sat 2                      | Follow –up needed |
| Qatar                | 2012-2015/O                                                                                      | Dec 2013/O                                        | Follow –up needed |
| Saudi Arabia         | 2012-2014/O<br>2015/ NO DATA REPORTED                                                            | April 2016/O,<br>April 2015/A                     | Follow –up needed |
| Syrian Arab Republic | DISEASE ABSENT**                                                                                 | 2002/ A & O                                       | Follow –up needed |
| Tajikistan           | 2012- 2013/NOT TYPED<br>2014-2015**/DISEASE ABSENT                                               | Nov 2011/Asia 1, Nov 2012/<br>NOT TYPED           | Follow –up needed |
| Tunisia              | 2014/O<br>2015/ DISEASE ABSENT                                                                   | Oct 2014/O                                        | Follow –up needed |

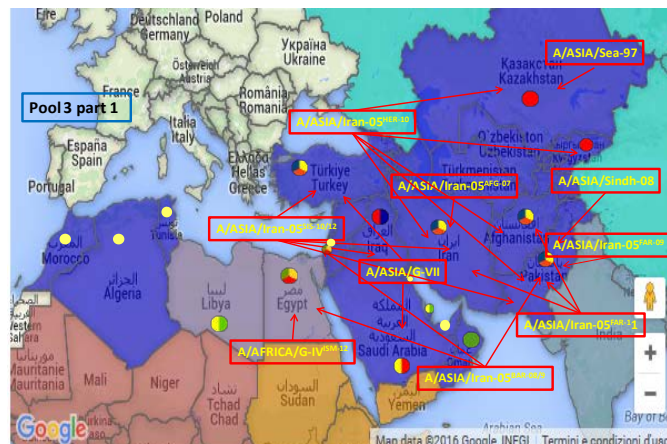
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|                             |                                                          |                                         |                   |
|-----------------------------|----------------------------------------------------------|-----------------------------------------|-------------------|
| <b>Turkey</b>               | Asia 1, A & O, NOT TYPED                                 | Oct 2015/ A May 2014-2015/ Asia 1 and O | Follow –up needed |
| <b>Turkmenistan</b>         | 2012/NO DATA REPORTED<br>2013-2015/DISEASE ABSENT        | Not available                           | Follow –up needed |
| <b>United Arab Emirates</b> | 2012, 2015/DISEASE ABSENT<br>2013-2014/O                 | Feb 2016/O                              | Follow –up needed |
| <b>Uzbekistan</b>           | 2012,2013 & 2015/NO DATA REPORTED<br>2014/DISEASE ABSENT | Not available                           | Follow –up needed |

**Map 8:** FMD distribution by serotype and topotype for West Eurasia and Middle East, 2012 – 2015 (EuFMD).

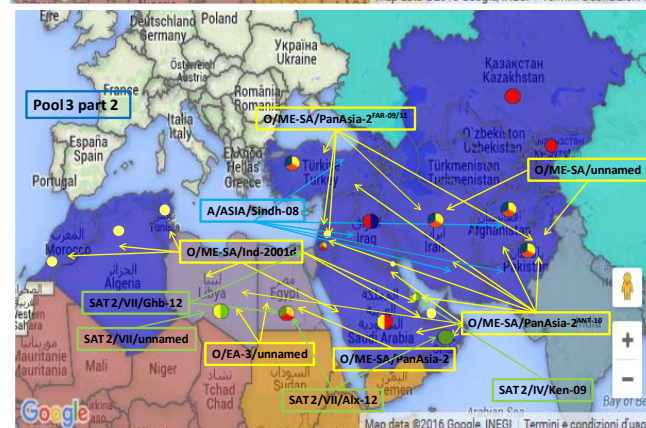
Conjectured circulating FMDV lineages in Pool 3 per 2015 <sup>1, 17</sup>:

- 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)<sup>1</sup>
- A/ASIA/Sea-97
- A/ASIA/Sindh-08
- A/AFRICA/G-IV
- Asia-1 (Sindh-08 lineage).



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

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



#### D. POOL 4 – Eastern Africa

##### Ethiopia <sup>9</sup>

The NAHDIC detected both FMDV serotypes A and O in an outbreak occurring in cattle in September 2016. The samples were collected from one outbreak.

