

New programme for FMD control in East Asia

OIE/JTF Project on FMD Control in Asia was commenced for 5 year (2011-2015) in the region under the **new OIE/JTF programme** (from August, 2011).

Budget : 570,000 USD / year under OIE/JTF programme

Activities:

- Strengthen Information Sharing on FMD in East Asia
 - Develop Regional Roadmap and Cooperation in East Asia
 - Strengthen capacity of diagnosis for FMD
 - Improve Control Measures (by the field study)
- **Inception Meeting** was organised on 13-14 December, 2011, Tokyo, Japan



Organisation
Mondiale
de la Santé
Animale

World
Organisation
for Animal
Health

Organización
Mundial
de Sanidad
Animal

OIE/JTF Project on FMD Control in Asia

Revised Framework of the Project

National Contact Person Workshop under
OIE/JTF Project on FMD Control in Asia
Tokyo , Japan, 14-15 August 2012

Itsuo Shimohira : Regional Representative for Asia and the Pacific



Inception Meeting

The Inception Meeting was organized in 13-14 December 2011 to launch the project

Objectives of the Meeting :

- To provide opportunity for members to discuss and propose ideas towards the Project.
- To promote information sharing among members
- To identify the gaps(constraints) in FMD control at the national and the regional levels
- To discuss the Project activities of the four components under OIE/JTF Programme
- To discuss the proposed Frame work and Scheme of the Project



Background

- FMD is endemic in South-East Asian countries and recently, previously FMD-free like Japan, RO Korea and PR Chinese Taipei also affected by FMD outbreaks.
- The causative virus in Japan 2010, found to be closely related to viruses occurring recently in PR China, Hong Kong SAR, RO Korea, Myanmar and Thailand
- In Southeast Asia, SEACFMD produced the Roadmap, and it is expected to serves as the most appropriate model in other regions.
- Under these circumstances, Japanese Government decided to support the FMD control project in East Asia under the OIE/JTF programme and this initiative was endorsed by the **5th Regional GF-TADs SC Meeting**, in July 2011.



OIE/JTF Project on FMD Control in Asia

1) Target area (countries) :

OIE Members in the **East Asia**, **SEACFMD** members and Hong Kong SAR

(Other OIE members in Asia may be covered by the project, if deemed appropriate by the Coordination Committee)

2) Final Goal :

Significant decrease of FMD outbreak in Asia by strengthen prevention and control measures against FMD

3) Expected Achievement of the project (Objectives)

- To provide **coordination platform for MS** to discuss, and decided cooperative activities of the project and **share experience and information**
- To develop a **Roadmap for FMD control in East Asia** by using, among others, the Progressive Control Pathway for FMD (PCP) while ensuring to be in line with the Global Strategy for FMD Control and in coordination with SEACFMD.
- To improve **FMD surveillance and diagnosis capacity** at a national level and harmonize diagnosis capability at the regional level
- To assist regional Members to **improve FMD control measures by providing technical supports (field study)**



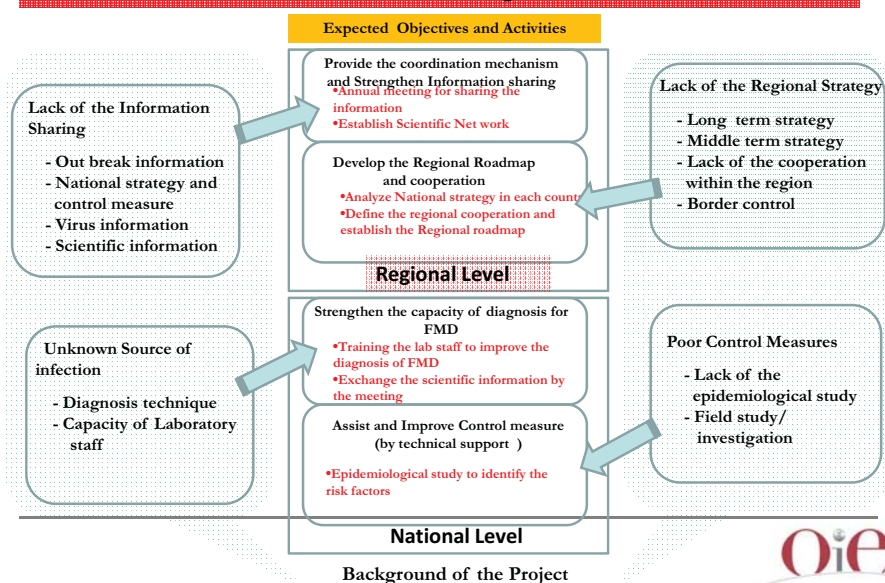
Conclusions and Recommendations of the Inception Meeting OIE/JTF Project on FMD Control in Asia

- Closely collaborate and coordinate between OIE/JTF Project for FMD Control in Asia and SEACFMD Campaign as well as other projects
- Promote information sharing on FMD in the region
- Develop strategies and a Road Map for FMD control in East Asia
- Strengthen the capacity of surveillance and diagnosis for FMD and Improve the FMD control measures in national and regional levels
- **Project framework, implementation scheme and Activities proposed were supported by participants**
- **The outcomes of the meeting is used to complete the final design of the overall Project in collaboration with OIE Headquarters**



Background and Expected Activities of the Project

Final Goal: Significant decrease of FMD outbreak in Asia by strengthen prevention and control measures against



Chronology of Amendment of Project Framework

- December 2011: The Draft of the Framework was proposed at the Inception meeting
 - **Project framework, implementation scheme and Activities proposed were supported by participants**
 - **The outcomes of the Inception meeting will be used to complete the final design of the overall Project in collaboration with OIE Headquarters**
- March 2012 : The outline of the Project was introduced at the SEACFMD Commission meeting and the OIE HQ suggested the amendment of the project framework
 - **The project should Contribute to the SEACFMD campaign by the eligible activities under the project**
 - **More simplified coordination system (not many group for management)**
- March- May 2012:Through the discussion with OIE HQ, MAFF and OIE AP
 - **Proposal from the OIE HQ was discussed by MAFF to revise the Framework and identify the eligible activities for support to SEACFMD campaign**
- June 2012: Revised Project Framework was endorsed by the OIE HQ
- July 2012: Introduced the new Framework of the project at the 6th GF-TADs SC meeting
- August 2012: NCP workshop to develop the Regional Road map in East Asia



Achievement 3 :
Strengthen the capacity of surveillance for and diagnosis of FMD

● **Objectives:**

To improve FMD surveillance and diagnosis capacity at a national level and harmonize diagnosis capability at the regional level

● **Activities:**

- 3-1) To select target countries after assessing the needs for capacity building
- 3-2) To conduct or support training programmes for FMD surveillance and diagnosis for the target countries by OIE Collaborating Centres/Reference Laboratory.



Achievement 1:
Coordination the project and Promote the information sharing on FMD in Asia

● **Objectives:**

To provide coordination platform for MS to discuss, and decided cooperative activities of the project and share experience and information

● **Activities:**

- 1.1) Organise the First Regional Workshop of the project
- 1.2) Organise Annual Coordination Committee Meeting (starting 2012)
- 1.3) Organise the scientific meeting to strengthen lab network among FMD researchers in Asia
- 1.4) Share scientific information including the circulating virus and vaccines



Achievement 4 :
Improve the FMD control measures in the region

● **Objectives:**

To assist regional Members to improve FMD control measures by providing technical supports

● **Activities:**

- 4-1) To select target countries after feasibility study, based on submitted proposal by the countries
- 4-2) To assist the target countries to plan and implement field work on FMD
- 4-3) To study circulating FMD viruses in Asia and share the information



Achievement 2 :
Developing strategies and a Roadmap for FMD control in East Asia

● **Objectives:**

To develop a Roadmap for FMD control in East Asia by using, among others, the Progressive Control Pathway for FMD (PCP) while ensuring to be in line with the Global Strategy for FMD Control and in coordination with SEACFMD.

● **Activities:**

- 2-1) To analyze national FMD control Strategy in each country
- 2-2) To develop a Roadmap for FMD control in East Asia
- 2-3) To define regional cooperation



Country specific activity (Field work)

1. Upon request of MS, the technical assistance and Field study could be provided (Country-specific training and Field study).
2. In some cases, mission team may be dispatched for feasibility study



Implementation Scheme

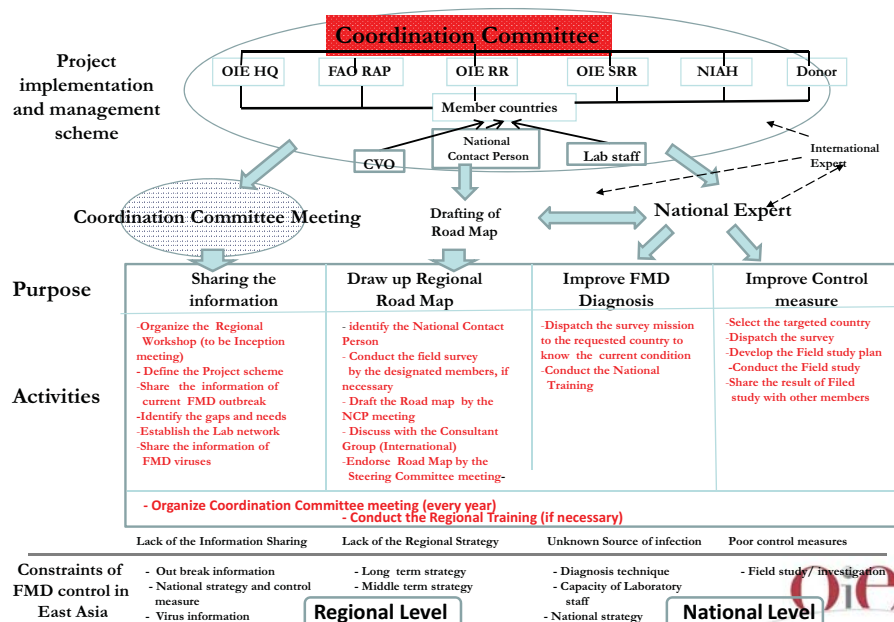
Regional Members (Target Members) : Japan, RO Korea, PR China, Mongolia, Chinese Taipei and selected target countries and territories in Asia.

Project Management

- **Coordination Committee (CC)** shall be established for policy support, scientific coherence, smooth implementation and management of the OIE/JTF Project on FMD Control in Asia. The **Coordination Committee** comprises the Chief Veterinary Officers (CVOs) of the Regional Members.
- **Coordination Committee Meeting (CC Meeting)** will be annually organised by the OIE Regional Representation for Asia and the Pacific to discuss a plan and activities of the project and to **develop and endorse the strategy and a Roadmap for FMD control in East Asia**.
- Participants of **CC Meetings** include CC members, **National Contact Persons (NCPs)**, national experts from the Regional Members, experts from OIE Collaborating Centres/Reference Laboratories, CVO of Hong Kong SAR, OIE Regional Representative for Asia and the Pacific, and OIE Sub-Regional Representative for South-East Asia
- **NCPs** are designated by CVOs of the Regional Members to support the project as contact points and **prepare a draft Roadmap for FMD control in East Asia**.



Outline and Implementation scheme of the Project

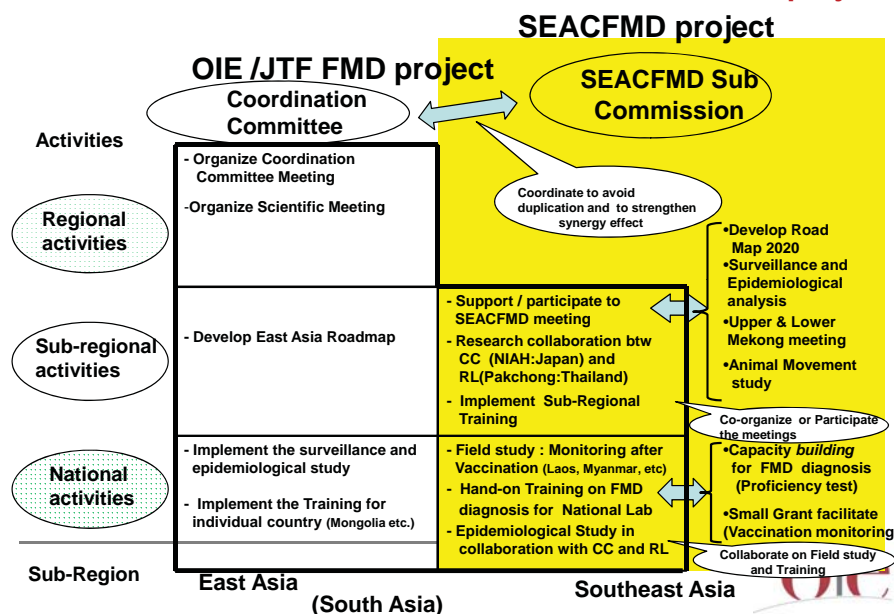


Regional Activities

1. Coordination Committee Meeting for Information sharing
2. Development of Regional Strategy and Roadmap for East Asia
3. Scientific meetings
4. Regional Trainings



OIE/JTF FMD activities in coordination with SEACFMD project



Contribution to SEACFMD Campaign

(1)

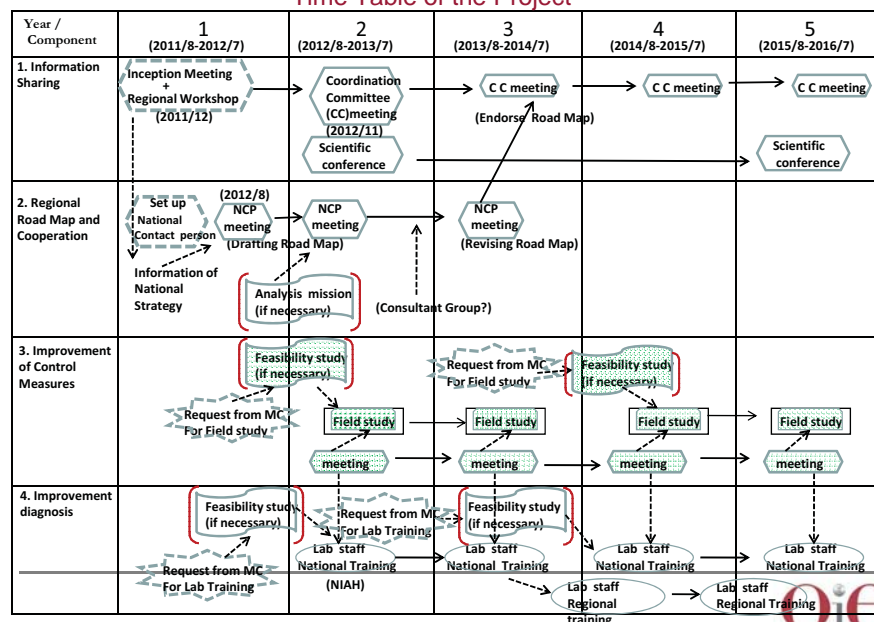
After discussed with the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Donor of this project, agreed to join the SEACFMD project as a full member by contributing the eligible activities under the project .

The following are to be eligible activities of the OIE/JTF project which contributing to the SEACFMD campaign and framework.

- Field activities for FMD surveillance and study in SEA region
- Surveillance and monitoring of FMD antibody after the vaccination by the Japanese donation to Laos. (to be implemented in 2012)
- Surveillance and monitoring of FMD antibody after the vaccination by the Japanese donation to Myanmar. (to be implemented in 2013)
- Capacity building for the laboratory on the Diagnosis techniques for FMD control



Time Table of the Project



Contribution to SEACFMD Campaign(2)

- Technical training for staffs from SEA on the FMD diagnosis in NIAH, Japan
- Support FMD Reference Laboratory in Pakchong, Thailand to implement Proficiency Test for FMD diagnosis in collaboration with NIAH Japan
- Technical collaboration between OIE Collaborating Centre, NIAH and NVAL (Japan) and Reference Laboratory in Pakchong, Thailand,
- Support to organise the meetings related to SEACFMD project
- Co-organize meetings related to SEACFMD
- Participation to the meeting related to SEACFMD project
- Attend the meeting related to SEACFMD from OIE Asia-Pacific
- Coordination activities related to SEACFMD under the project.
- Employ expert(s) to implement activities related.
- Some part of the Coordination and management activities of the project.



