



WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future

ROADMAP for FMD CONTROL in EAST ASIA



November 2013

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Preface

Foot and Mouth Disease (FMD) is one of the most significant animal diseases that negatively affects the economy of countries and territories worldwide at both the macro and micro levels. Due to its transboundary nature, FMD control applied solely at the national level is not sufficient to prevent the emerging or re-emerging of the disease in other countries or regions. Therefore cooperation and coordination at regional and global levels to control FMD is essential.

While some countries/territories in East Asia had been free from FMD for decade(s), they experienced FMD outbreaks from time-to-time such as major FMD outbreaks in 2000 and 2010. Because of intensive farming system and naïve susceptible animal population, each FMD outbreak in East Asia caused devastating loss to the economy and livestock industry. Therefore, efforts have been made through the OIE/JTF Project on FMD Control in Asia to develop a “Roadmap for FMD Control in East Asia”. The objectives of the Roadmap are to provide members with strategic direction to progressively achieve OIE official recognition for zonal or country freedom from FMD with or without vaccination, and to assess national and regional progress towards regional FMD freedom. The Roadmap was developed ensuring the consistency with the Global FMD and SEACFMD Control Strategies and tailored to fit the epidemiological situation and capacity for disease control of member countries in East Asia.

On behalf of the Director General of the OIE, I sincerely wish to thank the Chief Veterinary Officers and National Contact Persons of PR China, Chinese Taipei, Hong Kong SAR of PR China, RO Korea, Japan and Mongolia for their collaborative efforts to develop this Roadmap, Drs Gideon Brückner, Joseph Domenech and François Caya for technical advice and valuable guidance.

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October 2013

Executive Summary

Introduction

The OIE/ JTF Project on FMD Control in Asia is an initiative of the OIE and the Japanese government to strengthen FMD control in the Region. Among others, one major objective of the Project is to develop a Roadmap for FMD Control in East Asia, aiming to provide regional direction, goal and strategies for countries/territories in the Region to achieve their targets in obtaining a FMD free status with or without vaccination, and to assess national and regional progress towards regional FMD freedom.

The Roadmap was developed by a series of meetings and discussions among National Contact Persons (NCPs) assigned by Chief Veterinary Officers (CVOs) of the respective members. The OIE and FMD experts were consulted to ensure its scientific validity and consistency with the Global Strategy. The final draft was proposed for endorsement to the Coordination Committee (CC), comprising CVOs and development partners.

The Roadmap is planned for an initial phase of five years. Noting that FMD will not be eradicated at the end of this period, the expectation is to make significant progress towards reducing the burden of FMD for Members where the disease exists, and to maintain FMD-freedom where the disease no longer exists.

Background

Asia is a large continent with diversity of geography, weather, culture, livestock production systems and animal disease status. The OIE Regional Representation for Asia and the Pacific covers three Asian sub-regions: South-East Asia, South Asia and East Asia. FMD is endemic in most of the countries in South-East Asia and South Asia. Insufficient control of the disease, traditional livestock production systems and transborder trade in these two sub-regions are considered as major contributors to FMD. In South-East Asia, the SEAFMD Campaign (later renamed as SEACFMD), now being a long-standing OIE project, has assisted member countries to control FMD. The 2020 SEACFMD Roadmap was developed and adopted by ASEAN, aiming to reach regional FMD free-status by the year 2020.

Different from South-East Asia, countries/territories in East Asia had been free from FMD for decade(s). However, Japan, RO Korea and Chinese Taipei unexpectedly experienced major FMD outbreaks in 2000 and 2010. Because of intensive farming practice and non-immune animal population, each FMD outbreak in East Asia caused devastating loss to the economy and livestock industry. After the 2010 FMD outbreak, Japan regained FMD-free status without vaccination while RO Korea and Chinese Taipei changed their policy to mass vaccination. In this context, an effort has been made through the OIE/JTF Project on FMD Control in Asia to

develop a “Roadmap for FMD Control in East Asia,” tailored to fit the epidemiological situation and capacity for disease control by member countries/territories in East Asia. PR China participates in both the SEACFMD and East Asia Roadmap and thus might serve as a bridge between them.