The latest genotypes reported to be circulating in the countries for the above serotypes are A/AFRICA/G-IV and O/EA-4/unnamed in samples respectively collected in 2016. VMSD tests conducted on these viruses did not give matching results with A22 IRQ, A IRN 05 and A/TUR/20/2006 for serotype A, while for serotype O, good vaccine matching results were obtained for O 3039 and O/TUR/5/2009, but not with O Manisa.

##### Kenya <sup>10</sup>

The National FMD Reference Laboratory Embakasi, Kenya reported the detection of FMDV serotypes A (2 samples) and O (2 samples) in the six bovine samples examined. Samples were last forwarded in 2013 by the country to the WRLFMD for genotyping. The genotypes that were detected in these samples in relation to the serotypes reported this month were A/AFRICA/G-1 and O/EA-2/unnamed from samples respectively collected were in 2013 and 2012. The laboratory is engaged through the African Union – Inter-African Bureau for Animal Resources (AU-IBAR) on a project, with the technical support of the Royal Veterinary College, University of London, UK, for the definition of risk factors responsible for the occurrence of priority diseases in Kenya, including FMD.

### Mauritius <sup>1, 6</sup>

Mauritius is still experiencing new FMD outbreaks as four new episodes occurred between the 9<sup>th</sup> of August and 5<sup>th</sup> of September 2016. The outbreaks involved cattle, sheep and goats and a summary of the animals involved is reported in Table 9. As can be seen from this table, morbidity was 100%, which is exceptionally high for FMD. The new outbreaks could be due either to direct transmission, through the movement of infected animals or indirectly, through fomites or contaminated vehicles or feed.

Samples collected from these outbreaks were forwarded to Onderstepoort Veterinary Institute (OVI), South Africa (OIE Reference Laboratory) and laboratory confirmation is still pending.

Control measures are still in force and are represented by restriction of animal movement, quarantine, surveillance within and outside the surveillance zone, zoning and vaccination.

Twenty-four of the 25 samples (original clinical samples and cell culture isolates) collected from cattle during the initial episodes that occurred in the second and third week of August were confirmed by the WRLFMD as positive for FMDV serotype O. These samples were forwarded by the OIE Reference Laboratory of ANSES, Paris France.

**Table 9:** summary of the animals involved in the FMD outbreaks that occurred in August- September 2016 in Mauritius.

| Species | Susceptible | Cases | Deaths | Destroyed | Slaughtered | Apparent morbidity rate | Apparent mortality rate | Apparent case fatality rate | Proportion susceptible animals lost* |
|---------|-------------|-------|--------|-----------|-------------|-------------------------|-------------------------|-----------------------------|--------------------------------------|
| Cattle  | 4,335       | 4,335 | 124    | 56        | 0           | 100%                    | 2.86%                   | 2.86%                       | **                                   |
| Goats   | 4           | 4     | 0      | 4         | 0           | 100%                    | 0.00%                   | 0.00%                       | 100%                                 |
| Sheep   | 2           | 2     | 0      | 2         | 0           | 100%                    | 0.00%                   | 0.00%                       | 100%                                 |
| Total   | 4,341       | 4,341 | 124    | 62        | 0           | 100%                    | 2.86%                   | 2.86%                       | **                                   |

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

\*\*Not calculated because of missing information

**Table 10:** Summary of the history of FMD Pool 4, 2012 – 2016, for geographic distribution see Map 9 below.

| COUNTRY     | FMD HISTORY<br>FMDV serotypes, reported to<br>OIE in 2012 – 2015<br>**(1 <sup>st</sup> semester) | LAST OUTBREAK<br>REPORTED/SEROTYPE<br>#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<br>2012 – 2015**/O, A                                                           | March 2016/A & Sat 2,<br>April 2016/ O           | Follow –up needed |
| Eritrea     | 2012/O,<br>2013/ DISEASE ABSENT<br>2014/ DISEASE PRESENT<br>2015/ NO DATA REPORTED               | Jan 2012/O                                       | Follow –up needed |
| Ethiopia    | O**, 2012/A,<br>2012 & 2105/SAT 2,                                                               | Sep 2016/ A & O,<br>May 2016/SAT 2,              | See text          |

