Regional FMD strategies and roadmaps

Africa (Continental) According to Virus Pool

OIE Procedures for Endorsement
of National Official Control Programmes with Regard to FMD and PPR

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Kigali, Rwanda

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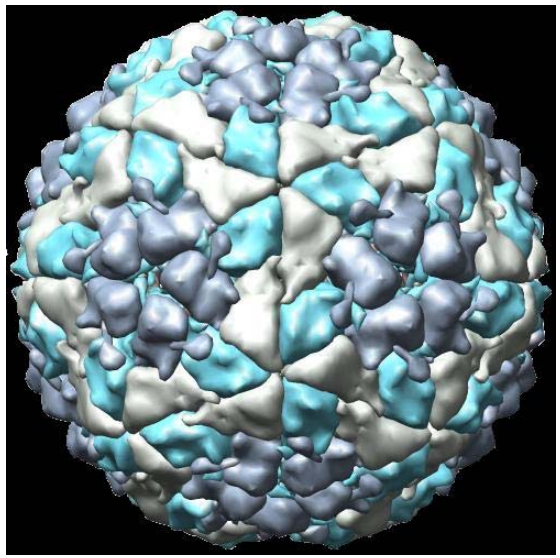
The organism

- Picornaviridae, *Aphthovirus*
  - 7 distinct serotypes (SAT1,2,3,O,A,C,Asia1)
  - Not cross protective
- Cloven-hoofed animals
  - Two-toed
- Inactivation
  - pH below 6.5 and above 11
- Survives in milk, milk products, bone marrow, lymph nodes



Animal Transmission

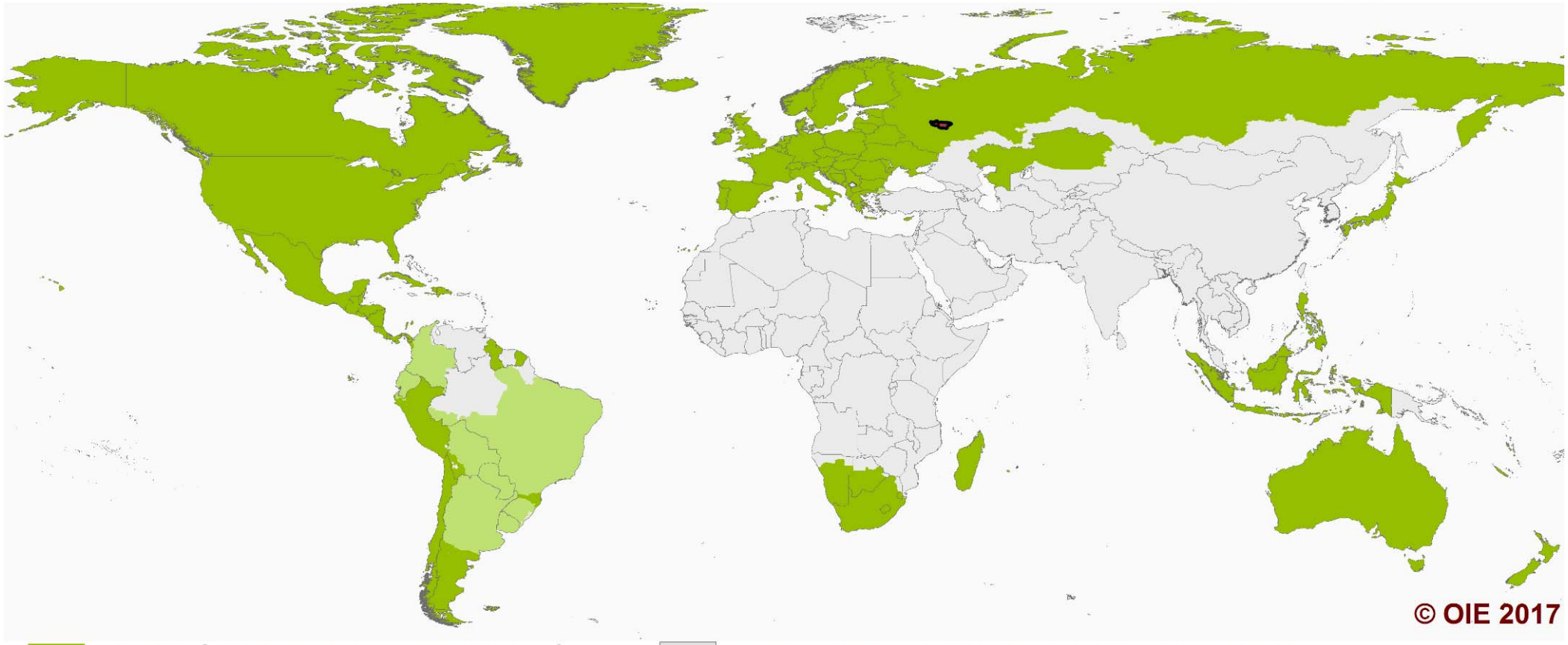
Species	Host	Carrier
Sheep Goats	Maintenance	Pharyngeal tissue 4-6 months
Pigs	Amplifier	No
Cattle	Indicator	Pharyngeal tissue 6-24 months

	Foot & Mouth Disease	Vesicular Stomatitis	Swine Vesicular Disease	Vesicular Exanthema of Swine
Clinical Signs by Species	**All vesicular diseases produce a fever with vesicles that progress to erosions in the mouth, nares, muzzle, teats, and feet**			
Cattle	Oral & hoof lesions, salivation, drooling, lameness, abortions, death in young animals, "panters"; ***Disease Indicators***	Vesicles in oral cavity, mammary glands, coronary bands, interdigital space	Not affected	Not affected
Pigs	Severe hoof lesions, hoof sloughing, snout vesicles, less severe oral lesions: ***Amplifying Hosts***	Same as cattle	Severe signs in animals housed on concrete; lameness, salivation, neurological signs, younger more severe	Deeper lesions with granulation tissue formation on the feet
Sheep & Goats	Mild signs if any; ***Maintenance Hosts***	Rarely show signs	Not affected	Not affected
Horses, Donkeys, Mules	Not affected	Most severe with oral and coronary band vesicles, drooling, rub mouths on objects, lameness	Not affected	Not affected