Concept and structure of the Roadmap

The Global Foot and Mouth Disease Control Strategy (Global Strategy) was jointly developed by FAO and the OIE under the GF-TADs framework, and was launched at the FAO/OIE global conference on FMD Control in 2012 (Bangkok, Thailand). The Global Strategy is not a ‘stand-alone’ activity but comprises three inter-related components, 1) FMD Control, 2) Strengthening Veterinary Services, and 3) Prevention and Control of other major diseases of livestock. ‘Tools’ for each component are described in the document of the Global FMD Control Strategy. Member countries/territories are encouraged to use ‘The Progressive Control Pathway’ for FMD (PCP-FMD) as a development tool for FMD Control, as well as an assessment tool. The adoption and application of a ‘Regional approach’ and ‘Regional Roadmap’ are also indicated as useful ‘Tools’ for successful control of FMD.

The Roadmap for FMD Control in East Asia was developed based on the concept of the Global Strategy. Taking the specific and unique regional context and epidemiology of FMD into consideration, the Roadmap comprises three main strategies:

- **Roadmap Strategy 1:** Encouraging Project members to develop National FMD Control Strategies with the aim of establishing an ‘Official National FMD Control Plan’ for eventual endorsement by the OIE

In line with the Global Strategy, a National FMD Control Strategy should include three components

- Component 1: Official National FMD Control Plan (aiming to be endorsed by the OIE)
 - Component 2: Strengthening Veterinary Service
 - Component 3: Improving the prevention and control of other major diseases of livestock
- **Roadmap Strategy 2:** Improving information sharing and cooperation within the Region for a better understanding of the disease and the implementation of rapid response and contingency plans to effectively address events of disease outbreaks or epidemiological changes in the disease within the region

- **Roadmap Strategy 3:** Providing technical or possibly financial support for Members or when relevant for needing countries in the Region.

In addition, the delegated National Contact Persons listed five components with tools and activities as necessary elements to achieve the Goal. The five components are:

1. FMD Control
2. Strengthening Veterinary Services
3. Improving the prevention and control of other major diseases of livestock
4. Regional Cooperation and Coordination
5. Funding and Resource arrangements

Components 1,2 and 3 are directly adopted from the Global Strategy, whereas components 4 and 5 have a regional focus. “Tools” to be used for achievement as well as suggested activities are listed under each component.

The Appendices such as Country Profiles, FMD Control Plans, Roadmap timetables, will be reviewed and updated annually.