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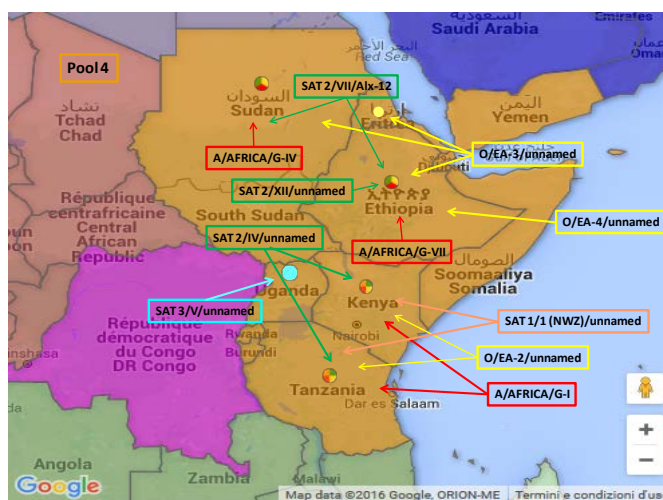
|                    | 2015**/SAT 1                                                                                      | Jun 2014/ SAT 1                                                                    |                               |
|--------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------|
| <b>Kenya</b>       | A, O, SAT1, SAT2,<br>2012 – 2015 /NOT TYPED                                                       | Sep 2016/ A, O & SAT 1,<br>Oct 2015/ SAT 2,                                        | See text                      |
| <b>Libya</b>       | NO DATA REPORTED                                                                                  | Oct 2013/ O, Sat 2/Apr 2012                                                        | Follow-up needed              |
| <b>Mauritius</b>   | DISEASE ABSENT                                                                                    | Sep 2016/0                                                                         | See text<br>Follow-up needed  |
| <b>Rwanda</b>      | 2012-2013/A, O, SAT1, SAT 2                                                                       | Nov 2012/not typed                                                                 | Typing required               |
| <b>Somalia</b>     | 2012-2014/NOT SAMPLED<br>2013 – 2014/ NO DATA<br>AVAILABLE                                        | 2011                                                                               | Follow –up needed             |
| <b>Sudan</b>       | 2013/SAT 2,<br>2012-2014/O & NOT TYPED<br>2015**/A & NOT SAMPLED                                  | Dec 2013/ O & A, Jan<br>2014/SAT 2                                                 | See text                      |
| <b>South Sudan</b> | 2014/A, O SAT 1, SAT 2, SAT 3,<br>2012-2013 & 2015/ NO DATA<br>REPORTED                           | 2011                                                                               | Follow –up needed             |
| <b>Tanzania</b>    | 2012-2015/A, O, SAT 1, SAT 2                                                                      | May 2015/O<br>Apr2013/ A, SAT 1, SAT2                                              | Follow –up needed             |
| <b>Uganda</b>      | 2012/ SAT 1,2012, 2014/O,<br>2013/NOT TYPED<br>2015/NO DATA REPORTED                              | May 2014/O Nov 2014/SAT1,<br>Jan 2015/A and SAT 3, July<br>2015/ SAT 2 and untyped | Follow –up needed<br>See text |
| <b>Yemen</b>       | 2012/O, 2013 – 2014/ DISEASE<br>PRESENT BUT WITHOUT<br>QUANTITATIVE DATA<br>2015/NO DATA REPORTED | 2009/O                                                                             | Follow –up needed             |

**Map 9:** FMD distribution by serotype and topotype for East Africa. 2011 – 2015 (EUFMD)

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

Conjectured circulating FMDV lineages in Pool 4 per 2015 2<sup>1, 17</sup>:

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



#### ***E. POOL 5 – West / Central Africa***

Cameroon<sup>13</sup>

The LANAVET - Garoua, Cameroon detected FMDV non-structural proteins (NSP) in 56 of the 90 bovine serum samples (63.3%), using the 3ABC- NSP ELISA. The laboratory has limited diagnostic possibilities as kits are available not at the moment.

LANAVET has ongoing collaborative activities with the Ohio State University and Plum Island Laboratory, USA.