OIE Member Countries' official FMD status map

Last update January 2017

Click on a specific region to zoom in



Member Countries and zones recognised as free from FMD without vaccination

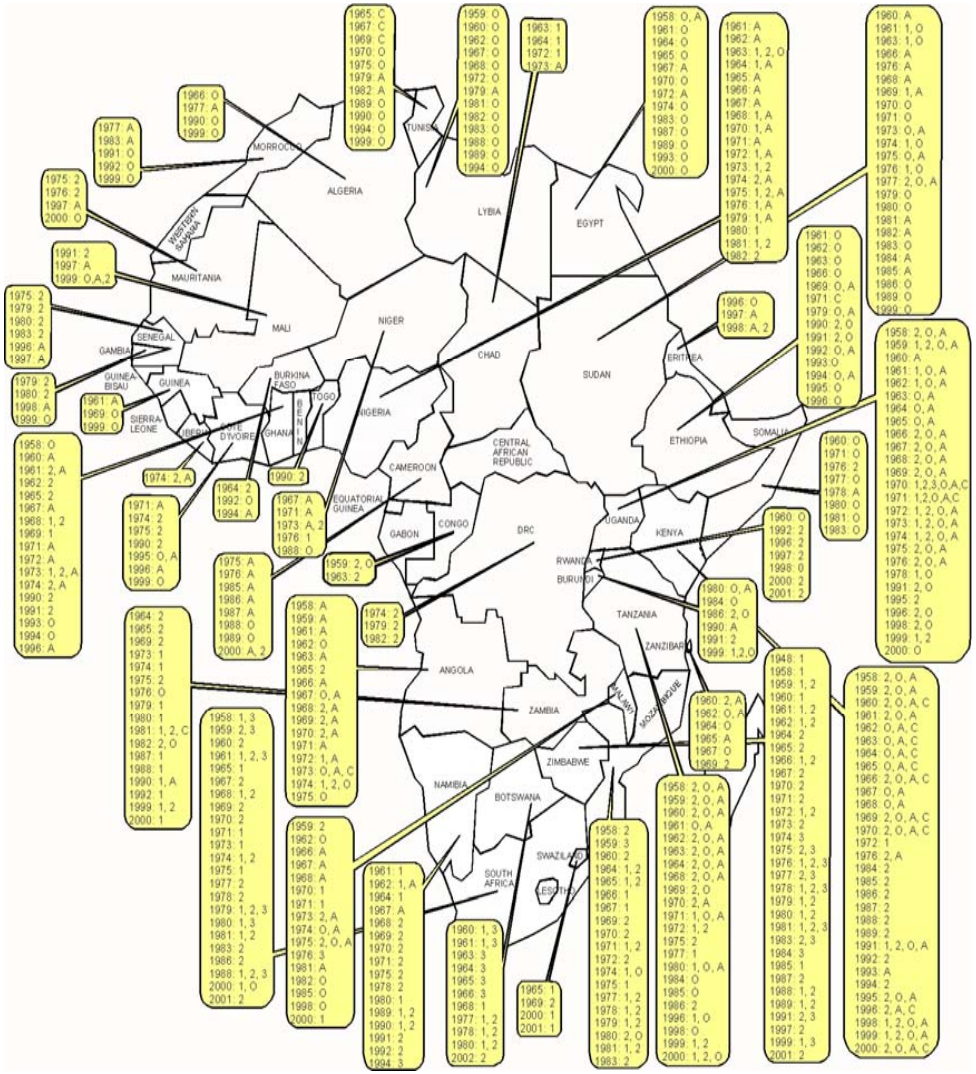
Member Countries and zones recognised as free from FMD with vaccination

Countries and zones without an OIE official status for FMD

Containment zone within a FMD free zone without vaccination

Suspension of FMD free status wthout vaccination

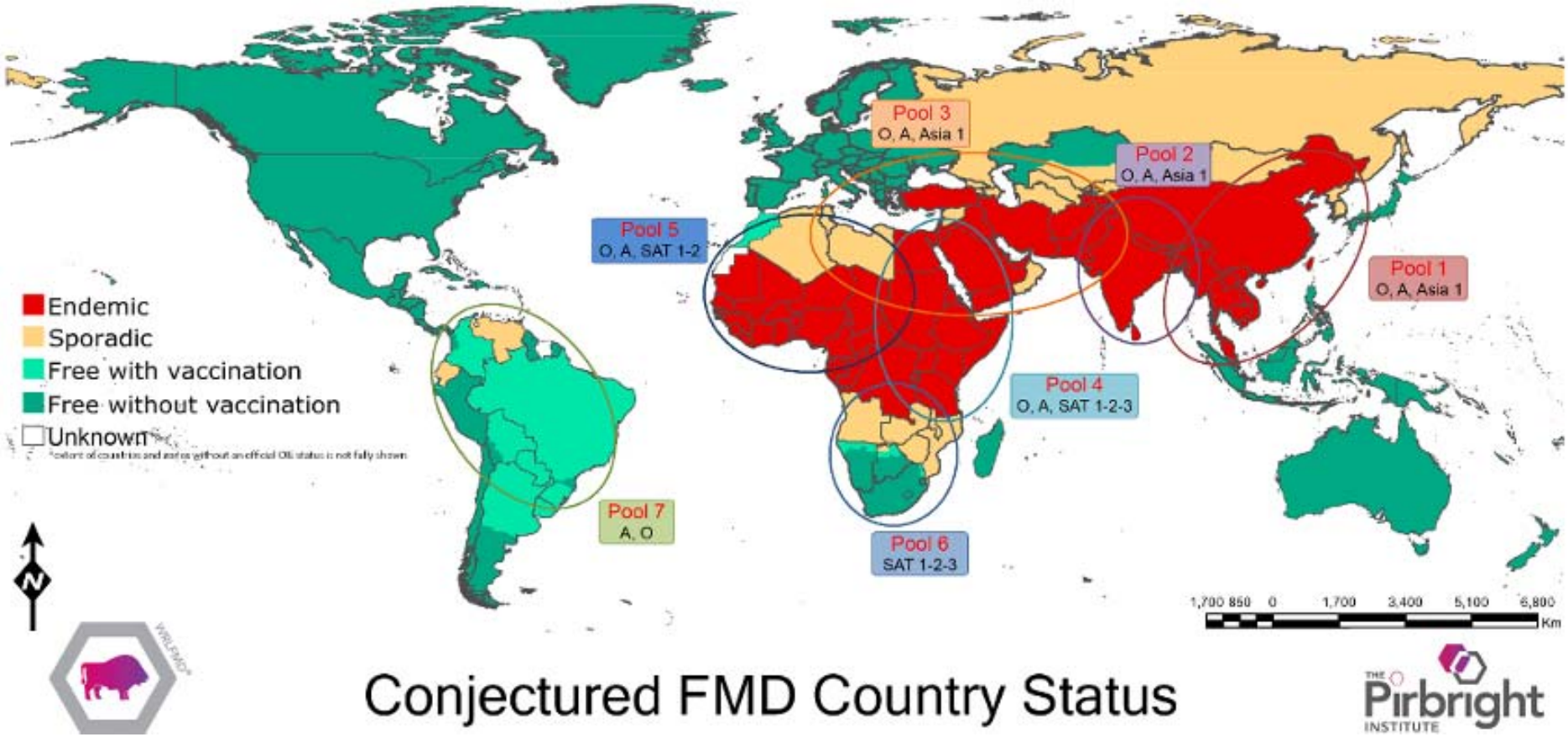
Map of typed FMD outbreaks between 1948-2002