THANK YOU FOR YOUR ATTENTION



Activity Plan in 2012-2013 under the OIE/JTF project for FMD control in Asia

- FMD Diagnosis Training for Mongolian Lab staff at NIAH in Japan, April- , 2012
- National Contact Person (NCP) Meeting, 14-15 August 2012, Tokyo
- 1st Coordination Committee Meeting (CC Meeting), 13-15 November 2012, Tokyo
- Field implementation in Xieng Khouang, Laos, September-November 2012
- Scientific Meeting in 2013 (back to back with CC meeting)
- Field implementation in Myanmar in 2013



Purpose of the NCPs workshop

The objectives of the Workshop are to:

- Understand the new Framework of the Project
- Share information on National Strategy on FMD Control
- Understand approach of the evaluation of the FMD control progress in accordance to PCP (Progressive Control Pathway for FMD)
- Create a process to develop FMD Roadmap for East Asia compatible with SEACFMD Roadmap.
- Develop collaborative strategies and projects contributing to FMD control in East Asia and South-East Asia.



-600 participants from over 100 countries, Regional Organisations, development partners and stakeholders supported **the launch of the FAO/OIE Global FMD Control Strategy**

-The World Bank emphasized **the importance of socio-economic studies** to support regional priority setting and allow selection of a few diseases to concentrate on and where possible combine disease control activities

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Capture of the Second Global Conference on FMD Control

Chantanee Buranathai
OIE-RR Asia Pacific
National Contact Point Workshop
14-15 Aug 2012, Tokyo, Japan

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Outline

- **Report from Global FMD Conference**
– (Dr. Peter De Leeuw)
- **The Global FMD Control Strategy**
– (Dr. Peter De Leeuw)
- **Progressive Control Pathway**
– (Dr. Keith Sumption)
- **Recommendations from the Global FMD Conference**

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Where are we going?(3)

Key message:

1. FMD causes worldwide and in developing countries much more damage than is often thought (*Rushton 2012*)
2. FMD control will have favourable and lasting collateral effects through improvement of VS and other disease control programmes
3. Better FMD control is possible with today's means and methods; the global return on investment is not difficult to show (*Rushton 2012*)

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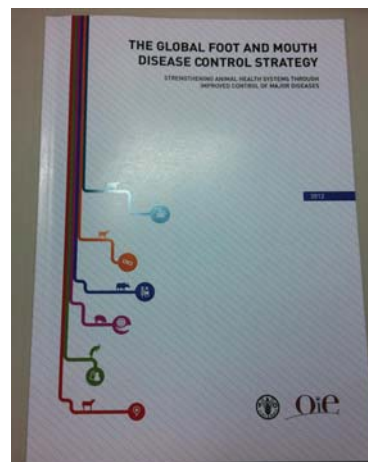
Post Bangkok Where are we going?

- **Bangkok was not a pledging conference**
- **Further specific support has to be seek**, to carry out the activities at the **regional and global levels**
- **At country level**, i.e. to stimulate countries that are in need or have little incentive to implement the Strategy, **seed money is needed** as foreseen in the strategy

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The Global FMD Control Strategy

- Global FMD Control Strategy was launched during the conference



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Where are we going?(2)

- **Draft FMD control projects** should be prepared, in particular in the FMD virus pool regions where extra input is needed (3, 4, 5 and 6)
- Such country FMD control programmes should be prepared and presented to possible donors **in the framework of regional approaches**
- **Socio-economic studies** should be prepared (to underpin regional disease control priorities) and presented to possible donors

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Component 1: FMD Control



Tools (continue)

- **OIE standards**, recognition of diseases status and endorsement of control programmes
- **Diagnostic laboratories**, Reference laboratories/centers, Regional and global networks
- **Vaccines and vaccination**

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Global FMD Control Strategy is NOT 'stand alone' activity



Three inter-related components

- Component 1: FMD Control
- Component 2: Strengthening of Veterinary Services
- Component 3: Prevention and Control of other major diseases of livestock

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Component 1: FMD Control



Tools (continue)

- National, regional, international surveillance and epidemiology skills and development of networks
- Emergency response
- Registration of farms and identification of animals, movement of animals
- Biosecurity
- Public-private partnership

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Component 1: FMD Control



Tools

- **Progressive Control Pathway** for FMD (PCP-FMD) as a development tool
- PCP as an assessment tool
- Regional approach and regional roadmaps
- **PVS pathway**: evaluation of the Veterinary Services

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Component 3: Prevention and Control of other major diseases of livestock

Tools (continue)

- Vaccine and vaccination
- Surveillance and epidemiology: national, regional and international Collaborating Center and networks

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Component 2: Strengthening of Veterinary Services

Tools

- OIE Standards on the quality of Veterinary Services
- OIE PVS Tool
- Linking of PCP-FMD stages to the OIE PVS levels of Critical Competencies

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Financial implications (first 5 years) (in USD as calculated by the World Bank)

-Cost of national FMD programmes for 79 initial 0-2 Stage countries:	68 M
- Vaccination cost for 45 initial 1-3 Stage countries (excluding India and China):	694 M
- Regional level (ref. lab and epidemiology support and networks)	47 M
- Global level (coordination, evaluation)	11 M

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Component 3: Prevention and Control of other major diseases of livestock

Tools

- PCP
- PVS Pathway
- World Organization for Animal Health (OIE) standards, guidelines and recommendations for other TADs than FMD
- Disease-specific diagnostic laboratories, Reference centers, Regional and international networks

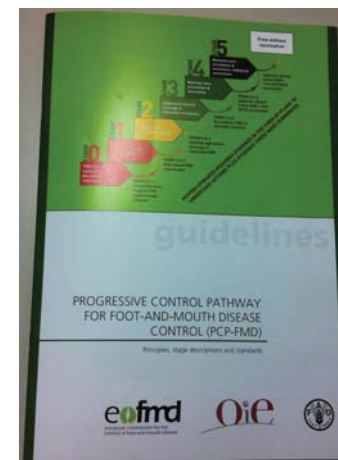
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West Eurasia as an example

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PCP-FMD

- Progressive Control Pathway for FMD (PCP-FMD) as a tool for FMD Control (Component 1)



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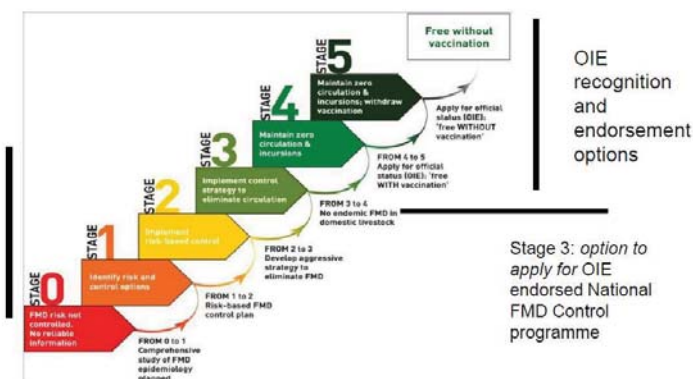
2012 Roadmap - provisional

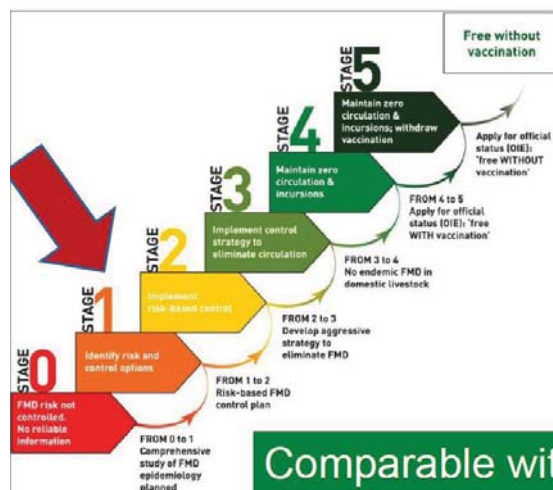
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Kazakh			1	1	1	3	3	3	4	4	5	5	5
Kyrgyz			0	0	1	2	2	3	3	3	4	4	5
Tajik			1	1	1	2	2	2	2	3	3	3	3
Turkmen			0	0	1	2	2	2	3	3	3	3	3
Uzbek			0	0	1	2	2	2	3	3	3	3	3
AFG			1	1	2	2	2	2	3	3	3	3	4
IRN			2	2	2	2	2	3	3	3	4	4	4
PAK			1	1	1	2	2	3	3	3	4	4	4
East Anatolia (TR)													
Thrace (TR)													
Marmara Aegean (TR)													
Central Anatolia (TR)													
Syria			1	1		3	3	3	4	4	4	4	5
Iraq													
Armenia			2	2	2	2	3	3	3	4	4	4	4
Azerbaijan			2	2	2	2	3	3	3	3	4	4	5
Georgia	pending		1	1	1	2	2	3	3	3	4	4	5

2011: One Framework –
from endemic to free without vaccination.
In achievable Stages.

Getting started:

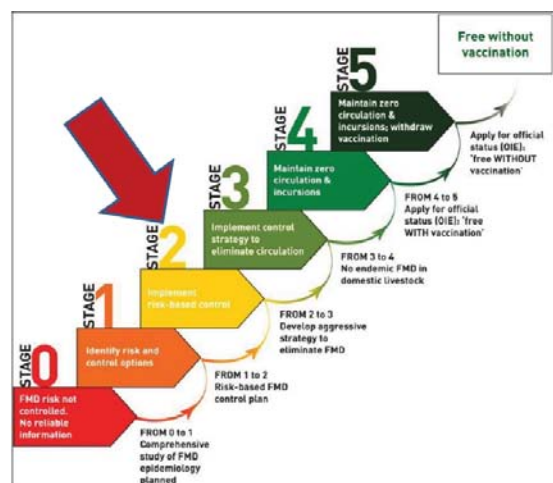
Policy ,
Strategy,
Implementation
Monitoring
Evaluation





PCP Stage 1 Focus: “To gain an understanding of the epidemiology of FMD in the country and develop a risk-based approach to reduce the impact of FMD”

Comparable with Risk Assessment



PCP Stage 2 Focus: “To implement risk based control measures such that the impact of FMD is reduced in one or more livestock sectors and/or in one or more zones”

Comparable with sector level Risk Management

2012 Roadmap 2010 Roadmap

	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Kazakh	1	1	3	3	3	4	2	2	2	2	3	3
Kyrgyz	0	1	2	2	3	3	1	1	2	2	3	3
Tajik	1	1	2	2	2	2	1	2	2	2	3	3
Turkmen	0	1	2	2	2	3	1	1	2	2	3	3
Uzbek	0	1	2	2	2	3	1	1	2	2	3	3
AFG	1	2	2	2	2	3	1	2	2	2	3	3
IRN	2	2	2	2	3	3	2	2	3	3	3	4
PAK	1	1	2	2	3	3	1	2	2	2	3	3
East Anatolia (TR)	2	2	2	2	2	2	2	2	2	2	2	2
Thrace (TR)	4	4	4	4	5	5	4	4	4	5	5	5
Marmara Aegean (TR)	2	2	2	3	3	4	2	2	3	3	3	4
Central Anatolia (TR)	2	2	2	2	2	2	2	2	2	2	2	3
Syria	1		3	3	3	4	2	2	3	3	3	4
Iraq							back internal no bg.jpg					
Armenia	2	2	2	3	3	3	2	2	2	3	3	3
Azerbaijan	2	2	2	3	3	3	2	2	2	3	3	3
Georgia	1	1	2	2	3	3	2	2	2	2	3	3

Other Example

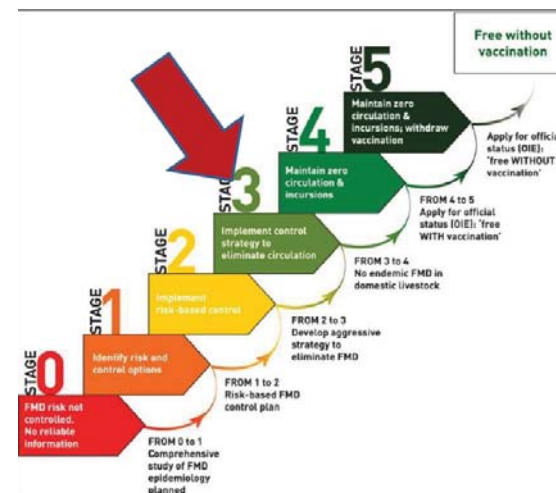
- Eastern Africa
- SAARC



Assessment of Progress

Principle of Assessment

- Based on PCP Guidelines
- Transparent, Evidence-based
- Consistent: regionally and globally
- Not too arduous



PCP Stage 3 Focus:

“Progressive reduction in outbreak incidence, followed by elimination of FMD virus circulation in domestic animals in at least one zone of the country”

Comparable with population level Risk Management

Tool 1: Self Assessment



- Formal assessment procedure by Global FMD WG
 - Questionnaire (yearly basis)
- Enable PCP-Gap Analysis
- Enable review/revision of forecast progress
- Yearly completion recommended

PCP Stage 4 and 5

OIE - endorsed official FMD control programme

Endemic  Free



Self-assessment tool developed and managed by FAO, supported by OIE

Official procedures developed and managed by OIE



Key recommendation from the second Global FMD Conference



- FMD being recognized by countries as high priority disease that should be tackled globally in a simultaneously manner
- Possibility to control FMD with the existing means a methods
- Roles and services of reference laboratory as a key support to the success
- Regional approach as key for control of FMD and other major TADs.

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Tool 2: External Assessment



- Experts review with national authorities
- Country visit for technical assessment if requested by a country or considered necessary
- Reports and recommendations of the experts
- Comparison of progress on paper
- Year to year change
- Regional Meetings with opportunities for countries to cross-examine the progress

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Key recommendation from the second Global FMD Conference (cont.)



- Applied research should be conducted to improve vaccines, diagnostics and the understanding of infection and transmission mechanisms, to develop better spread models and determine the presence of virus in products destined for commodity trade
- Regular GF-TADs regional and global Steering Committee meetings as well as regional roadmaps meetings be organized

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Regional Roadmap meeting = an opportunity to share and review progress



1. Complete PCP checklist prior to Regional Roadmap Meetings
2. Come to the meeting with evidence of progress
 1. Country presentation
 2. Reports, strategic documents
3. At conclusion of the meeting, a **provisional PCP stage** will be assigned
4. Further evidence may be requested
 1. Examination of document (dossier)
 2. Mission to the country

* **Provisional PCP Stage Assignments to be endorsed by GF-TADs regional and global committees***

THANK YOU FOR YOUR ATTENTION

FMD situation in Mongolia



Resent situation and prevention and control of FMD in Mongolia

Government Implementation Agency For
Veterinary and Animal Breeding, Mongolia

ALTANGEREL KHUKHUU
Veterinary officer

Transboundary animal disease status in mongolia

Disease	Last case	Status
FMD	April, 2010	infected
Rinderpest	Dec. 1991	Infection free May 2005
CBPP	1973	Under surveillance
Sheep pox	Jan. 2007	infected
Goat pox	Oct 2008	infected
Avian Influenza	2005, 2006, 2009, 2010, 2011	Cases in wild bird, but not in domestic

Outline

- ✦ FMD situation in Mongolia
- ✦ Disease control and prevention in Mongolia
- ✦ FMD free zone

Number of culled livestock, by species (2000-2010)

Year	Camel	Cattle	Sheep	Goat	Pig	Total
2000	54	552	152	158	0	916
2001	4	1159	16	20	2	1201
2002	0	435	46	4	0	485
2003	0	0	0	0	0	0
2004	0	2072	157	88	0	2317
2005	0	186	28	21	0	235
2006	0	4	20	0	0	24
2010	10	6730	13495	5698	0	25933
Sum	68	11138	13914	5989	2	31092

Recent fmd outbreaks in mongolia (2000-2010)



Outbreaks of FMD in 2010



A total of 25,933 livestock have been destroyed, out of which 17,249 in Sukhbaatar province, 7,390 in Dornod province, 191 in Khentii province, 1,030 in Tuv province and 73 in Gobi-Sumber province (100 per cent culling of infected livestock).