Last genotypes identified in the country were represented by A/AFRICA/G-IV and SAT 2/VII/Lib-12 in samples collected in 2013 for which VMSS tests are not available.

#### **Nigeria<sup>11</sup>**

The National Veterinary Research Institute, Vom, Plateau State, Nigeria has reported the isolation of FMDV serotypes O and SAT 1 in epithelial samples. The field isolates will be forwarded to the WRLFMD for genotyping. The laboratory was involved in providing support on the control of FMD to local farmers. The laboratory is continuing with the OIE twinning programme with CODA CERVA, Belgium.

The most recent genotypes isolated in the country are those from samples collected between 2011 and 2014 and are represented by A/AFRICA/G-IV, O/EA-3/unnamed and SAT 2/VII/unnamed.

The VMSS tests conducted for each relative circulating serotype gave good matching results with the following vaccine strains: A ERI/98 and A TUR/06, O 3039 and O TUR/5/09, and SAT 2 ERI and SAT 2 ZIM.

#### **Uganda<sup>6</sup>**

The country has experienced an unexpected increase in the incidence and morbidity of FMD in cattle. The virus is spreading quickly to many districts that were not previously affected by FMD. The districts involved are Morotto, Kumi and Kaabong, which respectively registered an increase from 0.1 to 6%, 0.03 to 6.2% and 0.01 to 7% for incidence and from 0.02 to 60%, 0.01 to 67% and 0.03 to 56% for morbidity. The source of the outbreaks has been attributed to introduction of new animals in endemic areas, illegal movement of animals and contact with infected animal at grazing or watering points.

#### **Ghana<sup>14</sup> and Senegal<sup>15</sup>**

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

**Table 11:** Summary of the history of FMD Pool 5, 2012 – 2016, for geographic distribution see Map 10 below.

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

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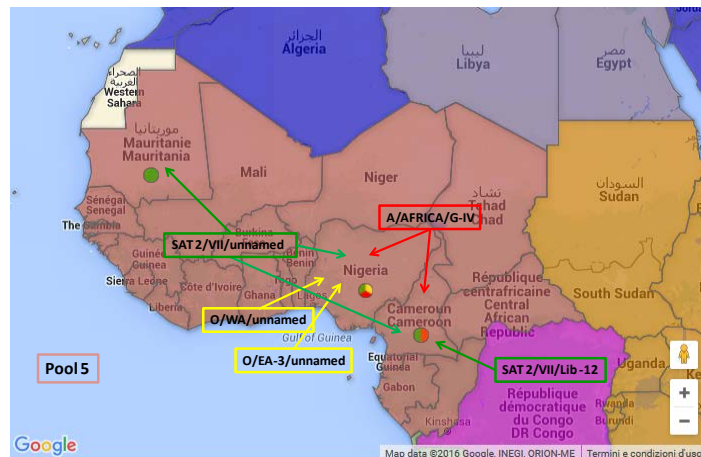
|                          |                                                                                             |                                                   |                                                      |
|--------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------|
|                          | 2013/ SEROTYPES NOT REPORTED                                                                |                                                   |                                                      |
| <b>Equatorial Guinea</b> | 2012 – 2013/DISEASE SUSPECTED<br>2014 – 2015/ NO DATA AVAILABLE                             | Not available                                     | Follow –up needed                                    |
| <b>Gabon</b>             | NO DATA AVAILABLE                                                                           | Not available                                     |                                                      |
| <b>Gambia</b>            | NO DATA AVAILABLE                                                                           | 2012/O                                            | Follow –up needed                                    |
| <b>Ghana</b>             | 2012 – 2015**/SEROTYPES NOT REPORTED                                                        | 2014/not available                                | See text<br>Follow –up needed                        |
| <b>Guinea Biss.</b>      | 2012-2013/DISEASE ABSENT<br>2014/ SEROTYPES NOT REPORTED<br>2015/ Disease suspected         | No data available                                 | Follow –up needed                                    |
| <b>Guinea</b>            | 2012-2013, 2015/ DISEASE ABSENT<br>2014/ SEROTYPES NOT REPORTED                             | 2014/not available                                |                                                      |
| <b>Liberia</b>           | NO DATA AVAILABLE                                                                           | Not available                                     | Follow –up needed                                    |
| <b>Mali</b>              | 2012/ NO DATA AVAILABLE<br>2013/ SEROTYPES NOT REPORTED<br>2014-2015/SAT 2<br>2015/A, SAT 1 | 2011/2012, no precise data                        |                                                      |
| <b>Mauritania</b>        | 2012-2013/NO REPORTED OUTBREAKS<br>2014-2015**/SAT 2                                        | Dec 2014/SAT 2                                    | Follow –up needed                                    |
| <b>Niger</b>             | 2012 – 2014/NOT SAMPLED                                                                     | 2014/not sampled, May 2015/O                      | Follow –up needed                                    |
| <b>Nigeria</b>           | 2014-2015/O                                                                                 | Sept 2016/ O & SAT 1 Nov 2015/A, Sept 2014/ SAT 2 | See text<br>Genotyping required<br>Follow –up needed |
| <b>Sao Tome Principe</b> | 2012/DISEASE ABSENT,<br>2013/NO DATA AVAILABLE                                              | Not available                                     | Follow –up needed                                    |
| <b>Senegal</b>           | 2013/NO DATA AVAILABLE<br>2012, 2014-2015**/ NOT SAMPLED                                    | 2014/ SAT 1<br>Feb 2015/ A and O                  | See text<br>Follow –up needed                        |
| <b>Sierra Leone</b>      | DISEASE ABSENT                                                                              | Oct 1958                                          | Follow –up needed                                    |
| <b>Togo</b>              | O, SAT 1                                                                                    | 2012/O                                            | Follow –up needed                                    |