- In Africa, FMD is widespread throughout the continent
- Six of the seven serotypes occur on the continent
- Only serotype Asia 1 not recorded
- Different ‘patterns’ of disease occur

Vosloo et al., 2002

CONJECTURED FMD COUNTRY STATUS

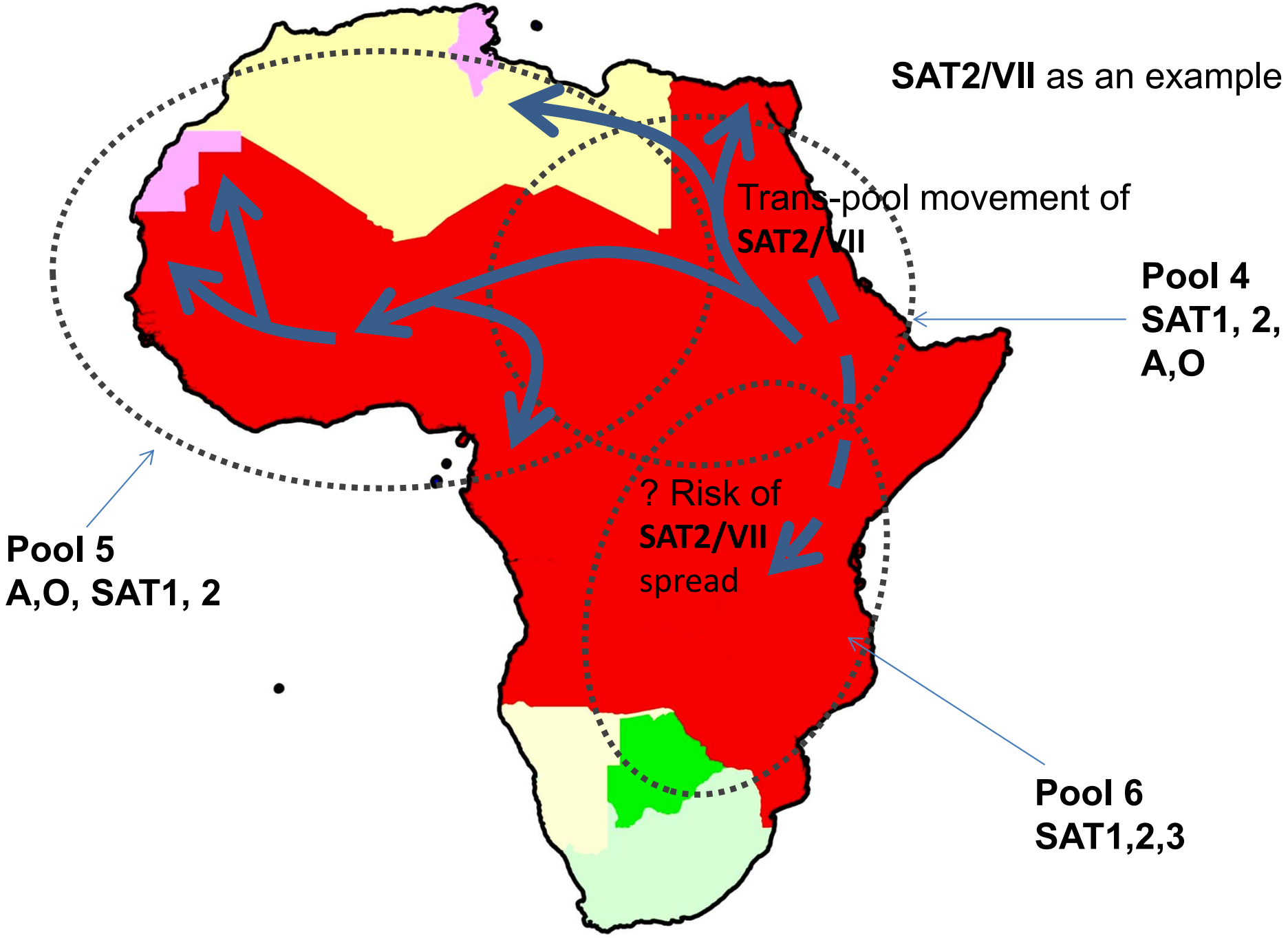


- Distribution of the seven endemic pools of FMD showing conjectured status.
- Periodically, viruses spread between pools and to free regions, and countries at the interfaces between pools (such as in North Africa and Central Asia) often experience FMD outbreaks from different regional sources.
- There is some overlap between **pools 4 and 5** and **pools 4 and 6** due to long-distance “trans-pool” movements. (© WRLFMD).

Long distance "trans-pool" movements in Africa

- Current serotypes circulating in Africa:
  - **SAT2** (topotype 7) emerged into North Africa in 2012
    - Continued cases in Egypt (2015)
    - Spread to Mauritania (2014), Oman (2015)
  - Other recent outbreaks in Egypt (2015, 2016)
    - **A/Africa/G-IV** (most related to FMD virus from Ethiopia 2015)
    - **O/EA-3** (most related to FMD virus from Sudan 2013)
  - West to East Africa: **O/EA-3**, **SAT2/VII** and **A/Africa/G-IV**
    - Ethiopia, Chad, Niger, Nigeria, Ghana, Senegal, Mali
    - **SAT2/VII** in Cameroon and Mauritania also