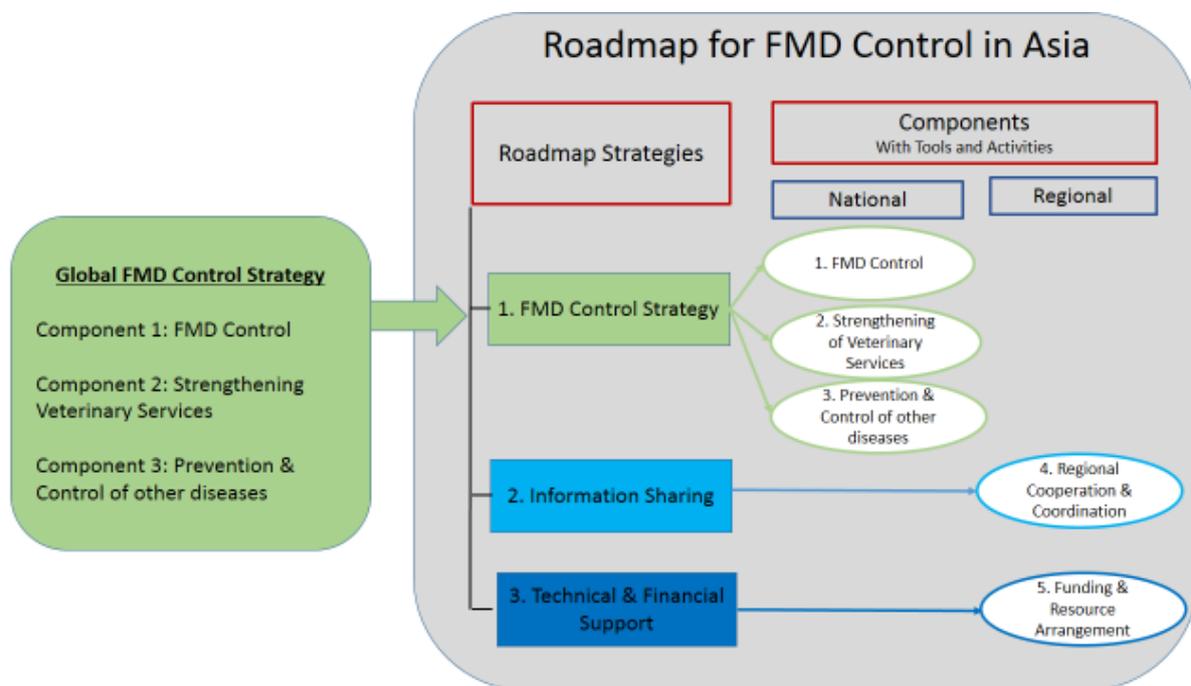


Figure: Structure of the Roadmap for FMD Control in East Asia

Roadmap for FMD Control in East Asia

Goal

Members in East Asia aim to progressively achieve OIE official recognition for zonal or country freedom from FMD with or without vaccination

Objectives

1. To provide members with strategic direction to progressively achieve OIE official recognition for zonal or country freedom from FMD with or without vaccination
2. To assess national and regional progress towards regional FMD freedom

Purpose

- To inform policy makers and stakeholders of the nature and objectives of the FMD control programmes at national and regional levels
- To guide and assist Members to develop National FMD Control Strategies and National FMD Control Plan for endorsement by the OIE
- To highlight the importance of veterinary services to support animal health, public health and economic development
- To demonstrate the applicability and need of the Roadmap for FMD Control in East Asia as a regional coordination model for other diseases

1. Background

Foot and Mouth Disease Situation

Foot and Mouth Disease (FMD) is one of the most significant animal diseases which causes devastating economic losses and undermines food security. Eradication of FMD is a great challenge due to the complexity of FMD which resulted from many factors. First, the FMD virus (FMDV) itself can be classified into seven serotypes, namely, O, A, C, SAT 1, SAT 2, SAT 3 and Asia 1. Infection or vaccination with one serotype does not provide immunity against another. Second, FMDV is highly contagious, able to infect and cause disease in many species, causing severe production loss in susceptible cloven-hoofed animals. Third, FMDV can spread rapidly in a variety of ways. On average, airborne transmission of FMDV can occur over a range of 40 miles over land and 180 miles over water (www.vetmed.ucdavis.edu/vetext/programs/beef_cattle/fmd.cfm). The globalisation of international trade in animals and animal products can contribute significantly in the rapid transboundary and global spread of the FMDV by road, air and sea transport. These epidemiological factors thus provide FMDV with a great potential as a transboundary animal disease.

Due to the complexity of the disease and many factors that can aggravate the impact of an outbreak, prevention, control or eradication of FMD requires collaboration and coordination between all role players and stakeholders in many aspects and at many levels. For example, laboratory diagnosis must be accurate and timely; sample submission to a reference laboratory to perform vaccine matching is crucial; public communication and public education are necessary to enhanced awareness; animal movement management is essential to prevent transboundary animal diseases; the choice of vaccine strains, its efficacy, efficiency and vaccination coverage are very important. These activities could not be successful without political commitment, policy harmonisation, collaboration and networking within the country, and also at the regional and global levels.

According to data available from the OIE-WAHID global database, FMD is widespread throughout the world, with only some countries enjoying either country or zonal FMD-free status. As of May 2013, 66 out of 178 OIE Members are recognized as FMD-free countries (65 without vaccination and one with vaccination) and 10 Members are recognized to have FMD-free zones (6 without vaccination and 4 with vaccination). The remainder of the 178 OIE Members do not have FMD-free status. FMD is highly endemic, especially in many developing countries where animal movement management are inadequate and veterinary services do not yet comply with the OIE standards for veterinary service delivery. It is commonly acknowledged that outbreaks in a single country that lacks appropriate FMD control can have adverse consequences for neighbouring or even distant countries. Therefore, FMD is of global concern. It is one of the

major trade-sensitive animal diseases affecting animal production, food security, economy development and international trade.