**Map 10:** FMD distribution by serotype and topotypes for West Africa, 2012 – 2015(EuFMD)

September 2016

Conjectured circulating FMDV lineages in Pool 5 per 2015 <sup>1, 17</sup>

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



#### F. POOL 6 – Southern Africa

##### Angola <sup>6</sup>

Following the FMD outbreak that occurred in April 2014, in cattle of a village of Cunado Cubango for which serotyping of the virus is still pending, the country is still adopting control measures to avoid new events. These are represented by disinfection, quarantine, official destruction of animal products official disposal of carcasses, by-products and waste, surveillance within containment and/or protection zone, together with modified stamping out and zoning. Vaccination was administered to 7,549 cattle, however details on the type of vaccine used are not available.

##### Namibia <sup>1</sup>

FMDV detected in a bovine sample collected in 2015, with location of collection unknown, was genotyped by the WRLFMD as SAT2/III/unnamed with the most closely related field virus not pertaining to the country represented by BOT/1/80 detected in Botswana in cattle with a seq. Id. of 86.6%. The present genotype is the only one belonging to serotype SAT 2, detected in Namibia since 2007.

Namibia reported its last episode of FMD in July 2015, in cattle in Zambezi where the serotype involved was not identified.

##### RSA <sup>16</sup>

The ARC- Onderstepoort Veterinary Institute, Republic of South Africa examined 4,590 samples using liquid-phase blocking ELISA for the detection of FMDV serotypes O and SAT 1, SAT 2 and SAT 3 and 205 samples using FMD NSP ELISA. The ARC-Onderstepoort Veterinary Institute is also collaborating with international organisations on research projects.

##### Zambia <sup>6</sup>

Following the FMD outbreak, which occurred in October 2015 in cattle of Shangombo, Western, caused by FMDV SAT 3, the country has adopted a ring vaccination around the affected areas of Shangombo, Kalabo and Sikongo districts, vaccinating 109,211 cattle heads.

Other FMDVs reported to circulate in this country are A/AFRICA/G-1, SAT 2/IV/unnamed detected in samples collected in 2015 respectively in Mpulungu district, and Chimula and Kowa village, which are both in the Northern province.

##### Zimbabwe <sup>6</sup>

Two series of FMD episodes were reported as continuing. The first referred to six further outbreaks to the episode that started in June 2015 caused by FMDV serotype SAT 2. The outbreaks occurred from the 23<sup>rd</sup> of August to the 5<sup>th</sup> of September 2016 in cattle in Matabeleland North and Midlands. Summary of the number of animals involved and location of the outbreaks are reported in Table 12 and Map 11.