Timing and number of FMD outbreaks from 2000-2010

Year/month	2000	2001	2002	2003	2004	2005	2006	2010	Total
January								0	
February		19		13				32	
March		4		5				9	
April	1	1		2		1	1	5	
May	1	1						2	
June								2	
July			3					3	
August					1		2	3	
September								10	10
October								1	1
November								8	8
December								1	1
TOTAL	2	25	3	0	20	1	1	26	76

TAD CONTROL MANAGEMENT AND RESOURCE

Veterinary Service, MoFA

- Disease diagnosis and confirmation
- Work out control strategies in accordance with OIE rules and specificity of livestock husbandry system at different geographical zones
- Implementation of control measures

Emergency Management Agency

- Harmonize all control actions in line with MoFA and SSIA guidance
- Mobilize forces of military, police and civil contingency
- Assign required funds for control
- Assist local authorities in disease control activities

State Specialized Inspection Service

- Issue degree of designating the quarantine zones
- Inspection over implementation of control measure

Disease control and prevention in Mongolia

FMD control strategy

Creation of Control zone

This includes outbreak zone, buffer zone, vaccination zone, and healthy zone

Quarantine activities

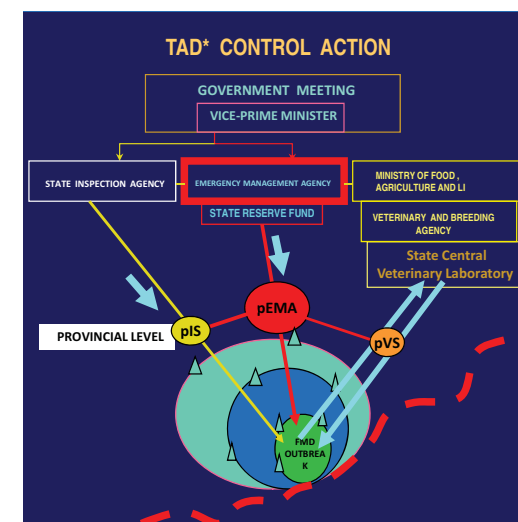
Control and quarantine of livestock, livestock products, human and traffic movements

Stamping out (optional)

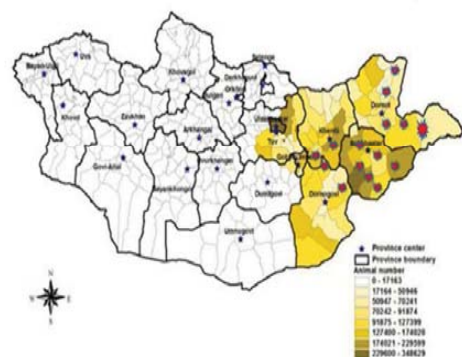
The compensation for stamping out is calculated to equal 90% of the livestock market price

Vaccination: Force vaccination without any fees

Other activities: Training and awareness raising, interdepartmental collaboration and preparedness



FMD outbreaks in 2010 and emergency vaccination area



FMD VACCINE

No	Name	Country	Registration
1	Aluminum hydroxide, inactivated vaccine, I, (O, A, N, Asia 1, NAO-1,2,3)	Russia	089
2	Oil adjuvant, inactivated vaccine subtype O, A, Asia-1, AFTOVAXPUR,	Merial French	0180
3	Aluminum hydroxide, inactivated 2 and 3 valent vaccine, AFTOVAX	Kazakhstan	0181
4	Aluminum hydroxide, inactivated vaccine, I	China	0267
5	Oil adjuvant, inactivated vaccine subtype O, A, Asia-1	India	0223
6	Oil adjuvant, inactivated vaccine subtype O, A, Asia-1	Russia	0359

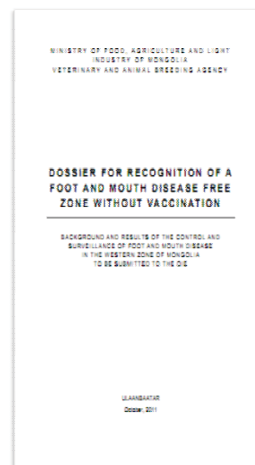
FMD strategic vaccination in 2011



Immunization of susceptible species in 2000-2011 (1,000 head)

Year	Province	Sum	Camel	Cattle	Sheep	Goat	Pig	Total
2000	1	11	32.4	75.9	430.8	375.3	0.024	914.3
2001	11	102	95.2	1377.1	5812.4	2801.1	16.2	10272.2
2002	13	104	158.9	1446.2	7459.0	5022.4	23.7	14265.7
2003	10	85	143.5	814.9	4226.0	3896.9	4.1	10110.1
2004	9	75	54.1	340.0	2627.4	1436.0	0.08	4457.6
2005	10	61	99.9	295.3	1839.1	2133.0	0.0	4367.2
2006	6	64	108.4	433.9	1472.8	943.1	24.6	2982.8
2007	6	65	140.5	426.1	1577.1	1211.3	8.2	3363.2
2008	8	72	104.6	454.5	2152.6	2310.0	0.0	5021.7
2009	4	49	93.3	299.3	584.8	583.3	0.0	1560.7
2010	7	71	28.1	506.3	3583.6	2601.4	2.1	6720.9
2011	10	97	69.0	1085.4	6102.57	4662.4	30.1	12147.9
Total	92	821	1102.3	7399.5	35721.6	25502.3	109.1	69598.4

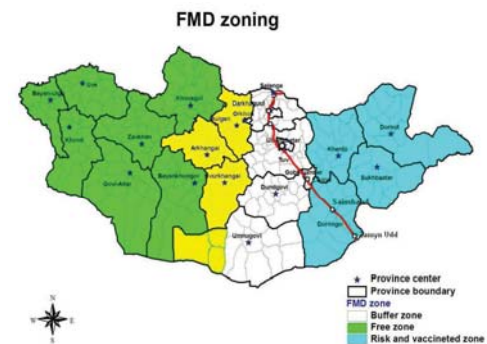
**FMD free zone,
without vaccination**



FMD free zone

**THANK YOU
FOR YOUR ATTENTION**

Government building-11
G.Sambuu street-11, Chingeltei district-4
Ulaanbaatar – 15141, MONGOLIA
Tel: +976-51-261640
Fax: +976-51-261635
e-mail: vetsermongolia@magicnet.mn



Summary of FMD Outbreak in Miyazaki, 2010



Country presentation from Japan

*Dr. Noriyoshi Ojima
Deputy Director
Animal Health Division
Ministry of Agriculture, Forestry and
Fisheries
Japan*

Outbreaks of FMD in 2010

<2010 Outbreak >
20 April to 4 July
Miyazaki Prefecture

292 farms, 211,608 animals

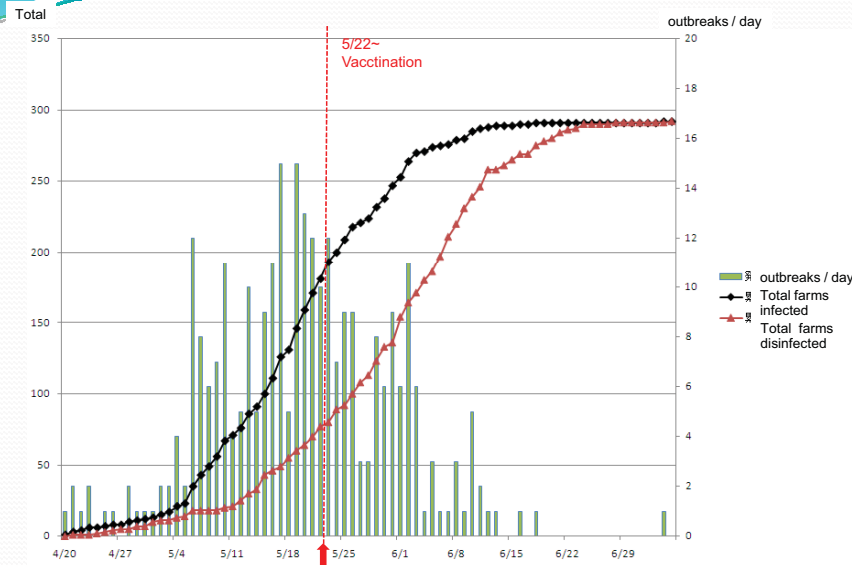
Cattle: 37,454
Swine: 174,132
Goat: 14
Sheep: 8



Contents

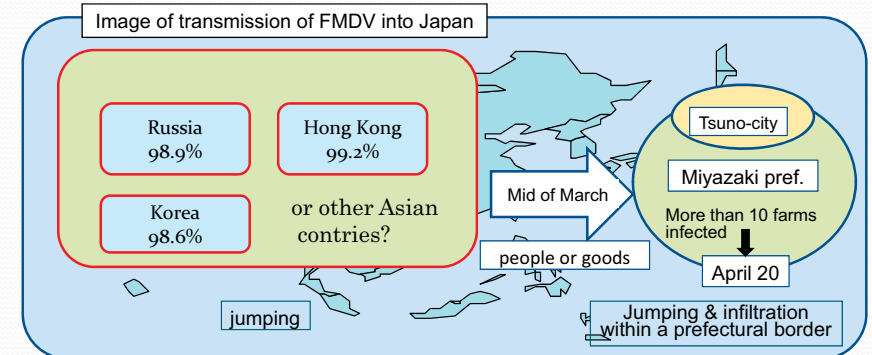
1. FMD outbreak in Miyazaki 2010
2. FMD outbreak response measures
3. Post-outbreak activities
4. National Strategy for FMD Prevention and Control

Number of outbreaks / Completion of control measures



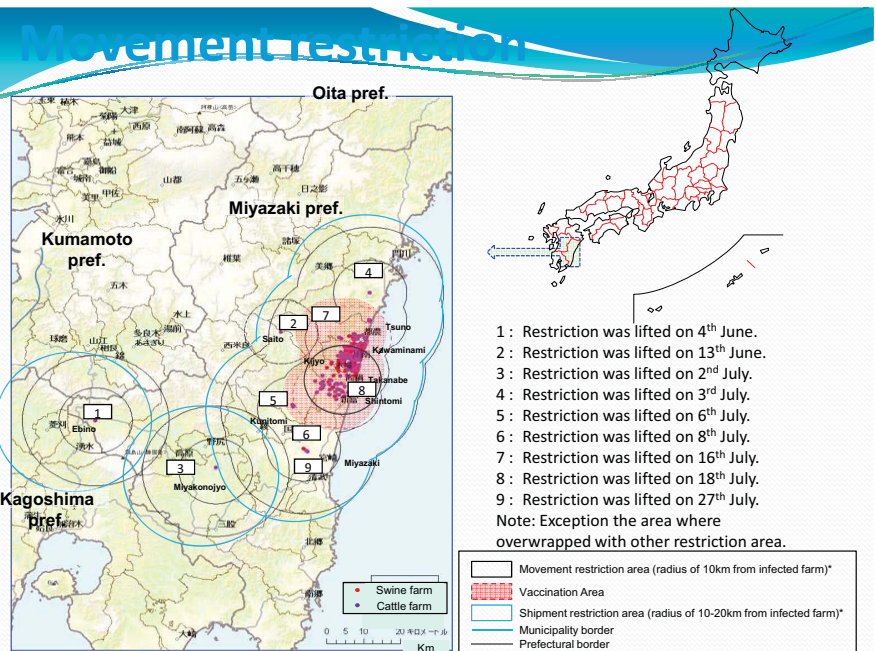
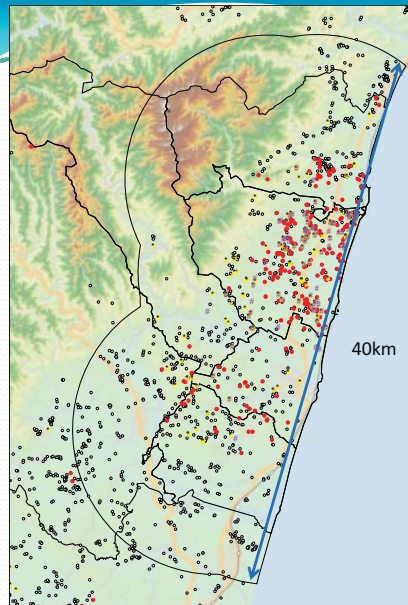
Incursion of FMDV into Japan

- The isolated viruses in Japan are closely related to ones that were isolated in Hong Kong (99.2%), Russia (98.9%), Korea (98.6%) in 2010.
- Movements of people or goods from other Asian countries may have caused the transmission, but identification of the cause is difficult.

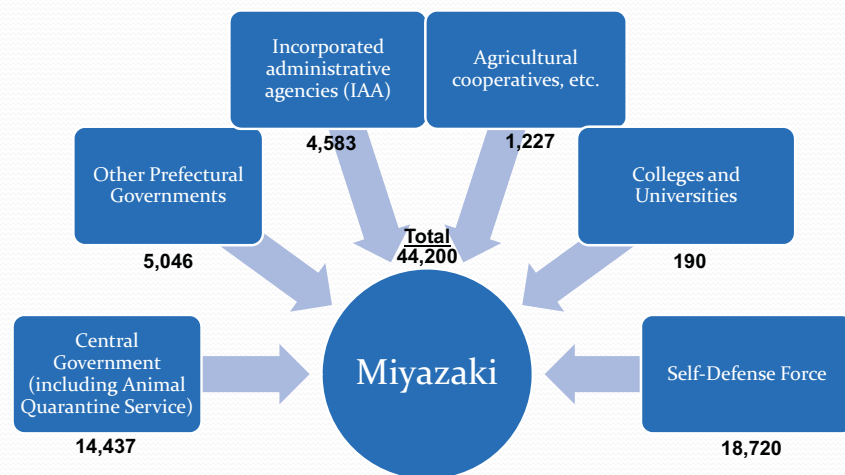


Vaccination

- All cloven-hoofed animals in the movement restriction zone in the Kawaminami area
- Oil-adjuvant killed vaccine against type O ($r1 > 0.5$)
- Destruction of the vaccinated animals



Many came and supported.



Numbers : supporters

Recovery of FMD Free Status

2010

5 Jul.



Control Measures for the last outbreak was completed.

6 Oct.



Submission of a dossier to the OIE

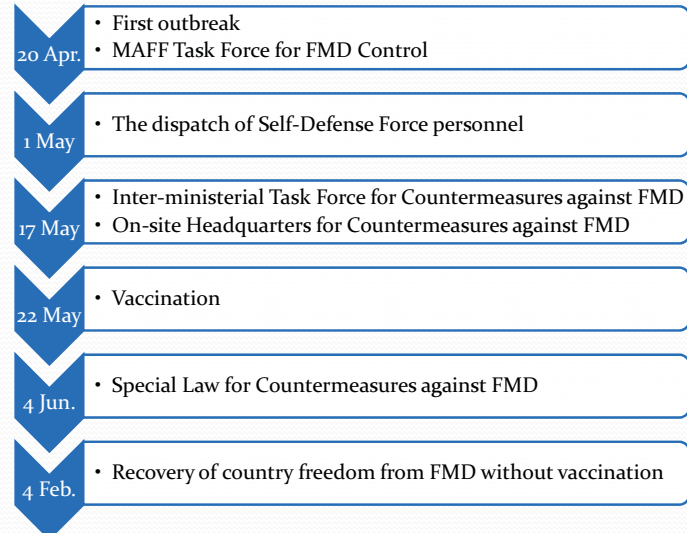
4 Feb.