Global Foot and Mouth Disease Control Strategy

Following the acknowledgement of the multiple and complex factors related to the global control of FMD, the need for a Global Foot and Mouth Disease Control Strategy (Global Strategy) was identified during the first OIE/FAO Global Conference on FMD in Asuncion, Paraguay in June 2009 and further developed as the FAO/OIE Global Framework for the Progressive Control of Transboundary Animal Diseases at the FAO/OIE global conference on foot and mouth disease control, Bangkok, Thailand, June 2012. The FMD control strategies and tools are considered as global public goods which benefit all countries, or several groups of countries, all populations and future generations stretching beyond national borders.

The Global Strategy is not a 'stand-alone' activity but comprises the incorporation of three inter-related components, 1) FMD Control, 2) Strengthening of Veterinary Services, and 3) Prevention and Control of other major diseases of livestock. 'Tools' for each component are described in the documented Global Strategy. 'The Progressive Control Pathway' for FMD (PCP-FMD) is encouraged as a development tool for FMD Control (Component 1), as well as an assessment tool. In addition, the adoption and application of a 'Regional approach' and 'Regional Roadmap' are also indicated as useful 'Tools' for successful control of FMD.

Regional Roadmap for FMD Control in East Asia

Many FMD outbreaks around the world demonstrated and confirmed that it is not possible to apply the global strategy in a situation where national and regional strategies are not sufficiently developed, implemented, harmonised and coordinated.

In Asia, the OIE has been successfully conducting the South-East Asia and China FMD Campaign (SEACFMD), launched in the early 1990s with seven original member countries, then later expanded to include three ASEAN member countries and PR China. The SEACFMD developed the "SEACFMD 2020 Roadmap" as a guiding policy to prevent, control and eradicate FMD by 2020 in South East Asia and PR China. This roadmap has been considered as a model for other regions and sub-regions. While there was still not yet a regional collaboration framework among East Asian countries, though after PR China became a member of SEACFMD campaign in 2010, the OIE Regional Representation for Asia and the Pacific launched a new project called "OIE/JTF Project for FMD Control in Asia" in 2011, with the participation by PR China, Chinese Taipei, Hong Kong Special Administration Region (SAR) of PR China, RO Korea, Japan and Mongolia. A close collaboration and institutional coordination between the OIE/JTF Project for FMD control in Asia and SEACFMD Campaign, as well as with other projects and organisations, should however be put in place to ensure a complementarity and coordinated

approach for FMD control. In this context, PR China, being a member of both SEACFMD and OIE/JTF project, could play a critical role as a bridge between these regions and making the regional initiatives a seamless and coordinated exercise.

East Asia, in particular Japan, RO Korea and Chinese Taipei experienced widespread FMD outbreaks in 2010 which devastated livestock productions in the Region and eventually cost billions of dollars to contain the disease. In addition to the economic damage, FMD outbreaks and the subsequent massive culling of animals to control the disease have raised great concern, not just in the farming community, but also in the society at large. The concerns included aspects related to animal welfare, ethical issues and possible threats to domestic animal biodiversity.

While some countries in East Asia have been free from FMD for decades, FMD is still endemic in many countries in Asia. Animal disease prevention and control in most of these endemic countries are not very efficient and could be a potential source of FMDV, posing a FMD risk to other countries in the Region. Therefore, one major objective of the Project is to develop a Roadmap for FMD Control in East Asia, aiming to provide regional direction, goal and strategies for Members to achieve their target in obtaining a FMD free status, and to assess national and regional progress towards regional FMD freedom.

The Roadmap for FMD Control in East Asia has been developed by series of meetings and discussion among National Contact Persons (NCPs) assigned by Chief Veterinary Officers (CVOs). NCPs provided information on their national situation, with updated data and comments. The draft was circulated among Members for comments and updates, and consulted with FMD experts to ensure its scientific validity and consistency with the Global Strategy. The final draft was proposed to the Coordination Committee (CC), comprising CVOs and development partners for endorsement. The FMD Roadmap is planned for an initial phase of five years. Noting that FMD will not be eradicated at the end of this period, the expectation is to make a significant progress in reducing the burden of FMD for Members where the disease exists, and to maintain FMD-freedom where the disease no longer exists.