“Trans-pool” movements



Recent cases in North Africa

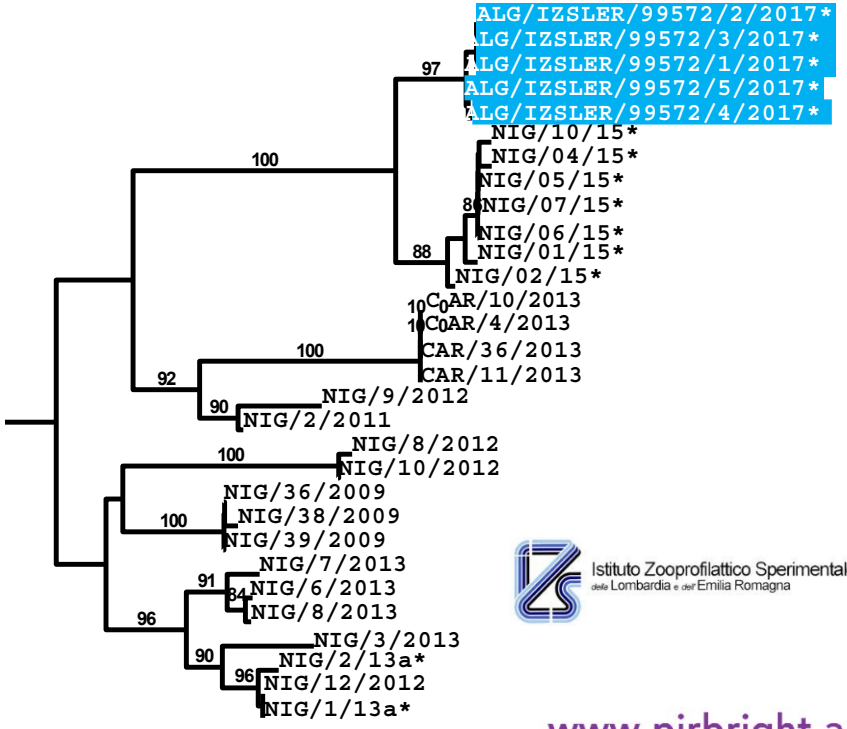
Algeria (end of March 2017)

- 4 Outbreaks in cattle

Tunisia (April 2017)

- A single outbreak in cattle

- Due to a new FMD virus strain for the region (**A/AFRICA/G-IV**) probably originating from west Africa
- Further reports of SAT 1 (not confirmed by Brescia, Italy)
- *in vitro* vaccine-matching indicates antigenic match to A/Eritrea-98 and A22, but not A/Iran-05



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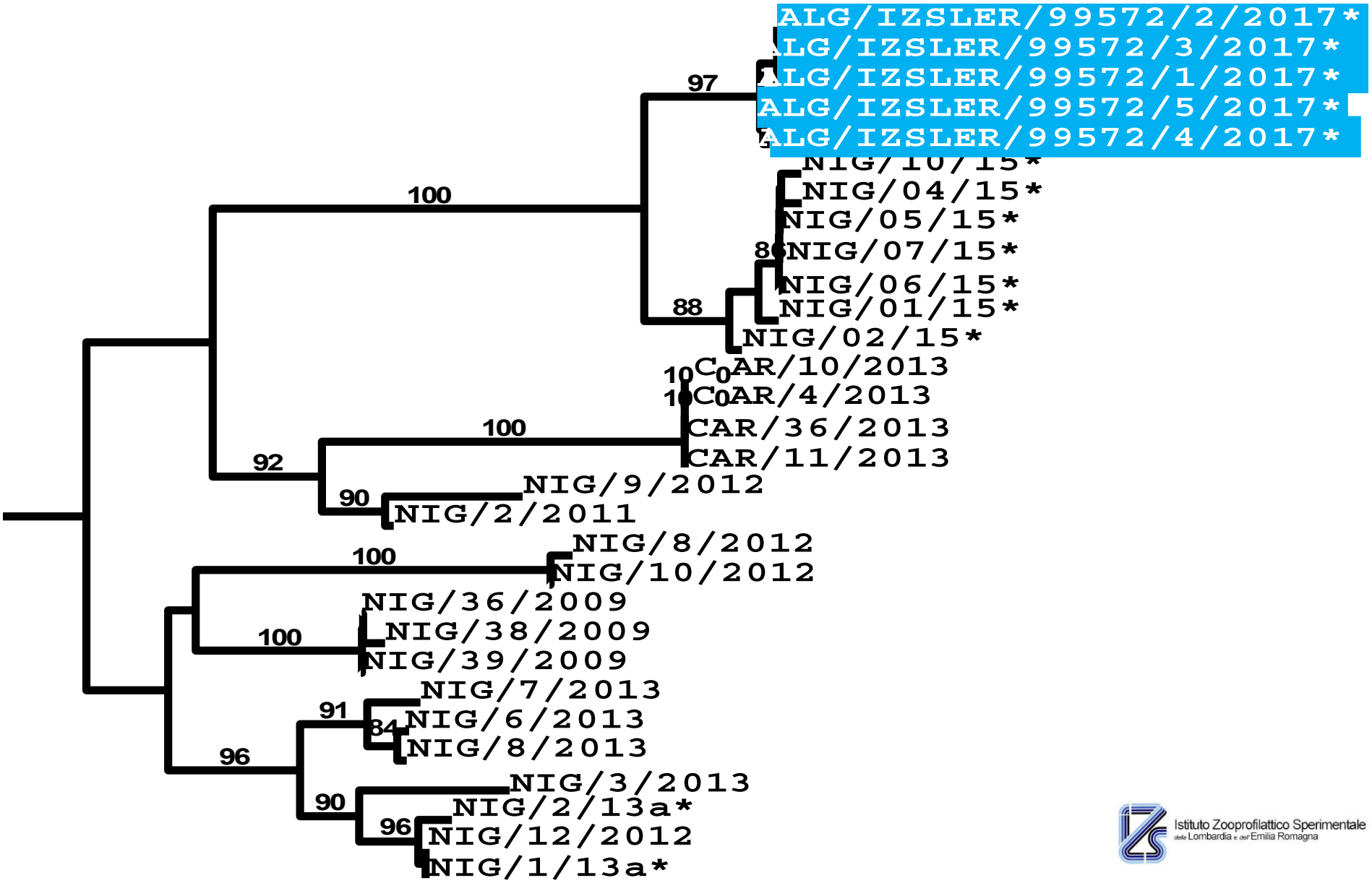
Recent cases in North Africa