Recovery of FMD free status without vaccination by the OIE

FMD outbreak response measures

- Stamping out policy
- Movement control
- Emergency vaccination
- Full compensation

History of countermeasures



Post-outbreak activities

- FMD freedom surveillance
- The final FMD freedom surveillance
- Wildlife surveillance

Organizations responsible for FMD prevention and control

- Local veterinary service centers of prefectural government
- Animal Health Division in MAFF
- National Institute of Animal Health (NIAH)
- Task Force for FMD Control in MAFF
- Animal Quarantine Service in MAFF

National Strategy for FMD Prevention and Control

- Guidelines for Control of FMD (GCFMD)
- Established in 1965 and significantly amended in 2004 and 2011
- The purposes are to maintain FMD free status as well as to ensure early detection and rapid response to control FMD and to recover its free status.

National Reference Laboratory

National Institute of Animal Health





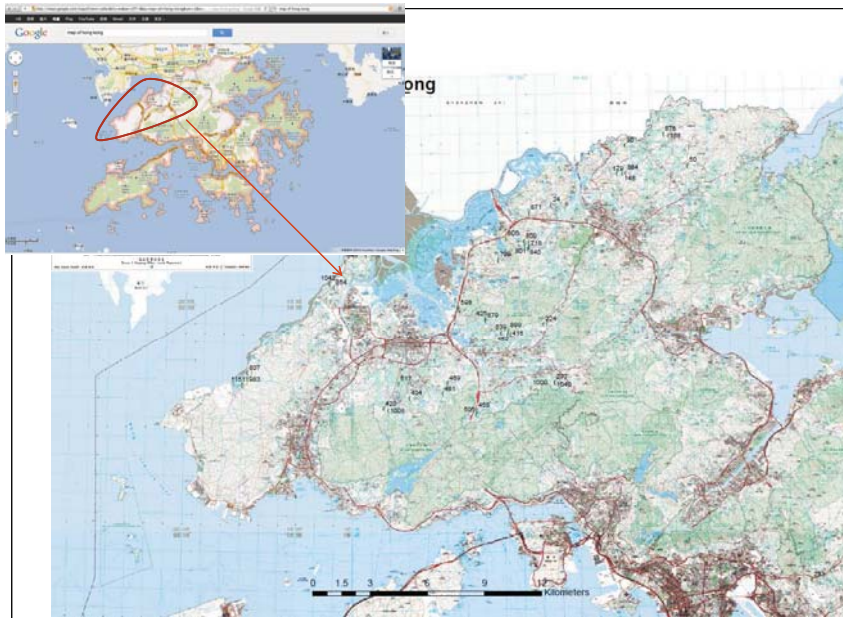
Thank you for your
attention !

Lessons learnt from FMD event in 2010

- Coordination was insufficient, which might cause unnecessary confusions.
- The biosecurity standards were not well followed by farmers and lack of concreteness.
- Early detection and early notification were not fulfilled.
- Preparations for control measures were incomplete.
- The emergency vaccinations were too late due to lack of compensation system.

Contents of GCFMD

- I. Basic policies
- II. Prevention and preparedness
- III. Detection of suspicious cases and investigation
- IV. Confirmation of the cases
- V. Immediate response
- VI. Control measures at the infected farms
- VII. Control and block of the traffic
- VIII. Movement and shipment restriction
- IX. Control of livestock gathering facilities
- X. Establishment of disinfection station
- XI. Surveillance
- XII. Precutational killing
- XIII. Vaccination
- XIV. Re-introduction of livestock
- XV. Epidemiological survey



Foot and Mouth Disease Hong Kong Situation Update

Dr. Esther TO
Veterinary Officer
Animal Management Division
Agriculture, Fisheries and Conservation Department
10 August 2012

Local control

- Local farms visited at least on a monthly basis
- One farm a day
- Passive surveillance



Background

- Hong Kong currently has 43 pig farms
- A total population of 8000-9000 pigs
- Small to medium sized farms
- FMD is endemic in Hong Kong



FMD in Hong Kong

- FMD is a notifiable disease in Hong Kong under Cap 139B Public Health (Animals and Birds) Ordinance
- Report to OIE



Import control

- All pig breeding stocks are imported from the Mainland

Year	2010	2011	2012
Total Quantity (head)	1477	1281	630

Disease status

Year	2010	2011	2012
No. of cases	4	3	1
Location	New Territories	New Territories	New Territories
Species/Serotype	Pig/FMDV-O	Pig/FMDV-O	Pig/FMDV-O

Import control

- Certified that the imported pigs were free from FMD in the last 12 months
- Quarantine period for breeding pigs on local farm is 28 days after importation.



Post Outbreak Investigation

- Sampling
- Serotyping of field strain
- Education and advice for farmers
- Vaccine recommendations based on vaccine matching results from Institute for Animal Health (IAH) Pirbright

Control strategy

- Since FMD is endemic in Hong Kong, there is no specific strategic plan for the eradication of FMD
- Currently, we rely on vaccination and biosecurity to prevent and control FMD



Status

- The current vaccine (Serotype O) and vaccination practice (mass vaccination) is effective in the control and prevention of on farm FMD outbreaks

Outbreak

- Disease diagnosis
 - Samples (vesicular epithelium or vesicular fluid) will be taken and submitted to Tai Lung Veterinary Laboratory
 - In case of dead pig, carcass will be submitted for necropsy
- Mass vaccination with Serotype O
- Biosecurity advice
 - Movement and access control
 - Foot baths etc.

Constraints

- HK market is very small and vaccine manufacturer has low interest in supplying vaccine
- No downtime and mixed sources in the slaughterhouse
- Disinfection facilities and infrastructure of the slaughter house will need improvement
- Movement of pigs and dealers' vehicles between slaughter house and local farms increased the chance of cross contamination

Thank You

National Strategic Plan

- **The plan:**

- In accordance with the law and regulation:

- Statute for Prevention and Control of Infectious Animal Disease. (law)
- Regulations on Management of Vaccine Types for HC and FMD Elimination.

- The goal:

- First stage: FMD free country with vaccination.
- Second stage: FMD free country without vaccination.

2012/08/14

3

National Strategy for FMD prevention and control

Yang Wen-Yuan

2012.08.14



Bureau of Animal and Plant Health Inspection and Quarantine

2012/08/14

1

National Strategic Plan

- **Content:**

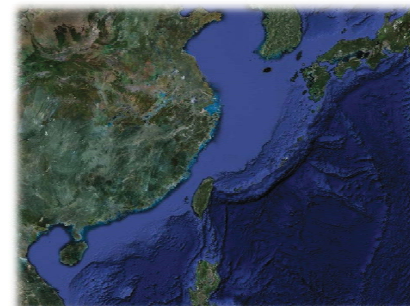
- Disease reporting.
- Blanket Vaccination.
- Surveillance.
- Preventive measures.
- Emergency response and control measures.
- Stockpile.

2012/08/14

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Outline

- National Strategic Plan
- Constraints
- Suggestions



2012/08/14

2

Blanket Vaccination

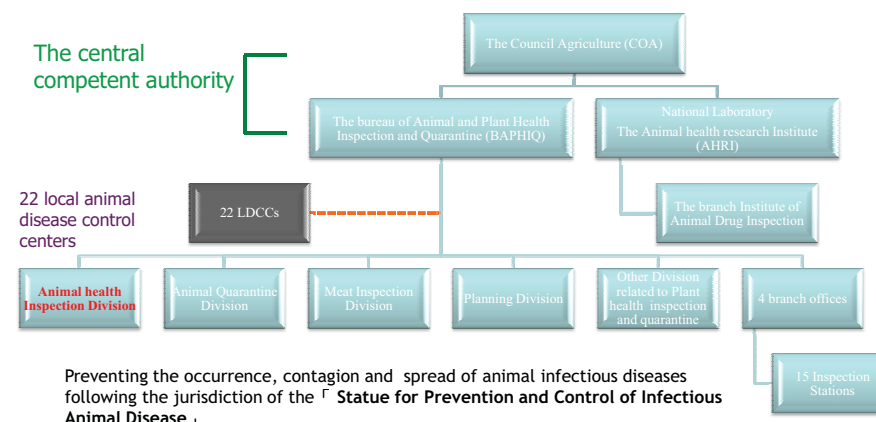
• Compulsory mass vaccination

- Empowered by Statute for Prevention and Control of Infectious Animal Disease.
- All cloven-hoofed animals shall be vaccinated with FMD vaccine.
- O Taiwan and O manisa strain vaccines (at least 6 PD₅₀) are used (IM route).
- The owner or keeper will be fine NTD 10,000-50,000 (USD 333-1667) for the violation.



2012/08/14

Framework of VS system



2012/08/14

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Blanket Vaccination

• Vaccination programme

- Empowered by Regulations on Management of Vaccine Types for HC and FMD Elimination.
- Pigs:
 - One dose is given at 12-14wks age and another one is vaccinated once half a year.
- Ruminants (cattle, goats and deer):
 - Basic vaccination shall be done at 4 and 12 months age respectively. Then the other one dose is given once a year.
- The vaccine is partly subsidized by the government (2 NTD/dose) to encourage the farmers follow the programme.

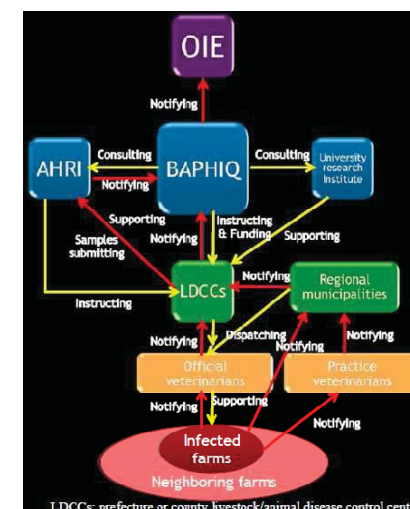
0.07 USD/dose
0.45 USD/dose

2012/08/14

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Disease Reporting

- Reporter:
 - Owners and keepers of animals.
 - Veterinarians
 - Officers for animal disease control.
- Time:
 - Animals suffering from or suspected of infectious diseases.



2012/08/14

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Surveillance

• On farm active surveillance

- Clinical inspection.
- Serological testing.
 - Stratified random sampling.
 - 95% probability.
 - 20% prevalence.
 - 600 pig farms/yr.
 - 300 ruminant farms/yr.
 - 15 serum samples/farm.



2012/08/14

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Surveillance

• Active Surveillance

- To evaluate the efficacy of blanket vaccination.
 - SN titer expression.
 - $\geq 16x$ in pigs.
 - $\geq 32x$ in ruminants.
- As a precaution action to detect possible viral activity in the field.
 - NSP antibody.

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Surveillance

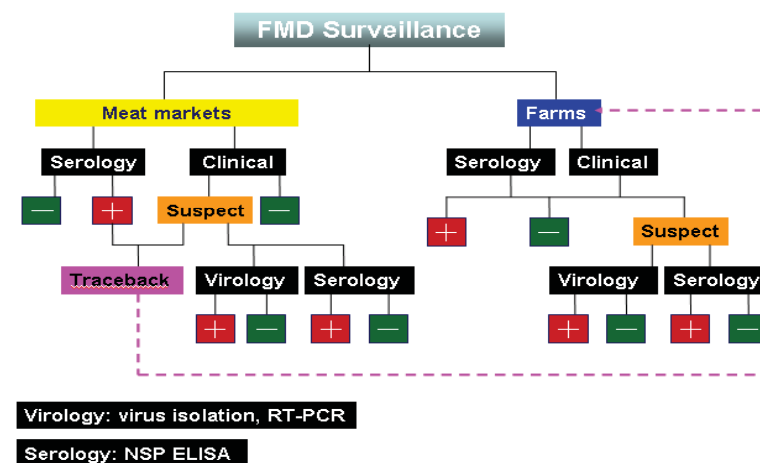
• Active surveillance on meat markets

- Clinical inspection .
- Serological testing.
 - On a daily basis.
 - At least one animal per original farm is randomly selected.
- Clinically suspected case shall be traced back to the original farm to conduct movement restriction and follow-up testing.
- The original farms with positive NSP antibodies shall be movement restricted and taken samples for follow-up confirmatory testing.

2012/08/14

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Surveillance



2012/08/14

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Preventive measures

• Disinfection in meat markets and slaughterhouses

- Vehicles control, in-and-out disinfection.
- Routine cleaning and disinfection of establishment and facilities.
- Supervised by LDCCs and veterinary meat inspectors.



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Surveillance

• Passive surveillance:

- To control and response any suspected case in the moment.
- Reported case.
- Vesicle fluid, blood and OP fluid samples are collected for further diagnosis.



2012/08/14

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Emergency Response and Control Measures

- Movement restriction on the infected farm.
- Clinical infected animals and their pen mates (exposed animals) shall be depopulated.
- Disposal of carcasses.
- Clinically healthy animals within the index farm shall be vaccinated.
- Surveillance of surrounding cloven-hoofed animal farms within 3 km radius area around the infected farm.

2012/08/14

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Preventive measures

• On-farm biosecurity

- Entry and out control.
- Personal and vehicle biosecurity.
- Routine cleaning and disinfection.
- Selective purchasing.
- Self monitoring.



2012/08/14

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Constraints

- Low biosecurity level of family farms or small scale farms and high difficulty to make these farmers to get the improvement.
- Small portion of farmers still not follow the vaccination programme to use vaccine. This part is regarded as high risk populations.
- Free range cloven-hoofed animal farms are hard to keep high coverage rate of vaccination.
- Decrease of resource and budget.

2012/08/14

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Emergency Response and Control Measures

- Other Serotype or virus strain of serotype O:
 - Quarantine area shall be defined.
 - 3 km radius area around the infected farm
 - Movement control of animals and products within the area.
 - Intensified surveillance.
 - The Quarantine and restriction would be lifted if the results of surveillance demonstrate zero viral activity or circulation.

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Suggestions

- More and constantly educations, awareness campaigns, on-site assistances and incentive measures would be conducted to encourage the owners and keepers to follow the vaccination programme, implement on-farm biosecurity, and report the disease instantaneously.
- Arrangement of contracted or official veterinarians to conduct the vaccination of animals within small scale farms and free range farms to make sure of well herd immunity.
- Surveillance on farms and livestock auction markets is the important risk control point. It's useful for evaluating efficacy of vaccination and monitoring the viral activity for early response.
- Making great effort to strive for the resources (budget) to deal with the matters and for emergency preparedness and response.

2012/08/14

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Stockpile

- **Vaccine and antigen bank**
 - Serotype: A, Asia-1 and O.
 - Commercial vaccine bank:
 - Monovalent.
 - 100,000 doses for each serotype.
 - Antigen bank:
 - Monovalent .
 - 750,000 doses for each serotype.

2012/08/14

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2012/08/14

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FMD situation in China



1. 2010

- ❖ Type O :
 - 18 outbreaks in 9 provinces
 - infected:3983, died:26, destroyed:29193
- ❖ Type A :
 - 2 outbreaks in Xinjiang
 - infected: 54, destroyed: 206
- ❖ Type Asia I:
 - no case

Country Report



Ma Jihong
China Animal Disease Control Center
2012-08-13

FMD situation in China



2. 2011

There were 7 FMD outbreaks in 5 provinces in China. 823 animals infected, 45 died and 7753 culled.

Serotype	O	A	Asia-1	Total
No. of outbreak	7	0	0	7
No. of animal infected	823	0	0	823
No. of animal died	45	0	0	45
No. of animal culled	7753	0	0	7753

Outline of Presentation



- 1 FMD situation in China
- 2 Present Control Strategy
- 3 Constrains
- 4 Future activities



FMD in Chinese mainland (Jan to Feb 2012)



- FMD O
- FMD A
- FMD Asia-1



FMD in China (Jan 2011 to Dec 2011)



- FMD O
- FMD A
- FMD Asia-1

FMD situation in Chinese mainland



Year	No. of outbreaks	No. of animal infected	No. of animal culled
2005	10 (Type Asia I)	612	4744
2006	17 (Type Asia I)	836	2424
2007	8 (Type Asia I)	157	1077
2008	3 (Type Asia I)	123	464
2009	8 (Type Asia I)	217	918
	7 (Type A)	572	13260
2010	2 (Type A)	54	206
	18 (Type O)	3983	29193
2011	7 (Type O)	823	7753
2012-Now	2 (Type O)	28	129
Total	82 (46 for Type Asia I, 9 for Type A and 25 for Type O)	7405	60168



FMD situation in China



3. 2012年(Jan-Jul)

There are 2 outbreaks in Hubei and Ningxia province in China. 28 animals infected, 129 culled.