2. Regional Context

Asia and the Pacific is a culturally, geographically, politically, socially, linguistically and economically extremely diverse region. East Asia is a sub-region of Asia and the Pacific that can be defined in either geographical or cultural terms. Geographically East Asia comprises of PR China, Chinese Taipei, Hong Kong SAR of PR China, Macao SAR of PR China, Democratic People's Republic of Korea (Korea DPR), Republic of Korea (RO Korea), Japan and Mongolia. The East Asia Region is the home for more than 1.59 billion people, i.e., about 38% of the population of Asia and over one fifth of all the people in the world (Source: United Nations World Population Prospects: The 2012 Revision, <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>).

Geographical distribution shows that Asia has the largest animal population, covering 48% of domestic animals around the world (Source: FAOSTAT <http://faostat3.fao.org/home>). Among them, 41% of animals are raised in East Asia with a wide range of production systems including landless, grassland-based, rain-fed and irrigated production systems (detail is provided in Table1) (Source: [ILRI/FAO production systems V.5 \(2011\)](#)). Such diversification of animal species and farming systems pose important risk factors for the resurgence and outbreaks of high impact Transboundary Animal Diseases in the Region including FMD.

Table.1: Animal population in East Asia Region (2011, FAOSTAT)

Country	Buffalo	Cattle	Goat	Sheep	Pig	Total
China Mainland	23378000	82886000	142039000	138840000	464600000	851743000
Chinese Taipei	3850	136152	190440	200	6185952	6516594
Korea DPR	0	580000	3560000	167000	2248000	6555000
Korea RO	0	3353353	245000	3400	8170979	11772732
Japan	0	4230000	15500	12500	9768000	14026000
Mongolia	0	2339700	15934562	15668530	30397	33973189
Hong Kong	280	1600	680	19	175000	177579
East Asia	23382130	93526805	161985182	154691649	491178328	924764094
Asia	189922514	477541224	542336176	466058951	576632299	2252491164
World	195397515	1426389030	924145893	1093566764	967164692	4606663894

unit numbers in head

The FMD status of countries/territories in Asia-Pacific varies considerably. FMD is endemic in most of the countries in South- and Southeast Asia; while Australia, New Zealand and countries in South Pacific islands are free from FMD. Some countries in East Asia were proven to be FMD-free for decades, for example, Japan had been free from FMD since 1908, Chinese Taipei since 1930, and the RO Korea since 1934. Unfortunately Chinese Taipei experienced FMD outbreaks in 1997 after 47 year-free from FMD. The widespread outbreaks of FMD in the year 2000 in RO Korea, Japan, eastern Russia, Mongolia and Chinese Taipei brought the termination of their FMD free status and substantial economic loss in animal production industries of these

countries. In response to these outbreaks, the OIE Regional Representation for Asia and the Pacific held an Emergency Meeting of Experts in June 2000 in Tokyo, Japan. The objectives of the meeting included:

- 1) To review the FMD outbreaks in each country,
- 2) To conduct comparative studies on FMD virus strains and their epidemiology in East Asia, and
- 3) To find out the measures for the prevention/control/eradication of FMD, re-establishment of freedom from FMD and opportunities for international collaboration.

A subsequent meeting was convened in Seoul, RO Korea in 2001 in which technical reports were presented to strengthen the collaboration between regional laboratories in FMD diagnosis. The third expert meeting, which was held in Chinese Taipei in 2004, recommended the members to use the existing mechanisms of the OIE to obtain prompt technical support for the control of FMD and other emerging diseases. The laboratories in East Asia were also requested to continue their collaboration to prevent and control emerging diseases including FMD, and to extend this collaboration to other regions. The outbreaks were eventually successfully controlled with Japan regaining its FMD free status in 2001. Chinese Taipei continued vaccination against FMD while the RO Korea suffered FMD outbreaks again in 2002.