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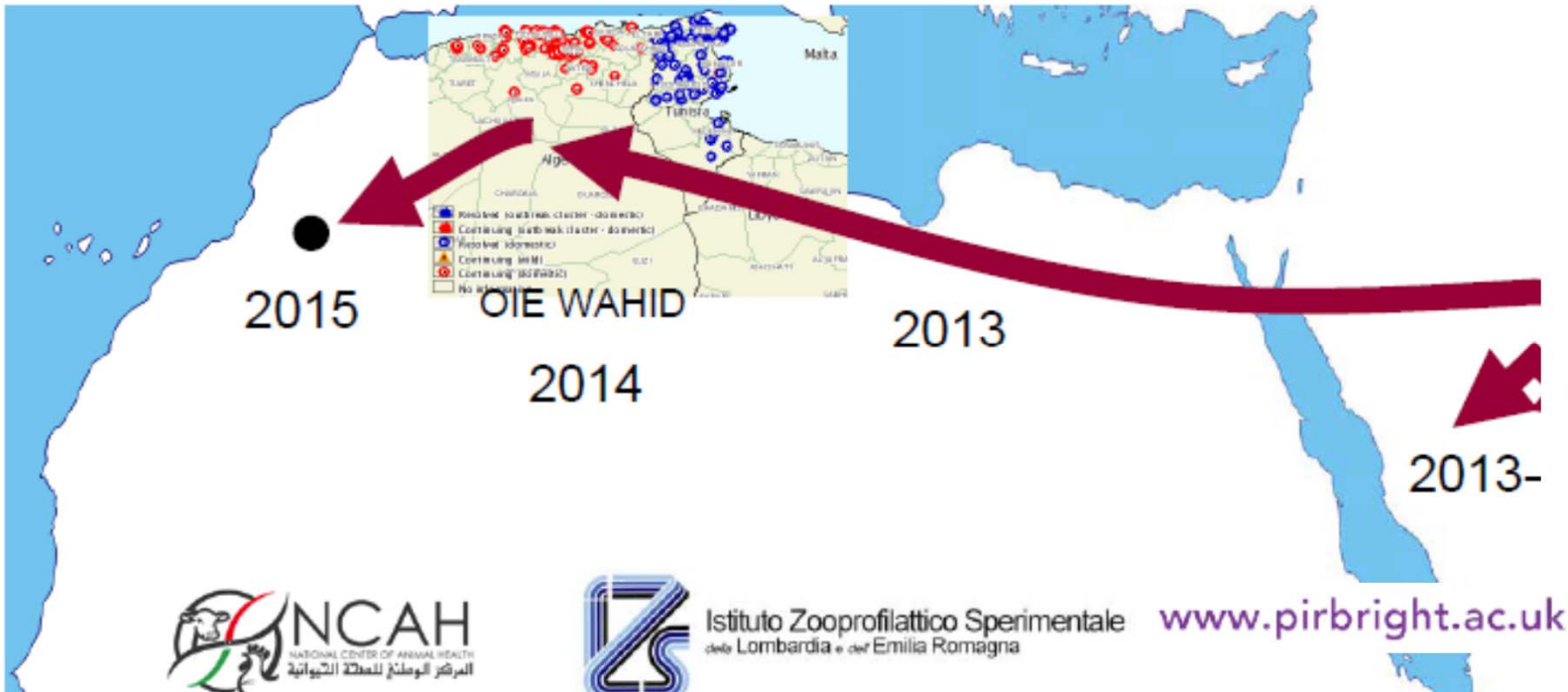
Other Long distance “trans-pool” movements

- Recent serotype O cases in North Africa
  - **O/ME-SA/Ind2001d** lineage from the Indian sub-continent – expanding range of this lineage
  - Since 2013: FMD outbreaks in Libya (2013) Tunisia, Algeria, Morocco (2014), also Mauritius in 2016
  - Transmission links from the Indian sub-continent unknown



FMD in Africa

- **CVO's of SADC region identified FMD as a disease of strategic importance at Pretoria I and II**

- **Adversely:**
  - **constrains market access for livestock commodities**
  - **hinders efforts aimed at regional integration**
  - **affects livelihoods and food security needs of the population**

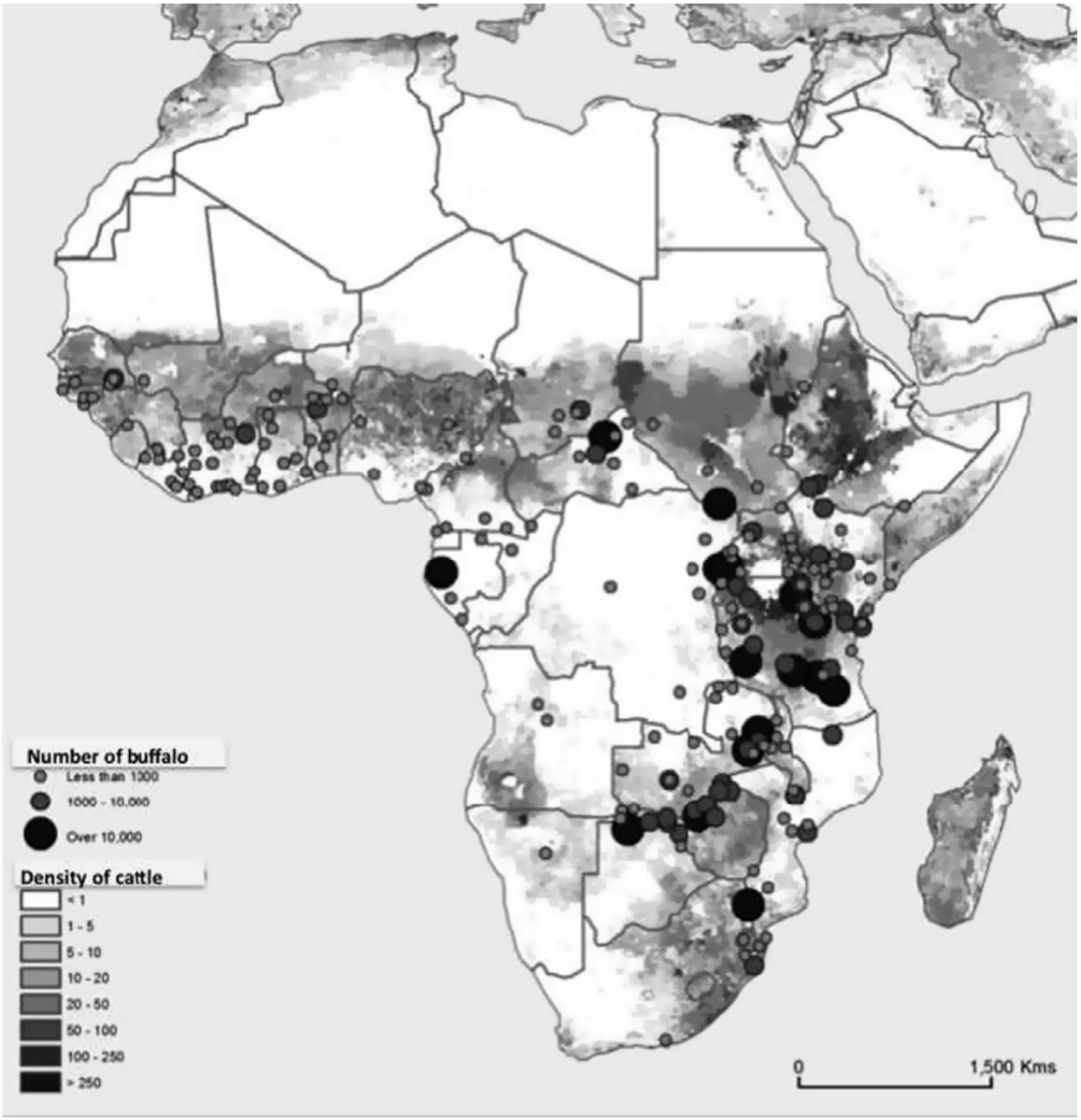
- **FMD as a TAD is unique because of the implication of wildlife, especially the African buffalo (*syncerus caffer)* in the epidemiology**