Serotype	O	A	Asia-1	Total
No. of outbreak	2	0	0	2
No. of animal infected	28	0	0	28
No. of animal culled	129	0	0	129



Compulsory vaccination

- all pigs shall be vaccinated against FMD Type O.
- all cattle, sheep/goats, camels and deer shall be vaccinated against Type O and Asia I.
- all dairy cattle and breeding bulls shall be vaccinated against Type A.
- the cattle and sheep/goats in border areas of Guangxi, Yunnan, Tibet, Xinjiang and Xinjiang Production and Construction Corps shall be vaccinated against Type A.

In 2011, a total of 2.82 billion ml of FMD vaccine was used. Results from field inspection and lab tests show that FMD vaccination coverage in China has exceeded 90% in recent years, with the rate of effective vaccine-induced antibody level outperforming the national standard.



FMD situation in China

- ❖ Serotype A
 - No outbreaks in the past 28 months
- ❖ Asia-1
 - No outbreaks in the past 37 months



vaccines production (2011)

FMD vaccines (strains)	Purpose	Annual production (2011) (0,000 dose)	production process
Swine FMD (type O) inactivated vaccine	Prevention of type O in pigs	58,795.24	suspension culture or roller bottle culture
Swine FMD (type O) inactivated vaccine (MYA/98)		52,222.65	
Swine FMD (type O) synthetic peptide vaccine		59,042.23	
FMD (Type O and Asia-I) bivalent inactivated vaccine	Prevention of type O & Asia I in cattle, and sheep/Goats	65,978.18	
FMD (Type A) inactivated vaccine	Prevention of type A in cattle	6,966.50	



Present Control Strategy

- ❖ Policy of overall vaccination, with costs shared by central and local budgets.
- ❖ In case of clinical cases at vaccination failure, cull infected animals at infected site, and take measures such as vaccination boosting and movement control in the buffer zone.



Constraints



- ❖ **Difficulties in implementation of compulsory vaccination policy**
 - **A high percentage of backyard-farming animals**
 - **Outlying areas and sparsely-populated rural areas**
-



➤ Disease surveillance

- An improved veterinary lab network at central, provincial, and county levels, animal production and health work stations at township level, and animal health worker in every village;
 - 304 national animal disease surveillance and reporting stations in major animal farming areas, and 146 animal disease surveillance stations in border areas, to report the surveillance results directly to the competent national authority.
 - A BSL-3 National FMD Reference Laboratory, and FMD diagnostic technologies consistent with OIE methodologies; and
 - The National Animal Disease Surveillance Plan, comprising of national and local plans, to use both pathology surveillance and antibody surveillance.
-



Constraints



- ❖ **Long-distance transportation of live animals**
 - ❖ **Stability of veterinary services structure and veterinarians/veterinary para-professional team at grass-root level**
-



➤ Response process and measures upon outbreaks

- outbreak reporting
 - confirmation
 - blockade
 - culling
 - safe disposal
 - Removal of blockade
-

Future Activities



■ To improve the quality of veterinary services

- Joint-training with the OIE on PVS
- More trainings for staff of veterinary services at different levels
- More efforts to stabilize organizational structure and veterinary staff at grass-root level

Future Activities



■ To implement National Mid- and Long-term Plan on Animal Disease Prevention and Control launched in 2012

Comprehensive measures to control FMD

- Continue compulsory vaccination policy
- Utilize high potency vaccines
- Strengthen surveillance
- Cull diseased and infected domestic animals
- Apply regionalization/compartimentalization
- Adopt vaccination exit strategy in a stepwise manner, from some zones to the whole country and from serotypes A and Asia I to serotype O

Thank You !

Future Activities



■ To strengthen bilateral collaboration

- Timely sharing disease information
- joint scientific research on real-time diagnostic technology and vaccine development
- jointly monitoring FMD virus mutation
- To explore the possibility of controlling TADs together with bordering countries
- Conduct technical training, personnel exchange and academic communication.

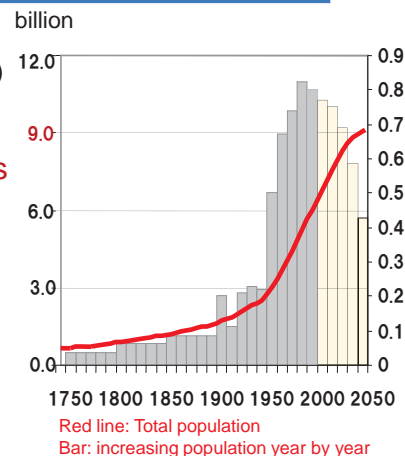
General Information of Asia

1. Human Population

World population 7.0 billions (2011.11)
More than 60% 4.2 billions in Asia

2. Populations of domestic animals (2007 FAO)

	World Population	Ratio of Asia
Cattle	1.38 billion	33.3%
Pigs	0.92 billion	58.5%
Sheep	1.09 billion	35.5%



3. Rapid Increase of economic activities in Asia Region

Active movements of people, animals, animal commodities

National Contact Person Workshop under OIE/JFT Project on FMD Control in Asia, Tokyo, Japan

August 15, 2012

Mechanism of FMD Outbreaks and its Control in East Asia

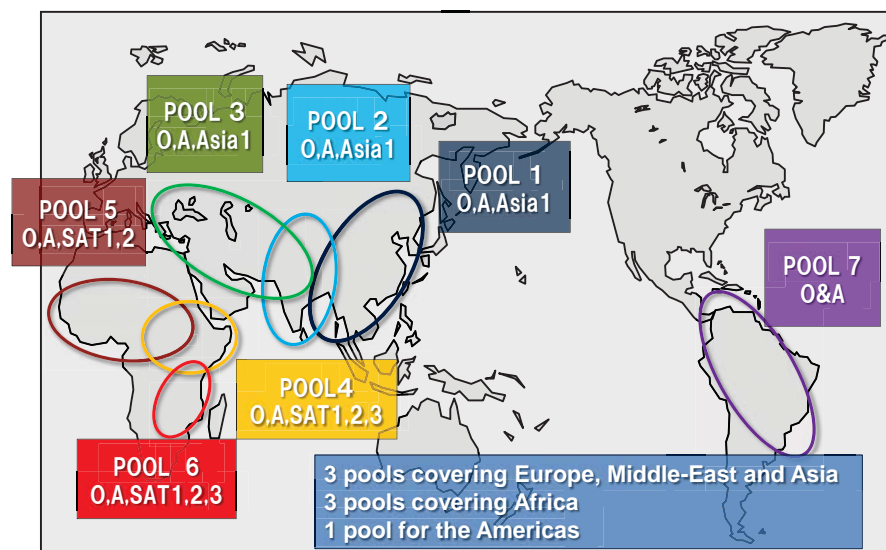
Exotic Disease Research Division
National Institute of Animal Health

6-20-1 Kodaira, Tokyo 187-0022, Japan

OIE Collaborating Center

Kenichi Sakamoto

Model of related FMDVs Distribution

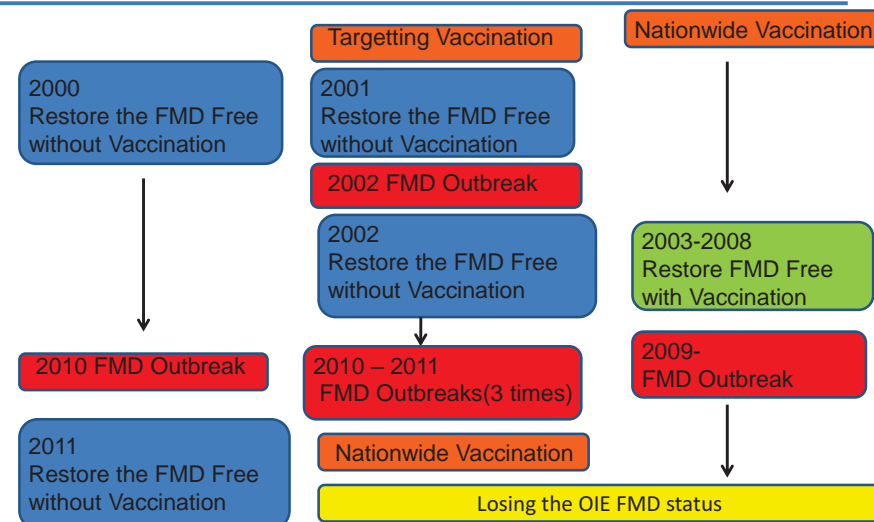


(OIE/FAO_WRLFMD, :OIE/FAO Global Conf. on FMD, Paraguay, 2009)

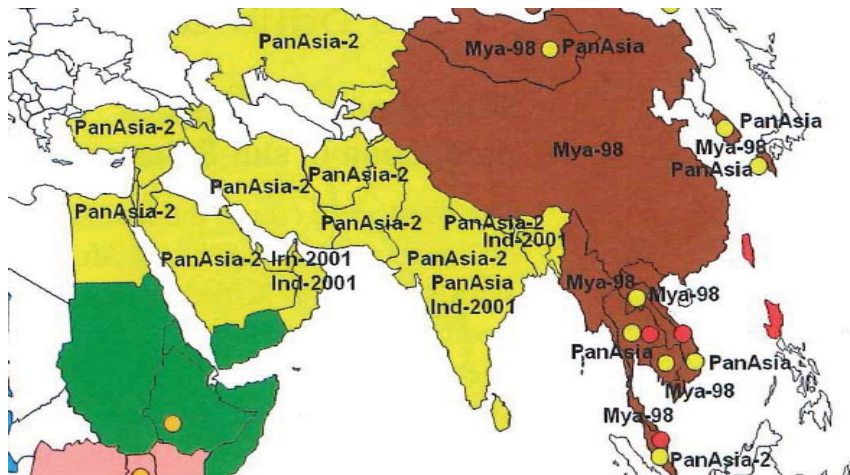
FMD Status of Japan, South Korea & Taiwan

● FMD Free countries without vaccination for long time until

Japan (2000 : for 98 years) S. Korea (2000 : 64 years) Taiwan (1997 : for 68 years)

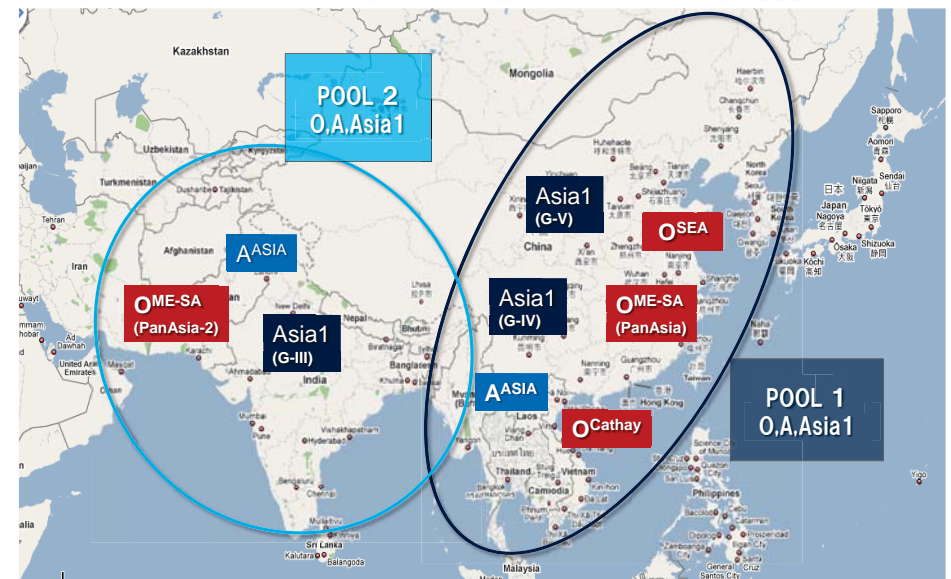


Distribution of Serotype O in the Asia



FMD virus in Asia

(Hammond et al. http://web.oie.int/eng/A_FMD2009/FMD_presentation/Session%202_1/2_1_1_Hammond.pdf)



FMD Type O in the region (2009-2011)

SEA topotype (Mya-98 lineage), Currently widely circulating in Asia. Lao PDR (2008-2009), Myanmar (2008-2009), Thailand (2009), Malaysia (2009), Hong Kong SAR (2010), China (2010). In East Asia the Republic of Korea (South Korea) (2010.4, 2010.11-2011.4), Japan (2010.4), Russia (2010.7), Mongolia (2010.8), The Democratic People's Republic of Korea (North Korea) (2010.12-2011).

CATHAY topotype
Vietnam (2008), Taiwan (2009-2011).

ME-SA topotype
Bangladesh (2009), Malaysia (2009), (PanAsia lineage). Bhutan, Bangladesh and Nepal (2010), (the O-Ind-2001 lineage). China (2011.3) (PanAsia lineage closely related to Vietnam isolates). Afghanistan, Iran, Pakistan and Turkey (O-PanAsia-2)

Unknown topotype
Kazakhstan (2011.5)

The recent characteristic of FMD outbreaks in the region

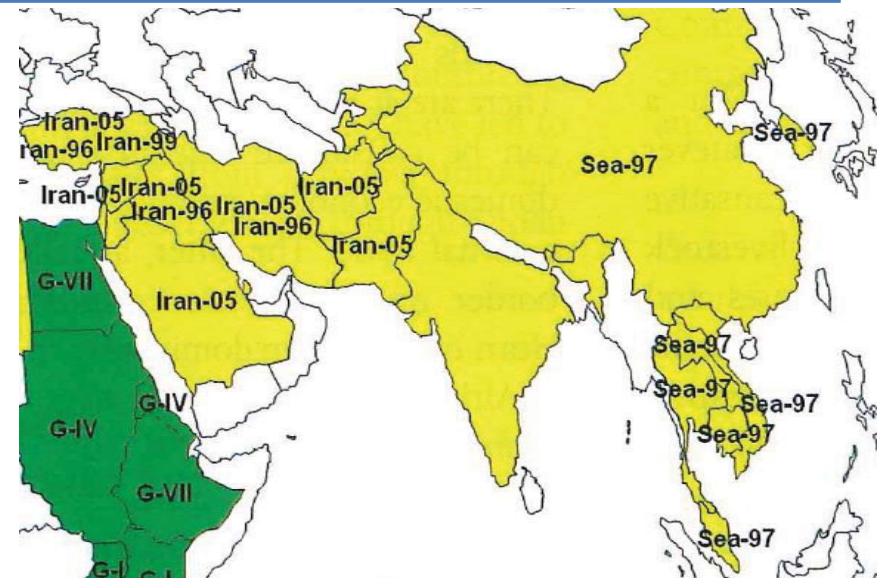
- The FMD **spreads more quickly** than before.
- FMD outbreaks are **predominantly caused by FMDV serotype O**.
- The two **main topotypes involved are South-East Asia (SEA) and Middle East – South Asia (ME-SA)**.
- FMDV of the **SEA topotype (Mya-98 lineage) is widespread in South-East Asia and East Asia**.
- The economic impact of FMD in East Asia (People's Republic of China, Japan and S. Korea) has been severe in 2010–2011.
- FMD outbreaks due to **serotype A have been sporadically observed in recent years**.
- Serotype **Asia 1 newly appeared** in Pakistan from 2010 and Bahrain and Iran in 2011.

Border between Malaysia and Thailand (Malaysia side)

A only shallow river exists in dry season there. The cattle does not wear any ear tags or any brand. They can cross this border without any inspections by animal quarantine services.