The countries/territories in East Asia experienced again massive outbreaks of FMD in 2010. With the effort of government and collaboration of farmers, Japan could regain the status as “FMD-free country where vaccination is not practised” in 2011. On the other hand, the RO Korea and Chinese Taipei using a risk-based approach for vaccination, continued their policy of FMD vaccination with the aim of seeking OIE recognition as FMD-free countries where vaccination is practised. The dominant strain of FMD virus in the East Asia region is serotype “O” though serotype “Asia 1” and “A” were reported during the last decade in PR China (See Table 2 for details). Affected species in the infected countries include cattle, sheep, goat, pigs, and in the case of Mongolia, also camels. Vaccination, in combination with a stamping-out policy, has been applied for the prevention and control of FMD. (See country profiles in Appendices for further information). Sporadic outbreaks are continued to be reported by PR China, Chinese Taipei, Hong Kong SAR of PR China, DPR Korea and Mongolia

(Source: http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home).

To control FMD outbreaks, with the ultimate goal of FMD-free status of the region, the strengthening of the performance of veterinary services is of critical importance. On a regional level, strengthening of region collaboration to prevent and control of FMD is equally important. The countries in East Asia, except Japan and Chinese Taipei, share extensive boundaries with neighbouring countries. In the case of PR China, raising 49% of the global pig population, the

country is surrounded by other Asian counties, some of which are FMD endemic and considered to be the source of FMD. Mongolia also shares a long border with Russia and PR China, and sporadic outbreaks of FMD occur in the triangle border area of these three countries. The reported multiple incursions of FMD in the white tailed gazelle in the eastern provinces of Mongolia in 2010 highlighted the possible involvement of wildlife in the transmission of FMDV and the impact of FMD control measures on wildlife conservation. Therefore, FMD control strategies in East Asia should be tailor-made for the particular and often unique risk factors taking into consideration the epidemiological situations and conditions of all countries in Asia.

Table. 2: FMD incidences in the East Asia Region (Number of new outbreaks reported to WAHIS)

Country	2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012	
	no.	sero type	no.	sero type	no.	sero type	no.	sero type	no.	sero type	no.	sero type	no.	sero type												
China											10	Asia 1	17	Asia 1	7	Asia 1	3	Asia 1	15	A/Asia 1	20	A/O'	10	O'	4	O'
Chinese Taipei											-	-	-	-	-	-	-	-	8	O'	4	O'	12	O'	15	O'
Hong Kong	13				8		7		5		-	-	-	-	-	-	-	-	-	-	4	O'	3	O'	1	O'
Korea DPR										-	-	-	-	1	Asia 1	-	-	-	-	-	26	O'	114	O'	-	-
Korea RO	15				16					-	-	-	-	-	-	-	-	-	-	-	89	O'	86	O'	-	-
Japan	3									-	-	-	-	-	-	-	-	-	-	-	292	O'	-	-	-	-
Mongolia							6		3		-	-	-	-	-	-	-	-	?	-	9	O'	-	-	-	-

Source: OIE Handistatus II for Data from 2000 to 2004
OIE World Animal Health Information Database (WAHID) for data from 2005 to 2012

Although other sub-regions in Asia established sub-regional cooperation frameworks such as the Association of South East Asian Nations (ASEAN), South Asian Association for Regional Cooperation (SAARC) and the Secretariat for the Pacific Community (SPC), East Asia has not yet established such an association or cooperation framework. The Development of a Roadmap for FMD Control in East Asia, and the activities under the OIE/JIF project for FMD control in Asia, therefore, will provide the collaborative and coordination platforms for the Members to progress towards the common goal as a FMD-free sub-region. In addition, close collaboration with other sub-regional networks such as ASEAN, SAARC and SPC is essential for progressive control of FMD in Asia.

It should also be acknowledged that the Regional GF-TADs for Asia and the Pacific is the important FAO and OIE joint mechanism for promoting regional and sub-regional collaboration and coordination in controlling transboundary animal diseases including FMD.