- **Even then, transmission of virus from buffaloes to cattle has been shown to be inefficient**

EPIDEMIOLOGY

- Epidemiology is influenced by two different patterns:
  - A cycle in which wildlife is implicated in maintaining and spreading the disease to other susceptible domestic animals and wild ungulates (suspected to be most predominant in the SADC region)
  - A cycle that is maintained within domestic animals independent of wildlife
- Most recent outbreaks in Pool 6 have implicated SAT 1 and SAT2, although O and A is also prominent in the northern parts (Tanzania, Kenya, etc.)
- Unclear how serotypes A and O are maintained in the northern part (Tanzania) of the region

Buffalo and cattle distribution in Africa



Tanzania, Zimbabwe, Zambia, DRC and South Africa represent the countries with the highest estimated buffalo numbers.

Estimated geographical distribution of buffalo and cattle in Africa. *From Casey et al. 2015 Patterns of FMDV distribution in Africa.*

FMD VIRUS CIRCULATING (pool 6)

- Serotypes currently circulating in EA region
  - In Kenya an increase in outbreaks caused by SAT1 and A (and decrease of O and SAT2) has been detected from 2015 to 2016.
  - Surveillance project in Uganda showed O, SAT1 and SAT2 in different regions (2014-2015) (*Frank Mwiine*)
  - The pattern is most likely in line with the “wave” concept of FMD spread observed in Tanzania (*Tiziana Lembo*).

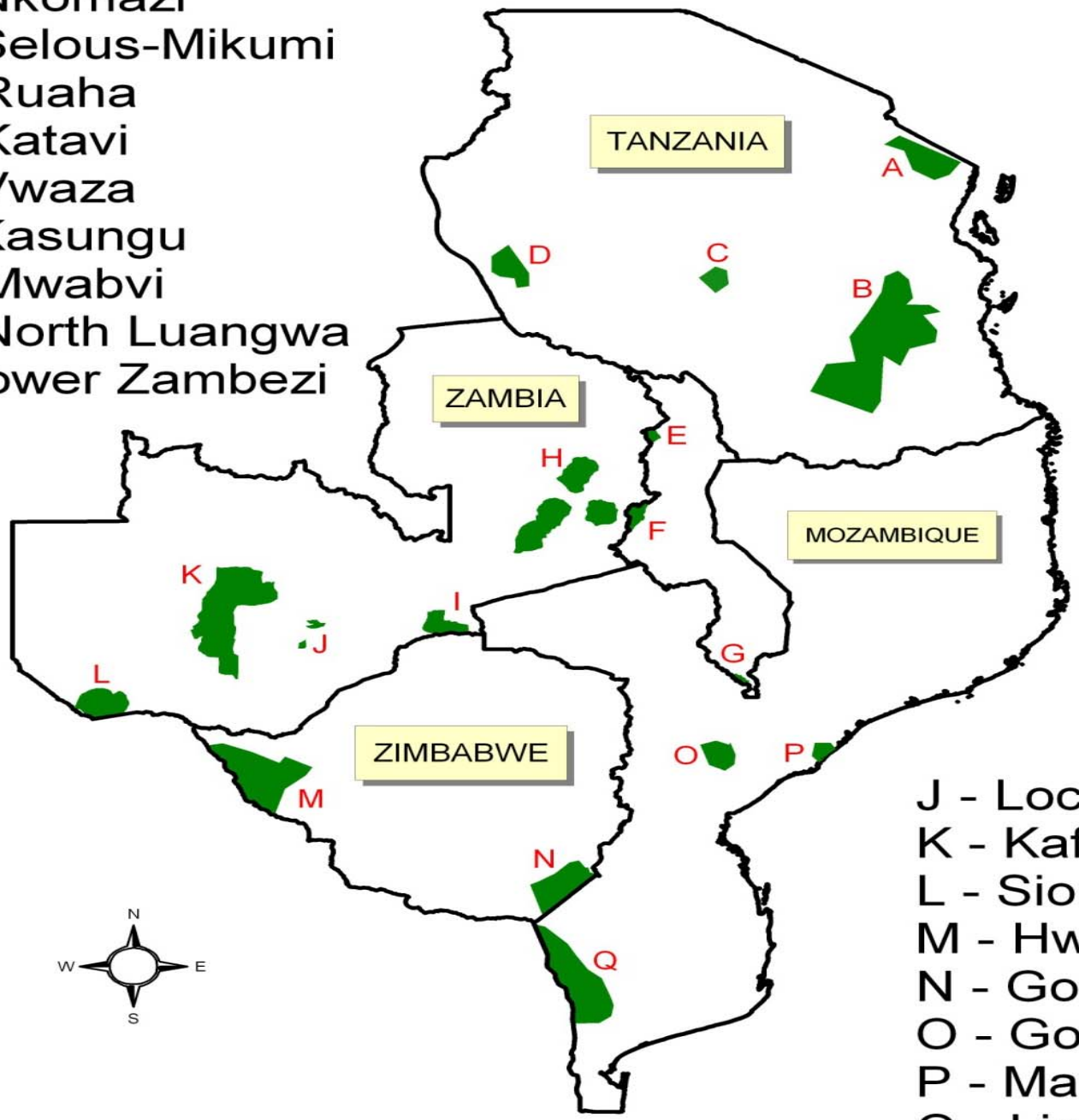
- Patterns of FMDV in southern Africa (2015-2017)
  - Outbreaks due to SAT1: Botswana, Malawi
  - Outbreaks due to SAT2: Namibia, Angola, Zimbabwe, Mozambique,
  - Zambia experienced an outbreak of SAT3 in October 2015

FMD VIRUS CIRCULATING …

- Knowledge of circulating FMD viruses in wild buffalo populations is key to understanding the epidemiology of FMD in the SADC region
  - **Such knowledge also has implications on control strategies for the region**
- This knowledge was until recently not readily available for most countries in the region
- **AfDB-financed SADC TADs project** commenced wide-scale sampling of wild buffalo populations in region's national parks 2 years ago. Surrounding cattle pops also included in the sampling
- Collaboration with **BVI, OVI and WRL for FMD (Pirbright)**
- Since then **> 1,400** buffalo and cattle serum and probang samples have been collected
- Exercise stopped in 2013 and has only few countries have continued with the annual sampling.
- Data being analysed and publications in progress and will be coming out soon