Distribution of Serotype A in the Asia



Cattle/Buffalo Trade vs. population and price

	Cattle (millions)	Buffalo (millions)	Import	Export	Comparative Unit Price Ranking	
Cambodia	3.34	0.72	-	+++	**	Moderate Low
Lao PDR	1.35	1.16	-	+++	**	Moderate Low
Malaysia	0.8	0.14	+++	-	*****	High
Myanmar	12.63	2.84	-	++++	*	Low
Thailand	9.34	1.58	++	++	***	Moderate
Vietnam	6.88	3	+++	-	****	Moderate High

FMD Type A, Asia 1, C in the region

Type A

FMD type A (ASIA toptype): wide circulation in the region. Lao PDR (2008), Thailand (2009), Vietnam (2008-2009), P.R. China (2009), the Republic of Korea (2010.1-3).

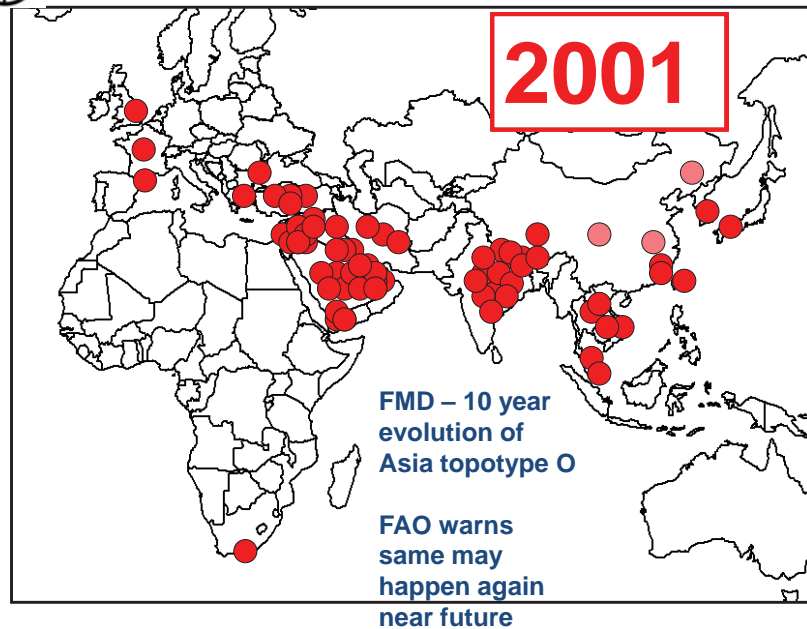
Myanmar (2010. 9), very close to the border with Bangladesh. By the phylogenetic analysis the virus was most closely related to viruses occurring in India in 2000.

Asia 1

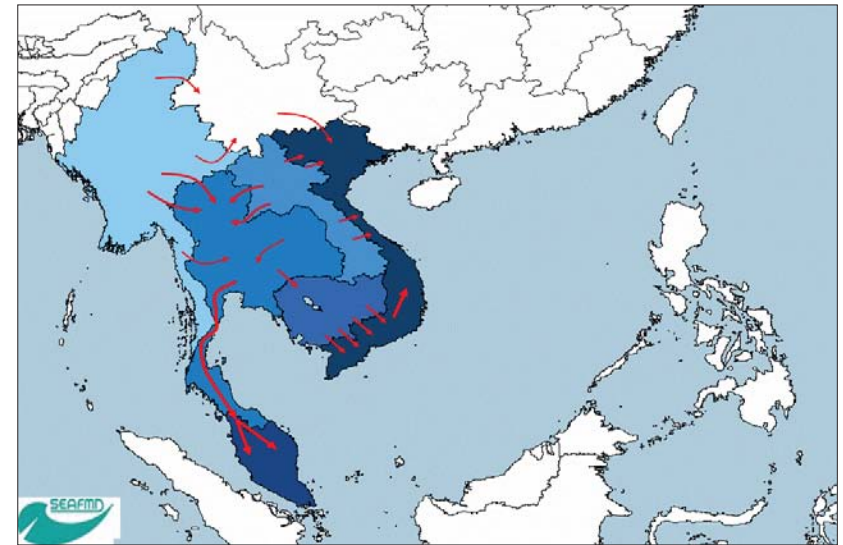
The recent appearance of new Asia 1, Pakistan (2010) Bahrain and Iran (2011).

C

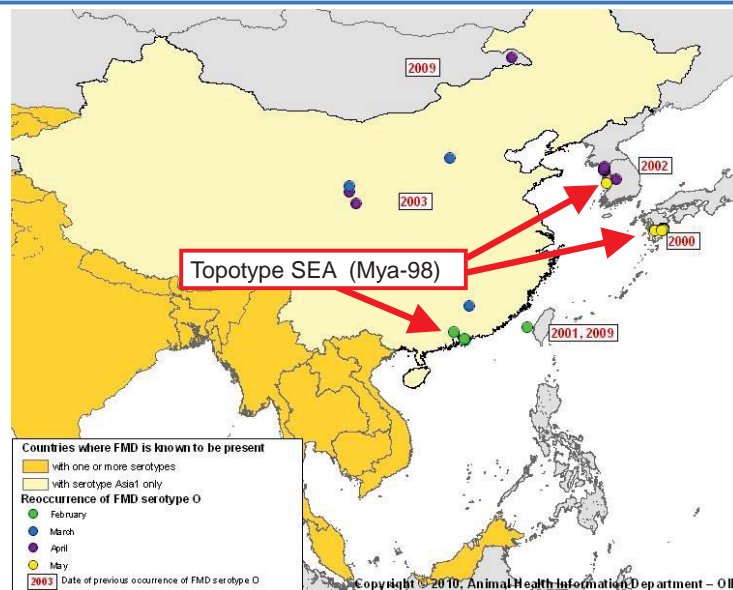
No outbreak in the region in 2009-2011



Cattle Movement in the region



Recent serotype O Outbreaks

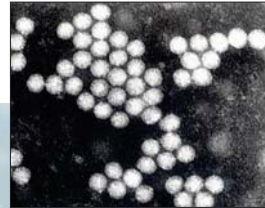


Recent FMD outbreaks in East Asia

- 1) 1997- **O: Cathay topotype:**
Taiwan (Nationwide) Illegal Movement of pigs from **China**
- 2) 1999-2002 **O: ME-SA topotype, PanAsia lineage:**
China, Taiwan, Japan, Korea, Amur region of Russia, Mongolia
- 3) 2005- **Asia 1:**
Hong Kong, **China**, Amur region of Russia, Mongolia, North Korea
- 4) 2009- **A: ASIA topotype, China**, South Korea
- 5) 2010-2011 **O, SEA topotype, Mya-98 lineage:**
China, South Korea, Japan, Amur region of Russia, Mongolia, North Korea

National Institute of Animal Health (Exotic Research Station)

BSL 3
FMD diagnosis
FMD research works



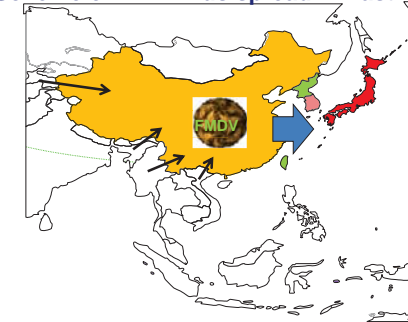
Mechanism of FMD spread in East Asia

China has the important role of the FMD outbreaks in East Asia

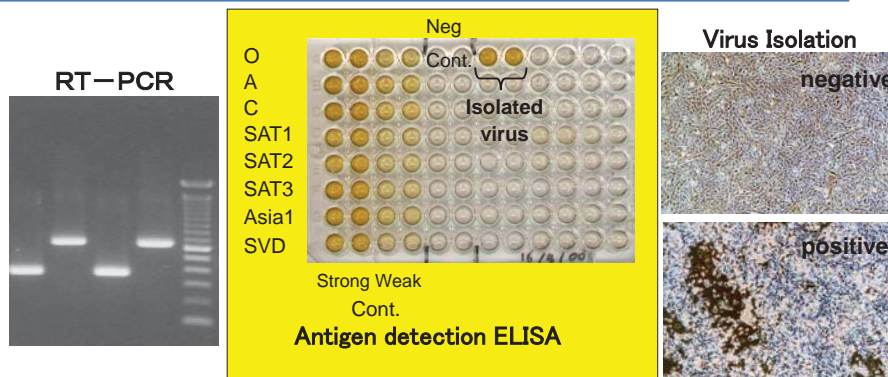
- 1) Long border with FMD epidemic countries in South East and Central Asia
- 2) Large numbers of susceptible animals (pigs, sheep, cattle)
- 3) Rapid increase of economic activities (A raising nation)
- 4) Active cross border movement of people and animal commodities

FMD (Epidemic countries) → China → East Asia countries

The Scheme of FMD virus spread in East Asia



FMD Diagnosis Methods in Japan



RT-PCR 2.5 ~ 6 hour

Antigen ELISA 4 ~ 6 hour

Virus isolation 2~7days

Consuming time for diagnosis

Antibody Detection

(in outbreaks and surveillances)

- LPB ELISA
- NT (in necessary)

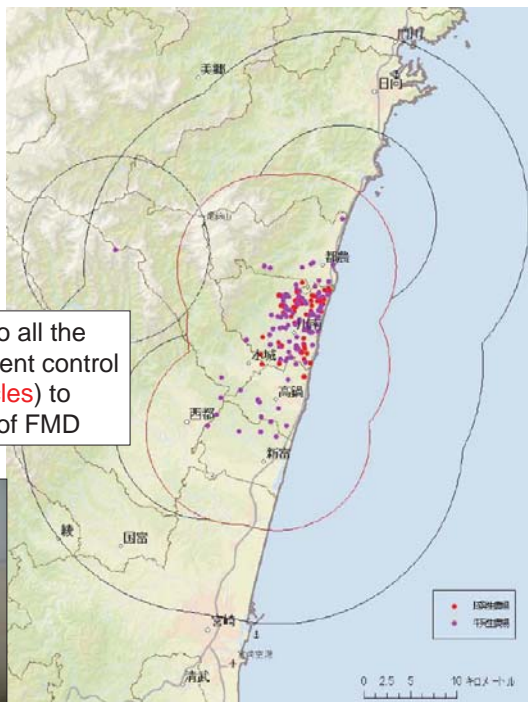
To reduce FMD outbreaks in the region

1. Sharing Disease Information in Asian Region (South East, Central and East Asia)
2. Early notification of the FMD to Member countries in the region and OIE
3. Strengthen the border control to prevent FMD virus entry
4. Scientific research collaborations of the FMD laboratories to control the disease among China, Japan, Korea and Taiwan
5. Technical support to South East Asian countries for diagnosis of FMD
6. Financial and economic supports to provide good matching FMD vaccines to SEA countries

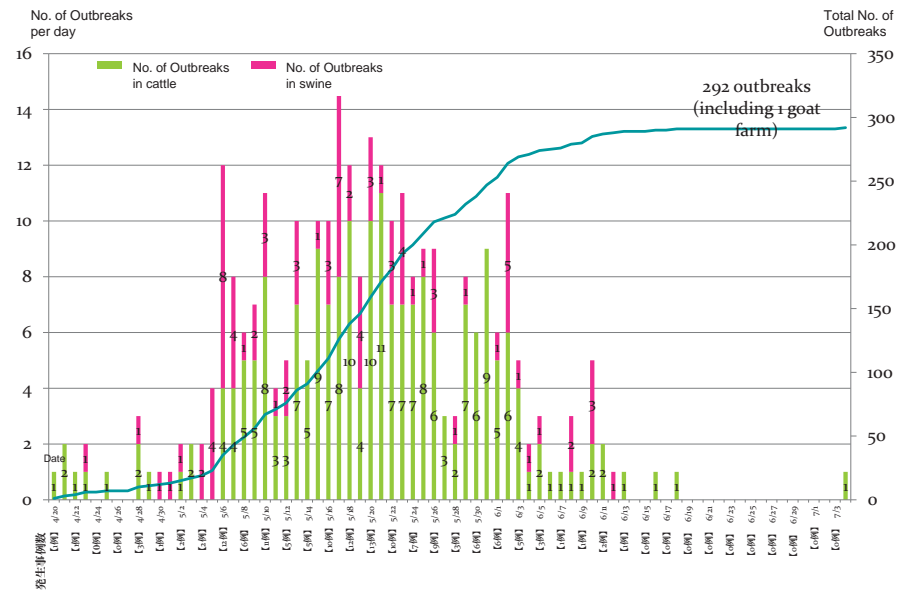
Cooperation and collaboration to control
FMD outbreaks in the region

May 22
Restriction Area
- 181 cases

Start vaccination to all the animals in movement control region (in Red circles) to control the speed of FMD



Number of outbreaks (Cattle and Swine)



First time Vaccination in Japan

- All cloven-hoofed animals in the movement restriction zone (10 km radius)
- 6 PD50 O Manisa (oil adjuvant killed vaccine)
- Estimated r_1 value 0.7
- Purified inactivated
- Destruction of the vaccinated animals



Number of vaccinated animals

Cattle	45,950
Pigs	79,606
Others	118
Total	125,556

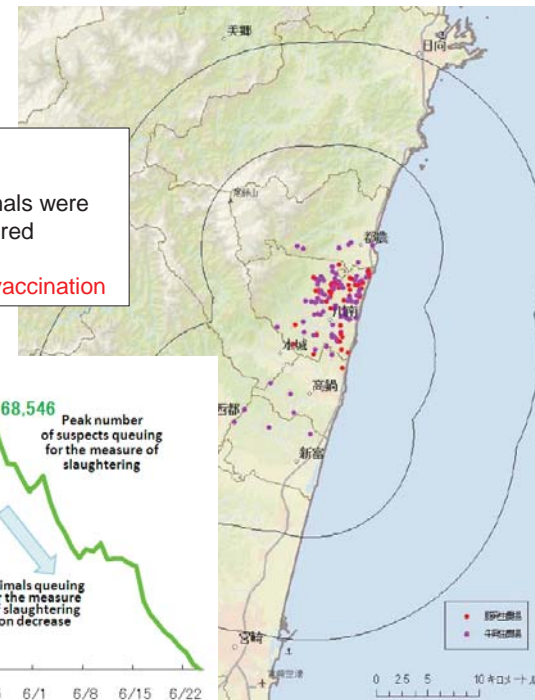
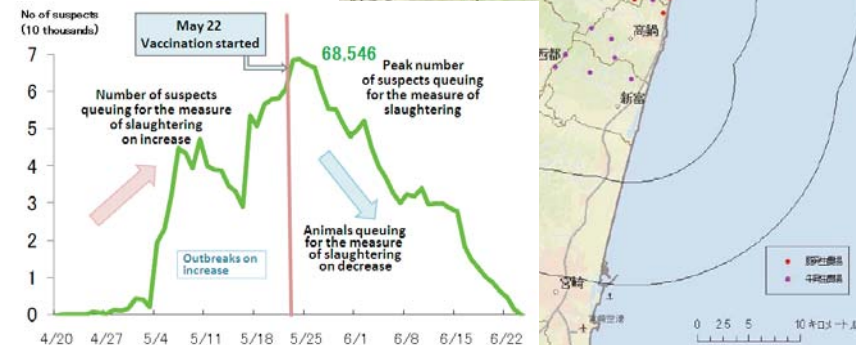
1,066 farms