The new outbreaks were caused by the illegal movement of animals and contact with infected animals at grazing.

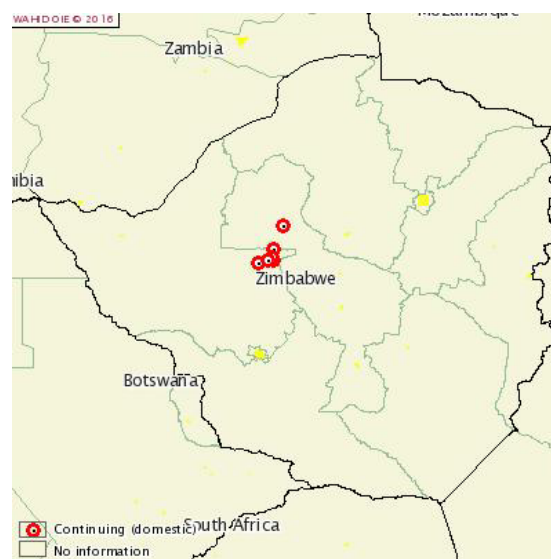
FMD has spread from the Gokwe South district, where sporadic cases are still being detected, to the neighboring Nkayi district. This is due to the use of oxen-driven carts by villagers living in Gokwe South, bordering Nkayi district, who visit this district for various reasons such as access services to health facilities and grinding mills. The district was placed under quarantine and awareness campaigns are carried out in the area. Vaccination is planned once resources to procure the vaccine are available. Weekly veterinary inspections are currently on-going.

**Table 12:** summary of the animals involved in the FMD outbreaks that occurred in August and September 2016 in Matabeleland North and Midlands, Zimbabwe.

| Species | Susceptible | Cases | Deaths | Destroyed | Slaughtered | Species | Apparent morbidity rate | Apparent mortality rate | Apparent case fatality rate | Proportion susceptible animals lost* |
|---------|-------------|-------|--------|-----------|-------------|---------|-------------------------|-------------------------|-----------------------------|--------------------------------------|
| Cattle  | 13,177      | 259   | 0      | 0         | 0           | Cattle  | 1.97%                   | 0.00%                   | 0.00%                       | 0.00%                                |

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

**Map 11:** Location of the FMD outbreaks in Matabeleland North and Midlands, Zimbabwe during August –September 2016.



The other FMD episode occurring in Zimbabwe is also a continuation of outbreaks, which had commenced in April 2014, caused by FMDV serotype SAT 2 in Masvingo. The present outbreak occurred on the 10<sup>th</sup> of August involving cattle of varying age groups on a self-contained commercial farm.

The cause of the new outbreak is due to the illegal movement of animals as 20 heifers with a V-brand which identifies cattle from a vaccination zone which cannot be moved to Masvingo, a none vaccination zone, were found during inspection of the infected farm. Healing foot and mouth disease lesions were observed in the illegally moved heifers. The infected farm was placed under quarantine with the administration of control vaccination to 1,412 cattle present in the neighbouring farms. A 28-days booster vaccination is to be carried out. Summary of the animals involved and location of the outbreaks is reported in Table 13 and Map 12.

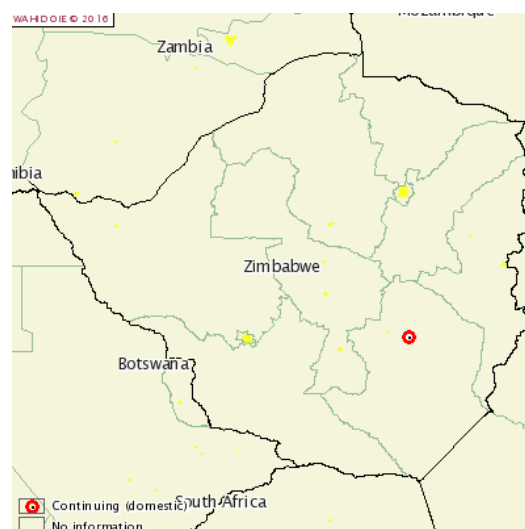
**Table 13:** summary of the animals involved in the FMD outbreak that occurred in August 2016 in Masvingo, Zimbabwe.