BUFFALO SAMPLING SITES IN 2010/2011

A - Nkomazi
B - Selous-Mikumi
C - Ruaha
D - Katavi
E - Vwaza
F - Kasungu
G - Mwabvi
H - North Luangwa
I - Lower Zambezi



J - Lochinvar
K - Kafue
L - Sioma Ngwezi
M - Hwange
N - Gonaredzu
O - Gorongosa
P - Marromeu
Q - Limpopo

FMD VACCINE

- **The only source of vaccine in the region is BVI**
- **Between 2008-2010 working closely with EU SADC FMD project BVI conducted field trials in Malawi, Botswana and Namibia aimed at further improving vaccine performance**
- **Result:**
  - **new recommendations on frequency of vaccinations**
  - **Increase of the payload in the vaccine for use in some areas**
  - **Training for countries on post vaccination monitoring**
- **Recently BVI embarked on expansion and improvement process that has culminated in additional modern facilities being commissioned.**

PCP STAGES


STAGE 0
FMD risk not controlled. No reliable information
STAGE 1
Identify risk and control options
FROM 0 to 1
Comprehensive study of FMD epidemiology planned
STAGE 2
Implement risk-based control
FROM 1 to 2
Risk-based FMD control plan
STAGE 3
Implement control strategy to eliminate circulation
FROM 2 to 3
Develop aggressive strategy to eliminate FMD
STAGE 4
Maintain zero circulation & incursions
FROM 3 to 4
No endemic FMD in domestic livestock
STAGE 5
Maintain zero circulation & incursions; withdraw vaccination
FROM 4 to 5
Apply for official status (OIE): 'free WITH vaccination'
Apply for official status (OIE): 'free WITHOUT vaccination'
Free without vaccination

PCP STATUS OF COUNTRIES IN THE REGION

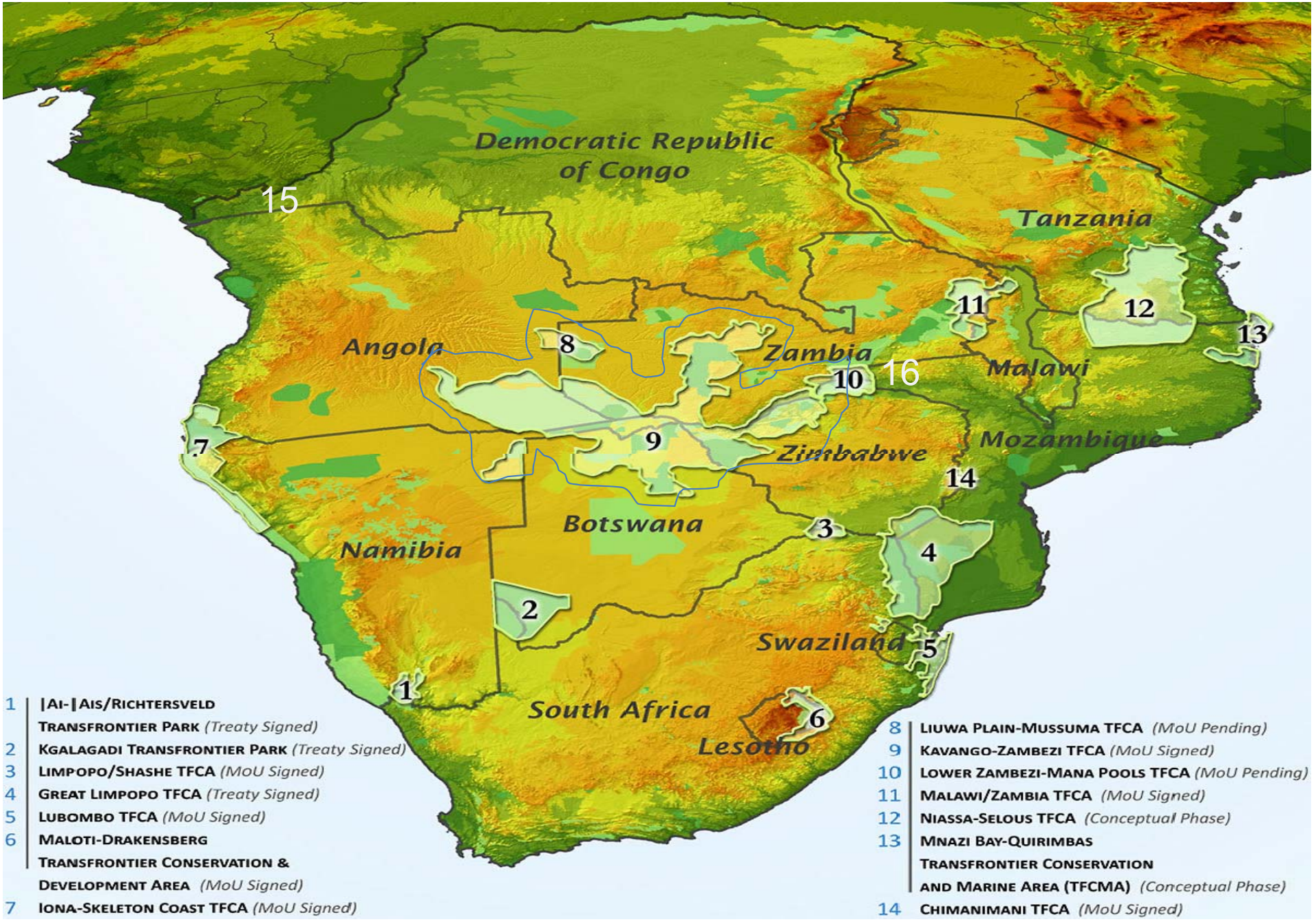
- **SADC Member States that have not yet attained official OIE recognized status with regard to FMD:**
  - **Angola**
  - **Malawi**
  - **Seychelles**
  - **Zambia**
  - **Dem. Rep. Congo**
  - **Mozambique**
  - **Tanzania**
  - **Zimbabwe**
- **SADC working with OIE/FAO are assisting these countries to progress towards official recognition of FMD freedom with or without vaccination by 2020.**