3. Roadmap strategies

The Global FMD Control Strategy clearly identifies roles and expectations for FMD strategies at each level. At the national level, capacity building and training will be essential components to implement the FMD strategy. In addition, countries in the earlier stages of the PCP are foreseen to require the provision of finance for materials and vaccines. At the regional level, the focus will be on:

- 1) Training,
- 2) Creation, maintenance and coordination of networks and
- 3) Providing international expertise in the fields of laboratory diagnosis, epidemiology, disease control and vaccine quality control.

The NCPs of Members believe that a regional roadmap should be effective to strengthen Members' engagement in:

- 1) Developing and implementing national strategies,
- 2) Improving information sharing, and
- 3) Providing technical or financial support for Members in need of assistance.

Considering the FMD status in Asia, the capability for FMD control, the capability of laboratories and the variable economic capacity of Members, NCP's proposed three strategies for East Asia to achieve FMD free status. This is reflected in the Roadmap for FMD Control in East Asia composing of three main strategies.

- Roadmap Strategy 1: Encouraging Project members to develop National FMD Control Strategies with the aim of having an 'Official National FMD Control Plan' eventually endorsed by the OIE
- Roadmap Strategy 2: Improving information sharing for better understanding of the disease and rapid response contingency plans to effectively address events of disease outbreaks or epidemiological changes in the disease within the region
- Roadmap Strategy 3: Providing technical or possibly financial support for Members or when relevant for needing countries in the Region.

Roadmap Strategy 1: Encourage Members to develop Official National FMD Control Strategies

Having an Official National FMD Control Strategy (National Strategy) is crucial for the Veterinary Services to control the disease. A National Strategy provides direction, sets the overall- and stepwise goals, determines the targets, and describes initiatives to be taken to achieve the goals. It also guides the priority and effective use of resources, and the monitoring and evaluation process. Moreover a National Strategy allows Veterinary Service to better cope with uncertainty and change, as well as reducing the risk and damage of an outbreak. It is also a guideline and

tool for Veterinary Services to enable them to capitalise on the interventions and/or minimise the negative effect.

Among Members of the Project, Japan, as an FMD-free without vaccination country, is beyond PCP stage 5; Chinese Taipei and RO. Korea will submit dossiers to restate their FMD-free with vaccination status, while PR China, Hong Kong SAR of PR China and Mongolia consider themselves as PCP Stage 3. Although, some Members are currently beyond PCP Stage 3, all Members are encouraged to update their Official National Control Strategies to be in line with the Global Strategy.

A National Strategy for FMD Control should be in support of the Global FMD Control Strategy with adaptations where indicated to meet country/territory conditions. The “three components” of the Global Strategy are inter-related and indispensable. They are:

- Component 1: FMD Control;
- Component 2: Strengthening Veterinary Services; and
- Component 3: Improving the prevention and control of other major diseases of livestock.

Component 1, as suggested in the Global FMD Control Strategy, should operate according to four sets of underlying principles: Technical, Organisational, Economic, and Financial and political principles.

The expected results of this strategy are:

- 1) Official National FMD Control plans of Members who are in stage 3 endorsed by the OIE by 2015
- 2) All Members have National FMD Control Strategies, which are in line with Global Strategy.

Roadmap Strategy 2: Improve information sharing for better understanding of the disease and rapid response in the event of outbreaks of disease or changes in the epidemiological situation in the region

In the Global FMD Control Strategy it is important and strongly recommended to apply a regional approach to exchange information and experiences, coordinate efforts and develop a regional Roadmap. Such a Roadmap should portray the Members’ ambitions and should allow for regular progress assessment.

As recommended in the Global FMD Control Strategy, Regional PCP roadmap meetings should be organised annually to provide a platform for Members to share information and experiences and to update the Regional Roadmap.

At the regional level, the importance of Reference Centres operating in a global network, while supporting a network of national diagnostic veterinary laboratories in each region is emphasised in the Global FMD Control Strategy. A similar structure is recommended for epidemiology centres with global and regional network dimensions and national epidemiology units.

In addition, technical information on FMDV strains, vaccine strains, vaccine efficacy, quality and efficiency, surveillance and research results should be shared.