May 19
Restriction Area

More wider spread

Large number of animals were waiting to be slaughtered

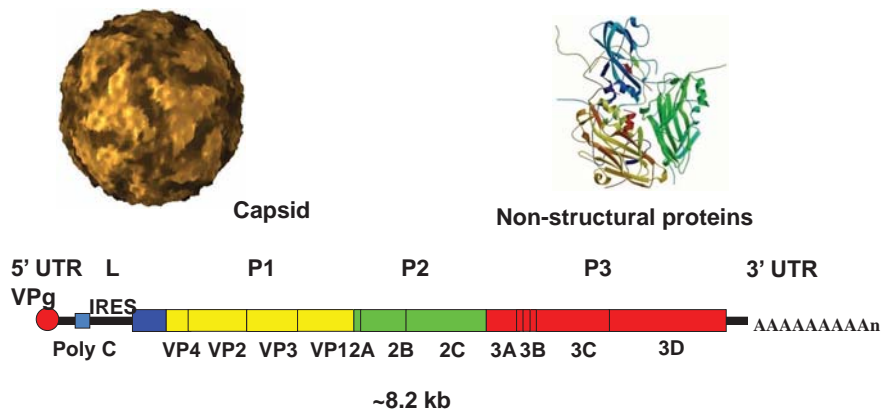
Japan decided FMD vaccination



Foot-and-Mouth Disease Virus

7 immunologically distinct serotypes

O, A, C, Asia 1, SAT 1, SAT 2, SAT 3



Vaccine matching of FMD in the region

- O SEA toptype (Mya-98): O Manisa, O Ind R2/75 and O Taw 98
- ME-SA toptype (PanAsia-2) (2009-2010) : O Manisa, O IND R2/75, O TAW 98 and O BFS.
- FMDV A from Iran (2009-2010) : A TUR 06.
- FMDV A from Afghanistan (2010-2011): A IRAN 05, A TUR 06.
- A from the People’s Republic of China and the Republic of Korea: Mya-97.
- Asia 1 from Bahrain, Pakistan and Iran (2010-2011):
not matching with Asia 1 IND 8/79, Asia 1 Shamir, Asia 1 WBN

FMD Differentiation of Infection and Vaccination

FMD Vaccine

Inactivated Vaccine (concentrated purified)

Potency: Normal 3PD50

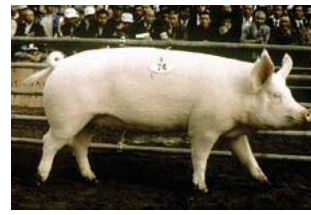
For emergency 6~12PD50

Differentiated Animal	Infected	Vaccinated
1)LPB ELISA	○	○
2)NSP ELISA	○	×

The conditions for FMD vaccine

- The FMD vaccine must be an inactivated vaccine.
- The vaccine should be a good antigenic match for field isolates.
- It is very important to send samples to FMD Reference Laboratories for virus isolation and sequencing.
- Whenever FMD vaccine is used, in an emergency to control FMD outbreaks or routinely, it is essential to be able to determine whether FMDV antibodies are the result of infection or vaccination.
- The vaccine should be produced in accordance with the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.
- Cooperation and research collaboration on FMD diagnosis and vaccine production are important among countries in the region.
- To differentiate between antibodies by infection and by vaccination, there is an urgent need to continue striving to produce pure vaccines to limit the effect of NSP’s when evaluating surveillance results.

Epidemiology of FMD



Minimal effective
infecting dose

$10^{1.0} \text{ ID}_{50}$

$10^{2.6} \text{ ID}_{50}$

Excretion
of virus

10^5 ID_{50}

10^8 ID_{50}

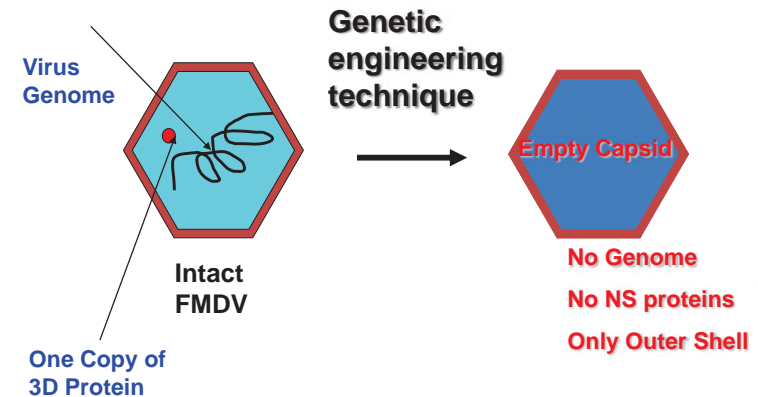
Epidemiological
role

Detector

Amplifier

A new generation FMD vaccine

Empty Capsid of FMDV as vaccine antigen



Examples of Amplifier

- Taiwan 1997, UK 2001, South Korea 2002
 - Recently Japan 2010, South Korea 2010-2011
-
- O type Cathay, ME-SA and SEA topotypes
 - Accumulation of FMDV in the environments makes **new outbreaks**.
 - FMD outbreaks in pigs are often on a **very large scale**.
 - The FMD can cause **serious economic damage**.

The epidemiological roles of susceptible animals in FMD

Cattle: The **most susceptible** livestock to FMDV.
(Detector)

Pigs: Pigs **excrete very large quantities** of the virus (100- to 2000-fold more than cattle and sheep).
(Amplifier)

Sheep: **Mild or un-apparent clinical signs**, making early detection of FMDV infection **difficult**.
(Transporter ?)

Economic Impact in Recent FMD Outbreaks

Year	Country	No. of Animal Destroy		Economic Damage
1997	Taipei China	Swine	4 million	3.6 Billion US\$ in first year
2000	Japan	Bovine	740	72.7 Million US\$
2000	S. Korea	Bovine	2200 (FMD Vaccine to 850,000 Bovine)	273 Million US\$
2002	S. Korea	Swine	160,000	225 Million US\$
2001	UK	Susceptible Animals 6 million		14.4 Billion US\$
2010	Japan	Swine & Bovine	290,000	3 Billion US\$ for complete recovery
2010-	S. Korea	Swine & Bovine	3.5 Million	3 Billion US\$



Thank you for your attention !!

Materials and methods

Virus

- ▷ A virus used in the experimental infections was isolated from a sample collected from the first case.
- ▷ It was initially isolated using primary bovine kidney cells and also was passed twice using baby hamster kidney cell lines.

Experimental design

- ▷ We inoculated the virus to heel bulbs of 2 pigs or tongues of 2 cattle.
- ▷ 4 pigs or 2 cattle were placed with the inoculated animals on 1 day post-inoculation for analyzing whether horizontal transmission will occur or won't.
- ▷ We observed daily those animals and collected samples routinely.

National Contact Person Workshop under OIE/JTF Project on FMD Control in Asia

9:30-10:00, Wednesday, Aug. 15, 2012

Experimental infection in animals using a foot-and-mouth disease virus isolated from the 2010 epidemic in Japan

Katsuhiko Fukai, D.V.M., Ph.D.

Senior Researcher

Exotic Diseases Research Station, National Institute of Animal Health, Japan

Materials and methods

RNA extraction

- ▷ RNA samples were extracted using by a commercial kit according to an instruction of a manufacturer.

Detection of viral genes

- ▷ Detection of viral genes was performed by an RT-PCR assay and a real-time RT-PCR assay according to methods described by Sakamoto et al. and in the OIE Manual.

Virus isolation

- ▷ Viruses were isolated from the samples and titrated using IB-RS-2 cell lines and ZZ-R 127 cell lines according to the OIE Manual.

Antibody tests

- ▷ Antibody titers were examined by a liquid-phase blocking ELISA and a neutralization test according to the OIE Manual.

Objects

- ▷ Foot-and-mouth disease occurred in Japan about 2 years ago.
- ▷ 292 cases were detected and about 0.3 million heads of infected, contact and vaccinated animals were destroyed as one of control measures.
- ▷ In history, it was the most devastating outbreak of any animal diseases in Japan.
- ▷ We collected many samples from the cases in those days.
- ▷ We also isolated many foot-and-mouth disease viruses from those samples.
- ▷ To analyze these viruses will be useful to analyze epidemiologically the 2010 outbreak in Japan.
- ▷ It will be convenient for improving a control measure to future outbreaks in Japan and elsewhere.
- ▷ We performed experimental infections in pigs and cattle using a foot-and-mouth disease virus isolated from the 2010 epidemic in Japan.

Vesicular development (Direct contact pig 3, 2 days post-contact)

Fore feet



Rear feet



▲ Vesicle

Clinical symptoms

Inoculated pigs

- ▷ Vesicular development was initially observed from on snouts, lips and feet between 1 and 3 days post-inoculation.
- ▷ They also showed depression, reduced appetite and lameness between 1 and 5 days post-inoculation.

Direct contact pigs

- ▷ Vesicular development was initially observed on snouts, tongues, lips and feet between 2 and 5 days post-contact.
- ▷ They also showed depression, reduced appetite and lameness between 2 and 10 days post-contact.

Vesicular development (Direct contact pig 3, 4 days post-contact)

Fore feet



Rear feet



▲ Vesicles

Vesicular development (Direct contact pig 3, 0 days post-contact)

Fore feet



Rear feet



Detection of viral genes and isolation of viruses from serum samples obtained from the inoculated pigs and the direct contact pigs

Pig No.	Days post-inoculation and days post-contact											
	0	1	2	3	4	5	6	7	8	9	10	11
	0	1	2	3	4	5	6	7	8	9	10	
1	-/- ^{a)}	+/+	+/+	+/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
2	-/-	+/+	+/+	+/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
3	NS ^{b)}	-/-	-/-	+/-	+/+	+/-	-/-	-/-	-/-	-/-	-/-	-/-
4	NS	-/-	+/-	+/+	+/+	+/-	-/-	-/-	-/-	-/-	-/-	-/-
5	NS	-/-	-/-	-/-	-/-	+/-	+/+	+/+	+/-	-/-	-/-	-/-
6	NS	-/-	+/-	+/+	+/+	+/-	-/-	-/-	-/-	-/-	-/-	-/-

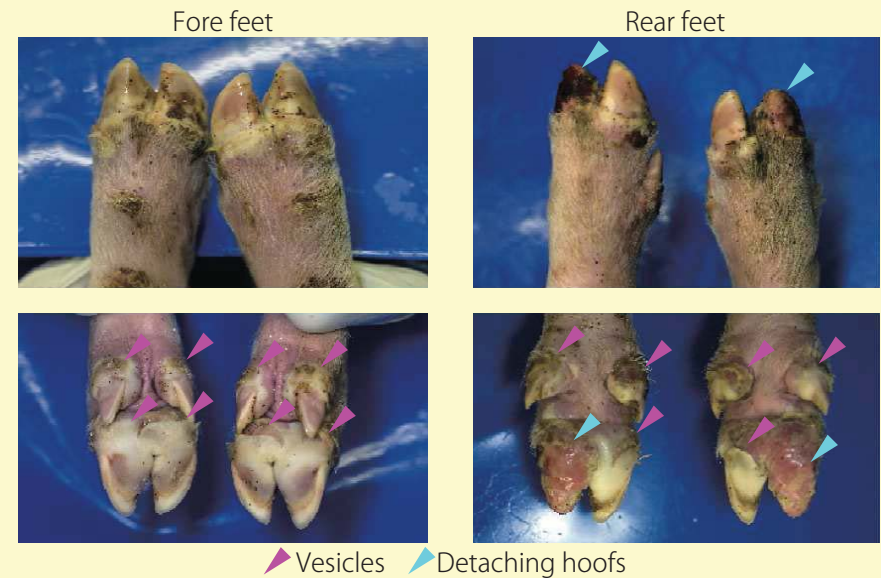
a) Detection of viral genes/isolation of virus.

b) Not sampled.

► Days when vesicular development was initially observed.

- In inoculated pigs, foot-and-mouth disease virus-specific genes were detected from serum samples between 1 and 3 days post-inoculation.
- Viruses were isolated from the serum samples between 1 and 2 days post-inoculation.
- In direct contact pigs, foot-and-mouth disease virus-specific genes were detected from serum samples between 1 and 7 days post-contact.
- Viruses were isolated from the serum samples between 2 and 6 days post-contact.

Vesicular development (Direct contact pig 3, 6 days post-contact)



Detection of viral genes and isolation of viruses from saliva samples obtained from the inoculated pigs and the direct contact pigs

Pig No.	Days post-inoculation and days post-contact											
	0	1	2	3	4	5	6	7	8	9	10	11
	0	1	2	3	4	5	6	7	8	9	10	
1	-/- ^{a)}	+/+	+/+	+/+	+/-	+/-	+/-	+/-	+/-	+/-	+/-	-/-
2	-/-	+/+	+/+	+/+	+/-	+/-	+/-	+/-	+/-	+/-	+/-	-/-
3	NS ^{b)}	-/-	+/-	+/+	+/+	+/+	+/+	+/-	+/-	+/-	+/-	+/-
4	NS	-/-	+/+	+/+	+/+	+/-	+/-	+/-	+/-	+/-	-/-	-/-
5	NS	-/-	+/-	+/-	+/-	+/+	+/+	+/-	+/-	+/-	+/-	-/-
6	NS	-/-	+/-	+/+	+/+	+/-	+/-	+/-	+/-	+/-	+/-	+/-

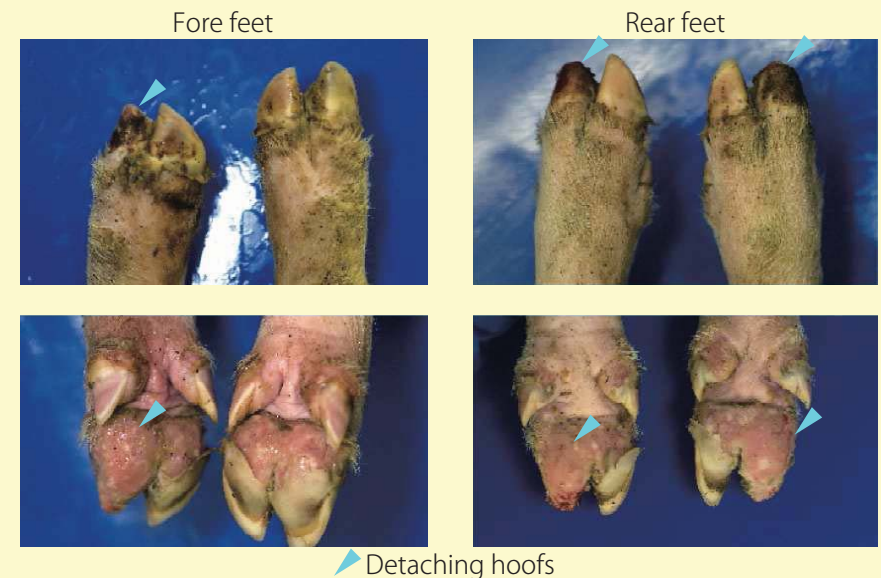
a) Detection of viral genes/isolation of virus.

b) Not sampled.

► Days when vesicular development was initially observed.

- In inoculated pigs, foot-and-mouth disease virus-specific genes were detected from saliva samples between 1 and 10 days post-inoculation.
- Viruses were isolated from the saliva samples between 1 and 3 days post-inoculation.
- In direct contact pigs, foot-and-mouth disease virus-specific genes were detected from saliva samples between 1 and 10 days post-contact.
- Viruses were isolated from the saliva samples between 1 and 5 days post-contact.