| Species | Susceptible | Cases | Deaths | Destroyed | Slaughtered | Species | Apparent morbidity rate | Apparent mortality rate | Apparent case fatality rate | Proportion susceptible animals lost* |
|---------|-------------|-------|--------|-----------|-------------|---------|-------------------------|-------------------------|-----------------------------|--------------------------------------|
| Cattle  | 118         | 30    | 0      | 0         | 0           | Cattle  | 25.42%                  | 0.00%                   | 0.00%                       | 0.00%                                |

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

September 2016

**Map 12:** Location of the FMD outbreak which occurred in Masvingo, Zimbabwe during August 2016



**Table 14:** Summary of the history of FMD Pool 6, 2012 – 2016, for geographic distribution see Map 13 below.

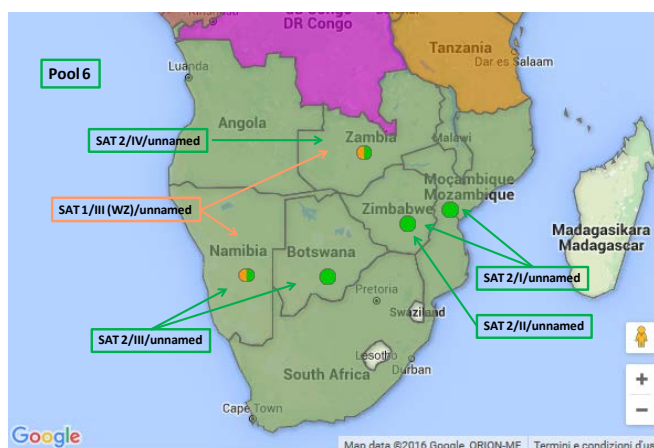
| COUNTRY      | FMD HISTORY<br>FMDV serotypes, reported to OIE in<br>2012 – 2015<br>**(1 <sup>st</sup> semester)         | LAST OUTBREAK<br>REPORTED/SEROTYPE<br>#see pg. 1               | Comment                       |
|--------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------|
| Angola       | 2012/DISEASE SUSPECTED BUT NOT<br>CONFIRMED 2013-2014/<br>DISEASE ABSENT<br>2015/ SEROTYPES NOT REPORTED | July 2015/ SAT 2<br>April 2016/typing pending                  | Follow –up needed             |
| Botswana     | 2012-2015/SAT 2<br>2014-2015/SAT 1                                                                       | Jun 2015/typing pending July<br>2015/SAT 2,<br>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<br>2013-2015/ NO DATA AVAILABLE                                               | Oct 2011,<br>Sep 2015/SAT 1                                    | Follow –up needed             |
| Mozambique   | 2012 -2013/DISEASE ABSENT,<br>2014/ SEROTYPES NOT REPORTED<br>2015/ NO DATA AVAILABLE                    | July 2015/SAT 2, May 2015/ SAT 1                               | Follow –up needed             |
| Namibia      | 2012-2014/SAT 1<br>2014-2015/SAT 2                                                                       | May 2015/SAT 1,<br>Jun 2015/SAT 2, July/typing<br>pending      | Follow –up needed             |
| South Africa | 2012-2015/SAT 2<br>2013/SAT 1<br>2015/SAT 3                                                              | Dec 2015/SAT 3, Nov 2014/ SAT 2,<br>Aug 2013/SAT 1             | See text<br>Follow –up needed |
| Zambia       | 2012/SAT 1, SAT 2<br>2013-2015/ NO DATA AVAILABLE                                                        | Jan 2013/SAT 1, SAT 2, Mar<br>2016/SAT 3                       | Follow –up needed             |
| Zimbabwe     | 2012-2015**/SAT 2 2013/SAT 3<br>2014/SAT 1                                                               | September 2016/SAT 2, Aug<br>2015/ SAT 1, Jun 2013/SAT 3       | See text<br>Follow –up needed |

**Map 13:** FMD distribution by serotype and toptype for Southern Africa, 2012 – 2015 (EuFMD)

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

Conjectured circulating FMDV lineages in pool 6 per 2015 <sup>1, 17</sup>:

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



#### G. POOL 7 – South America

**South America** <sup>6, 18</sup> The OIE FMD status of the countries in South America as reported in May 2016 is presented in Map 14.