PCP status of SADC Member States

Countries	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Angola	1	1	1	2	2	2	3	3	3	3
Angola (zonal)	1	1	1	2	2	3	3	4	4	4
DRC	1	1	1	1	2	2	2	2	2	3
Malawi	3		3	3	3	3	3	3	3	3
Malawi (zonal)	3		3	4	4	4	4	4	4	4
Mozambique	2	2	3	3	3	3	3	3	3	3
Mozambique (zonal: Tete, Manica)	2	2	3	3	3	5	5	5	5	5
Mozambique (zonal: South)	2	2	3	3	4	4	4	4	4	4
Seychelles	hist freed	5	5	5	5	5	5	5	5	5
Tanzania	1	1	2	2	2	3	3	3	3	3
Tanzania (Mainland:zonal)	1	1	2	2	2	3	3	4	4	4
Tanzania (Islands: Zanzibar, Pemba)	1	1	2	3	3	4	4	4	4	4
Zambia	2	2	3	3	3	3	3	3	3	3
Zambia (zonal)	2	2	3	3	4	4	5	5	5	5
Zimbabwe	1	2	3	3	3	3	3	3	3	3
Zimbabwe (zonal)	1	2	3	3	3	4	4	5	5	5

Fig courtesy of OIE SRR

TFCAS IN SADC: EXISTING AND PROPOSED



Map courtesy of KAZA

15 Maiombe Forest TFCA
16 ZIMOZA TFCA

FMD CONTROL

- **Based on FMD control status, Africa can be divided into:**
  - Beef Exporters to high value markets
  - Non Beef exporting countries

- **Main Control options**
  - Exporting countries
    1. Fencing
    2. Routine vaccinations
    3. Stamping out Movement control
    4. Movement Control
    5. Surveillance
  - Non exporting countries
    1. Movement control following outbreaks
    2. Vaccination usually following outbreaks
    3. Surveillance

HISTORICAL FMD OUTBREAKS IN 3 EXPORTING COUNTRIES OVER 80 YEARS

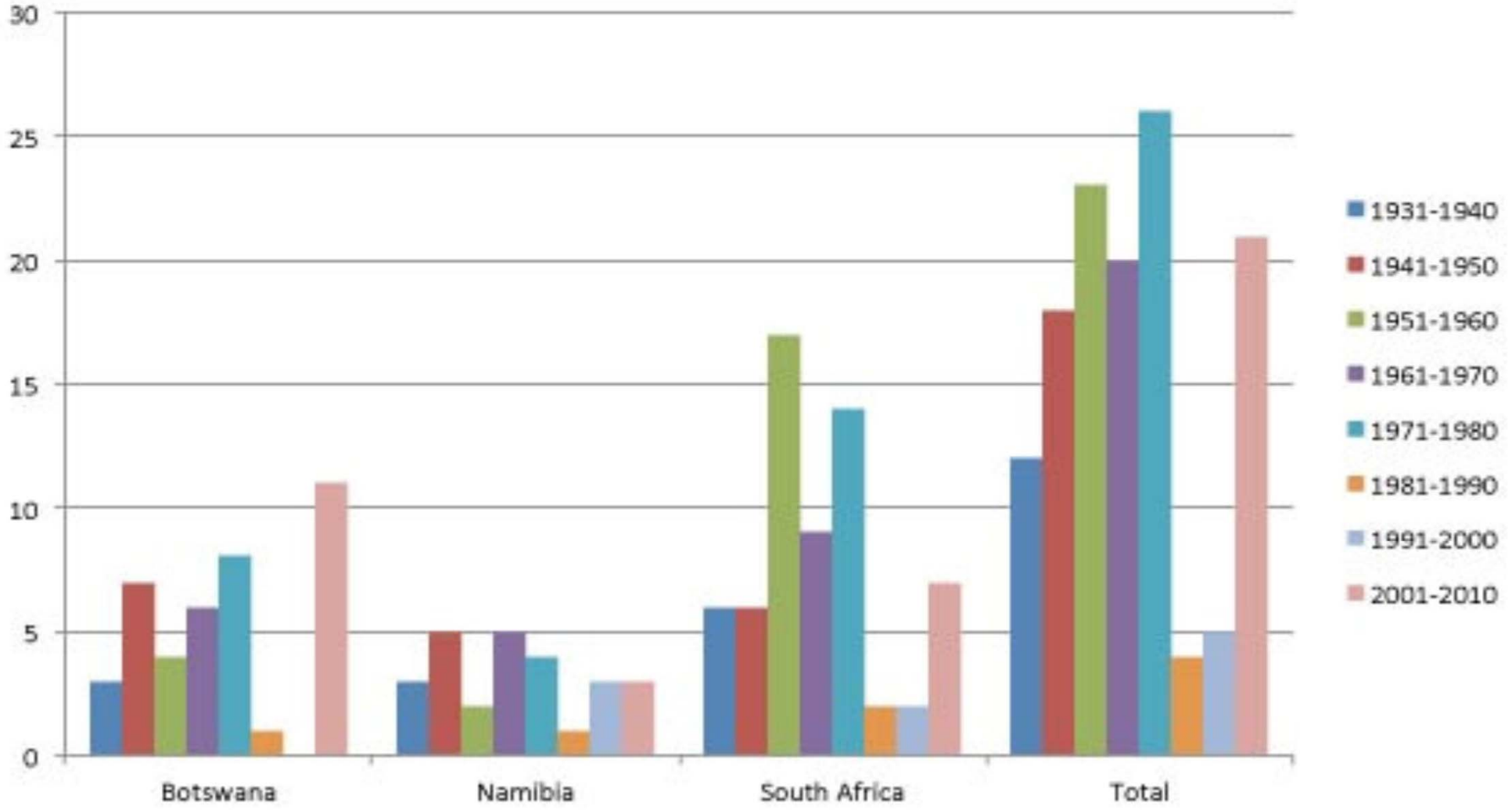


Fig courtesy G. Thomson

MAIN THRUST OF FMD CONTROL INITIATIVES AND STRATEGY SHOULD FOCUS ON

- Pooling of resources to follow PCP pathway for next 10yrs
- Issues include looking at
  - Vaccine effectiveness and improvement
    - New purified vaccine by BVI
    - Better understanding and PVM
  - Better understanding of FMDV circulating at the wildlife/Livestock interface
    - Better management of disease at TFCA interface
    - Quicker reaction to outbreaks
- Promote Commodity based trade
    - Within the continent
    - Outside the continent

MAIN THRUST OF FMD CONTROL INITIATIVES AND STRATEGY cont.

- **Focus is on:**
- Gaining knowledge of virus strains circulating in the wild buffalo population
- Designing effective vaccination programs
- Improving early detection and identification of the disease at field level and how this information is speedily relayed of to HQ for rapid reaction

MAIN THRUST OF SADC FMD CONTROL INITIATIVES AND STRATEGY cont.

- Definition of and maintenance of common regional minimum standards for improved surveillance in member states
- Improved laboratory diagnosis
- Co-existence of the reality of TFCA's
- Advocacy for implementation of the commodity based trade (CBT) concept to benefit disadvantaged livestock farmers in areas where the risk of FMD spread is negligible

Acknowledgements:

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THANK YOU

ASANTE