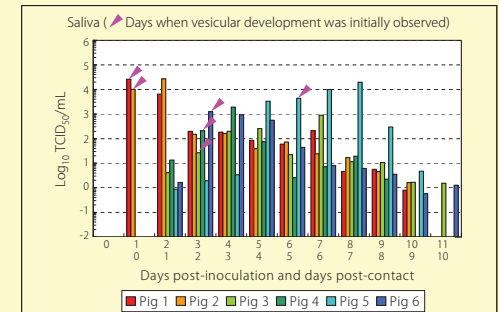
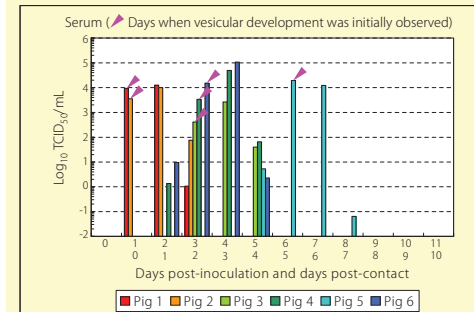
Vesicular development (Direct contact pig 3, 8 days post-contact)



Conclusions

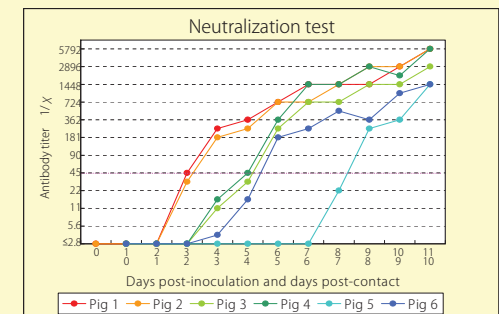
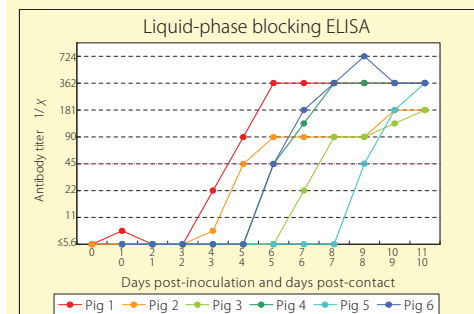
- ▷ The results of these experimental infections showed that the foot-and-mouth disease virus isolated from the 2010 outbreak in Japan was virulent in pigs and cattle, producing a synchronous disease in the inoculated pigs and cattle and efficient spread to direct contact pigs and cattle.
- ▷ We believe that these results are useful for epidemiologically investigating the 2010 outbreak in Japan and improving the measures for controlling a possible future foot-and-mouth disease outbreak in Japan and elsewhere.

Virus loads in the serum and saliva samples obtained from the inoculated pigs and the direct contact pigs

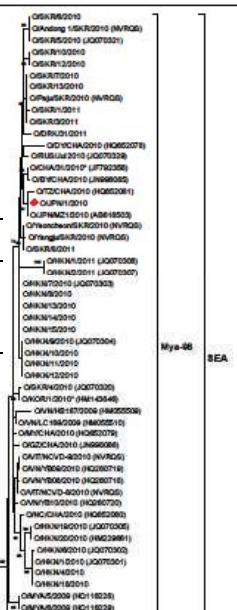
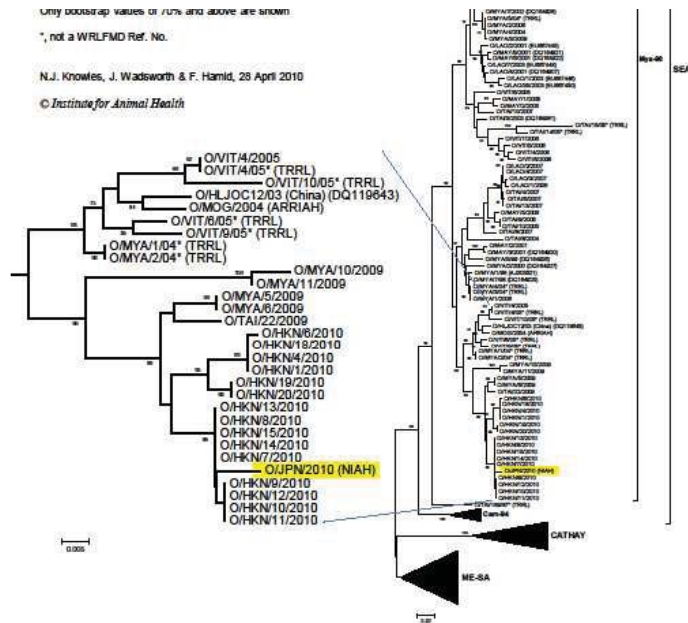


- ▷ In inoculated pigs, viral loads in the serum samples were between $10^{0.1}$ and $10^{4.1}$ TCID₅₀/mL. The loads in the saliva samples were between $10^{-0.1}$ and $10^{4.4}$ TCID₅₀/mL.
- ▷ In direct contact pigs, viral loads in the serum samples were between $10^{-1.2}$ and $10^{5.0}$ TCID₅₀/mL. The loads in the saliva samples were between $10^{-0.2}$ and $10^{4.3}$ TCID₅₀/mL.

Antibody titers in liquid-phase blocking ELISA and neutralization test in the inoculated pigs and the direct contact pigs



- ▷ In inoculated pigs, antibodies were first observed at 4 days post-inoculation in the liquid-phase blocking ELISA. They achieved a peak between 6 and 10 days post-inoculation. The maximum titer was 1/362. Antibodies were first observed at 3 days post-inoculation in the neutralization test. They rose continually during the experimental period and the maximum titer was 1/5792.
- ▷ In direct contact pigs, antibodies were first observed between 5 and 8 days post-contact in the liquid-phase blocking ELISA. They achieved a peak between 7 and 10 days post-contact. The maximum titer was 1/724. Antibodies were first observed at 3 days post-contact in the neutralization test. They rose continually during the experimental period and the maximum titer was 1/5792.



Source : Molecular epidemiology reports of WRLFMD

FMD Transmission route and alert levels

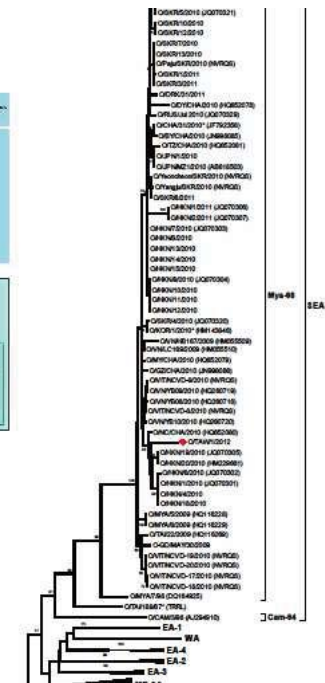
Timeline

- 2010.11.28. FMD occur(Pig) in Gyeongbuk
- 11.29. Alert level "Caution"
- 12.14. Spread to Gyeonggi
- 12.15. Alert level "Warning"
- 12.21. Spread to Gwangwon
- 12.23. Spread to Incheon
- 12.29. Alert level "Critical"
- * Set-up National emergency management agency
- Spread to Chungnam-buk, Deagu, Gyeongnam, Busan, Ulsan in serial order



22

Date received: 16/05/2012
No. of samples: 1
O/SEA/Mya-98: 1

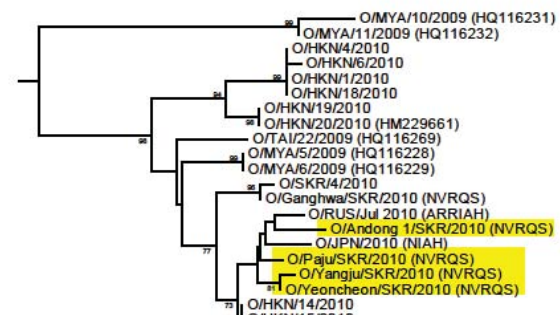
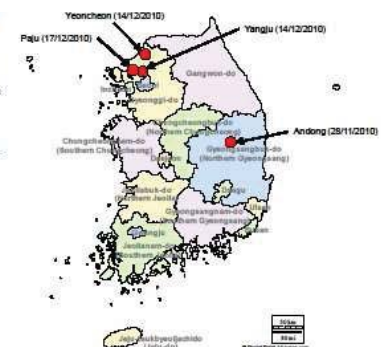


Serotype: O	Report date: 17/12/2010
WRLFMD RefNo: Paju/SKR/2010	Reported by: N.J. Knowles
Batch No: n/a	Checked by: D.P. King
Sender Ref: O/KOR/Paju/2010	Topotype: SEA
Location: Bugok-ri, Paju-eup, Paju city, Gyeonggi-do, South Korea	Genotype/strain: Mya-98
Date collected: 15/12/2010	Sequence filename: SKR10-AF.SEQ
Date received by WRLFMD: 17/12/2010	Date sequence last updated: 17/12/2010
Date received for sequencing: n/a	No. of nt determined: 639
Species: Cattle	No. of ambiguities: 0
Material used: Not known	Gene length: 639
Region sequenced: VP1	Total no. of comparisons: 2513
RT-PCR primers: Not known	Min. no. of nt for comparison: 600
	Total turn-around time: 0 days
	Sequencing time: n/a
Comments:	

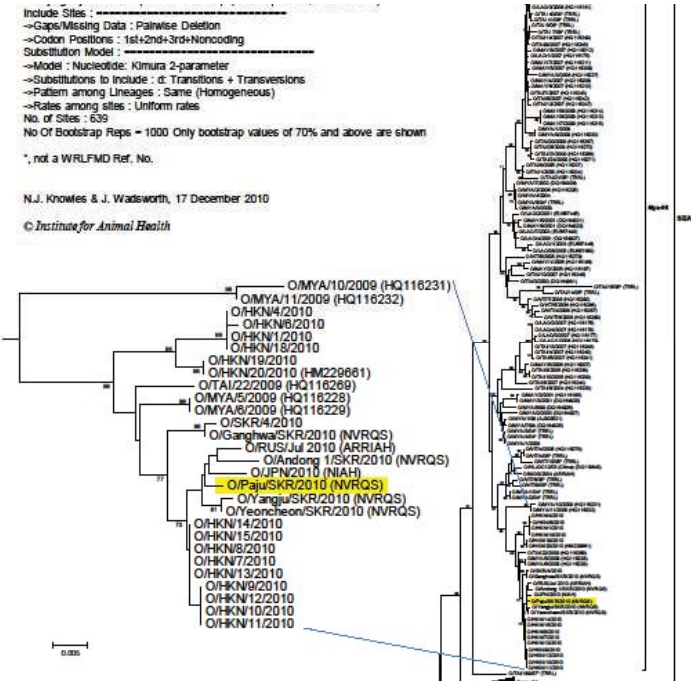
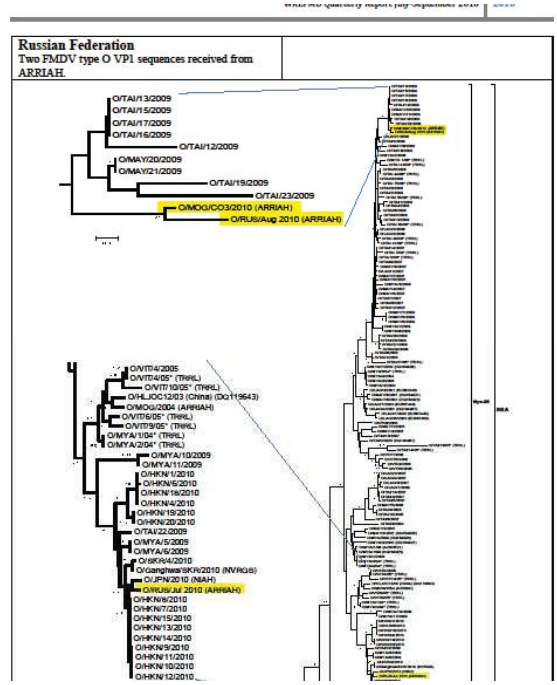
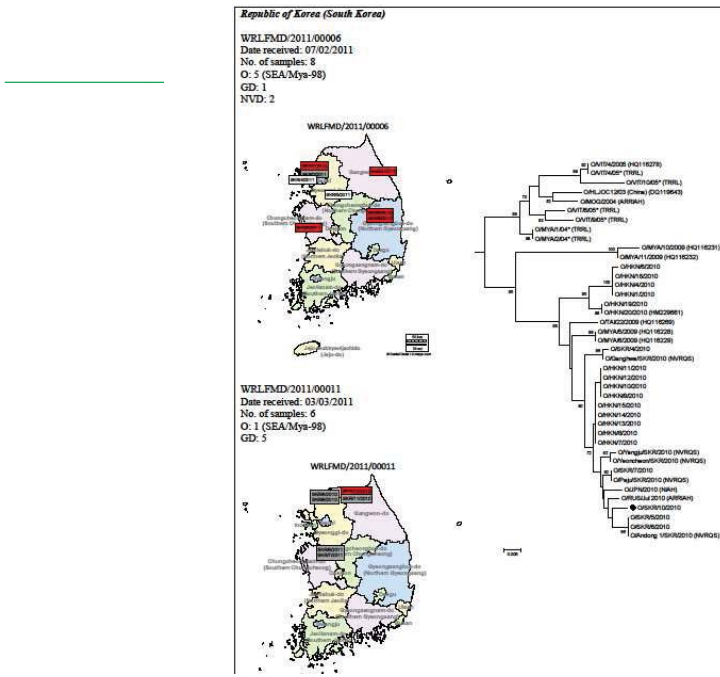
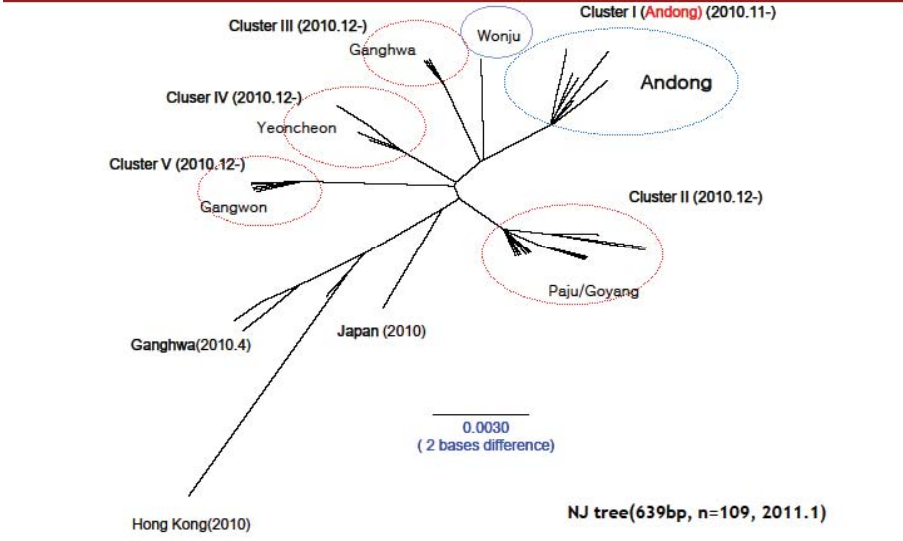
Most Closely Related Viruses							
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.
1	O/Yeoncheon/SKR/2010 (NVRQS)	SKR10-AE	639	635	0	99.37	0.63
2	O/Andong 1/SKR/2010 (NVRQS)	SKR10-AC	639	634	0	99.22	0.78
3	O/HKN/13/2010	HKN10-13	639	634	0	99.22	0.78
4	O/HKN/14/2010	HKN10-14	639	634	0	99.22	0.78
5	O/HKN/15/2010	HKN10-15	639	634	0	99.22	0.78
6	O/HKN/7/2010	HKN10-07	639	634	0	99.22	0.78
7	O/HKN/8/2010	HKN10-08	639	634	0	99.22	0.78
8	O/RUS/Jul 2010 (ARRIAH)	RUS10-AA	639	634	0	99.22	0.78
9	O/Yangju/SKR/2010 (NVRQS)	SKR10-AD	639	634	0	99.22	0.78
10	O/HKN/10/2010	HKN10-10	639	633	0	99.06	0.94
Most Closely Related Reference Viruses							
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.
1	O/Mya/7/98 (DQ164925)	MYA98-07	639	596	0	93.27	6.73
2	O/TAI/189/87* (TRRL)	TAI87-AC	639	572	0	89.51	10.49
3	O/CAM/3/98 (AJ294910)	CAM98-03	639	544	0	85.13	14.87
4	O/IND/R2/75* (AF204278)	IND75-A	639	544	0	85.13	14.87

Republic of Korea (South Korea)
VPI sequences received from National Veterinary Research and Quarantine Service (NVRQS), Anyang, Gyeonggi 430-824, Republic of Korea
Date received: 30/11/2010 to 17/12/2010
No. sequences: 4
O: 4

All four sequences belonged to the SEA topotype, Mya-98 lineage.



Molecular epidemiology of FMD O type viruses in 2010



All viruses belonged to the SEA topotype, Mya-98 lineage.