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 14). The FMD history between 2012 – 2014 is reported in Table 15.

**Table 15:** Summary of the history of FMD Pool 7, 2012 – 2015, for geographic distribution see Map 14 below.

| COUNTRY   | FMD HISTORY<br>FMDV serotypes,<br>reported to OIE in<br>2012 2015** (1 <sup>st</sup><br>semester) | LAST OUTBREAK<br>REPORTED/SEROTYPE<br>#see pg. 1 | Comment                                  |
|-----------|---------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| Paraguay  | DISEASE ABSENT                                                                                    | Dec 2011/O                                       |                                          |
| Venezuela | DISEASE ABSENT**                                                                                  | 2011/O, A                                        | National situation needs<br>verification |

**Map 14: FMD status for South America**<sup>14</sup>

#### IV. OTHER NEWS:

<sup>19</sup>The 1<sup>st</sup> West Africa FMD Roadmap meeting was held in Togo on the 7<sup>th</sup> and 8<sup>th</sup> September, 2016. The principal objectives of the meeting were a technical platform to provide for the countries in the region, training on the Progressive Control Pathway (PCP) for FMD and assess country progress in the PCP as well as information exchange on FMD virus circulation. The meeting was attended by veterinary services representatives of fifteen of the twenty four countries included in the FMD Pool 5 reported in Table 1, namely; Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. The outcome of the analyses, conducted on the countries that were assessed along the PCP Stages considering the data provided in their PCP-FMD questionnaires and their presentations was presented by PCP experts from FAO, OIE and EuFMD to the Regional Advisory Group (RAG) of West Africa for final recommendation on countries' PCP stages. The RAG consists of three Chief Veterinary Officers (Nigeria, Niger and Benin) and leads of the regional epidemiology (Senegal) and laboratory (Ghana) networks elected by the participating countries. On the basis of this analyses the RAG recommended the following PCP stages (0-5) for West Africa:

- Stage 1: Senegal, Nigeria, Gambia and Mali
- Provisional Stage 1: Benin, Cote d'Ivoire, Burkina Faso, Guinea, Guinea Bissau, Niger and Togo

- Stage 0: Cape Verde, Ghana, Liberia and Sierra Leone

The participating countries endorsed a series of regional priorities principally represented by the following points: actions for increased FMD awareness, implementation of active FMD cross-border and harmonized surveillance for an improved understanding of the circulating FMD lineages, increase in the efficiency of FMD diagnosis by national and regional laboratories as well as reporting to the stakeholders, development of long term work plans for capacity building by the laboratory and epidemiology networks with the support of OIE, FAO and EuFMD, search for donors to contribute to the control of FMD which is to be included in the control of other transboundary diseases.

<sup>1</sup>The 3<sup>rd</sup> WRLFMD Quarterly Report for the period July – September 2016 published the table below (Table 16) that contains a list of recommended FMDV strains for antigen banks of FMD-Free countries. The discussion of this table is within the report.

The WRLFMD is at present working to adopt a risk-based approach for identifying circulating FMDV lineages and relate these to priority vaccines for use in Europe and other FMD-free settings.

**Table 16:** Recommendations from WRLFMD® on FMD virus strains to be included in IN FMDV antigen banks (for FMD-free countries) - June 2016

Note: Virus strains are NOT listed in order of importance

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

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

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

## V. REFERENCES - Superscripts

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6. WAHID Interface – OIE World Animal Health Information Database  
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9. National animal health diagnostic and investigation center (NAHDIC), Ethiopia - *Dr. Daniel Gizaw*.
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16. ARC -Onderstepoort Veterinary Institute, Republic of South Africa - *Dr LE Heat* - *Ms E Kirkbride*
17. OIE/FAO FMD Reference Laboratory Network, Annual Report 2014
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19. 1st Regional FMD West Africa Roadmap meeting held in Lome, Togo:  
[http://www.fao.org/ag/AGInfo//programmes/en/empres/news\\_160916b.html](http://www.fao.org/ag/AGInfo//programmes/en/empres/news_160916b.html)