Roadmap strategy 2 supports the roles and activities of leading laboratories, OIE Reference Laboratories (RL) and Collaborating Centres as technical backup and assistance expertise on diagnostics and vaccine quality. The list of OIE Collaborating Centres, OIE Reference Laboratory for FMD Diagnosis in Asia, and leading laboratories for FMD diagnosis and research of Members is provided in Appendix 2.2. These leading laboratories, RL and Collaborating Centres will be consulted and included in capacity building on laboratory diagnosis, workshop/training and research. Similar support will be provided for epidemiology centres.

The expected results of this strategy are:

- 1) Improvement of information sharing in the Region, on not only disease reports but also technical information and lessons learned,
- 2) Sustainability of laboratory and epidemiology networks.

Roadmap Strategy 3: Provide technical or possibly financial support for Members or specific countries in the Region

Members in East Asia are more advanced in technology and economy compared with other sub-regions in Asia. Most of them are capable of providing financial and technical support for FMD control in their countries/territories. However, FMD prevention and control go beyond national borders; it is therefore unlikely that a single country can maintain long-term or permanent free-status without sufficient disease control in other countries. The evidence was clear during the 2010 FMD outbreak in Miyazaki, Japan when the causative FMD virus was identified as Southeast Asia (SEA) topotype (Mya-98 lineage) and found to be closely related to viruses occurring the same period in the PR China, Hong Kong SAR of PR China, RO Korea, Myanmar and Thailand even though some of these countries didn't share borders (WRLFMD Quarterly Report April-June 2010). Therefore, control of the disease at the source is the best proven practice in FMD control. When feasible, technical or possibly financial support for Members or specific countries in the region should be provided with better coordination and sharing of results and epidemiological data.

The Global FMD Control Strategy focuses on FMD control in endemic countries. The need to ascertain the availability of sufficient quantities of FMD vaccine fulfilling the OIE criteria is

emphasised and the designation of regional vaccine quality control centres is expected. The establishment of vaccine banks will be supported in some regions. In addition, there is a need to support new research. Several research areas could accelerate the achievement of the Strategy, for instance in the fields of (i) laboratory and field diagnosis; (ii) vaccines; (iii) epidemiology; and (iv) the socio-economic impact of FMD.

Roadmap strategy 3 encourages more resource sharing amongst Members. It also encourages such support to be extended to other countries, in particular endemic countries in Asia which are considered epidemiologically linked to the Region. The resources are not limited to financial support but could also include materials such as vaccines and test kits or even technical assistance such as training and exchange of experts.

The expected outcomes of this strategy are:

- 1) More support from Members towards FMD control in the Region,
- 2) Better coordination and sharing of results, funding activities and epidemiological information amongst Members.

4. Tools and key activities

Tools and key activities to be implemented under each Component, as well as relationships between them are listed in the Part B of the Global FMD Control Strategy. In addition to the first two Components included in the Global Strategy, namely FMD control and Strengthening Veterinary Services, NCPs of Members added. Regional Cooperation, and Funding and resource arrangement as indispensable components for the Roadmap for FMD Control in East Asia.

4.1 Component 1: FMD Control

Tools to be used:

- FMD Progressive Control Pathway (PCP-FMD)
- Regional roadmaps
- OIE Codes and Manuals for OIE standards, diagnostic tools, recognition of disease status and endorsement of control programmes
- OIE PVS Pathway
- Diagnostic techniques and laboratories
- Vaccines and vaccination
- Surveillance and epidemiological analysis
- Animal quarantine and animal movement management
- Other tools described in the Annex 2 of Part A of the Global FMD Control Strategy (available on the OIE and FAO Websites)

Suggested activities

At the national level, activities and training recommended in the Global FMD Control Strategy are those focusing on extension of FMD control measures to all FMD-susceptible domestic species:

- 1) Prompt response mechanisms (emergency and contingency planning, upgraded surveillance strategies, implementation of emergency response measures including culling);
- 2) Intensive, risk-based or targeted vaccination (depending on strategy);
- 3) Implementing the legal framework to effectively control FMD and contain outbreaks;
- 4) Developing public/private partnerships;
- 5) Application to the OIE for endorsement of the Official National FMD Control Plan; and,
- 6) Where appropriate, surveillance of wildlife.

The PCP-FMD is a set of FMD control activities stage that, if implemented, should enable countries/territories or zones to progressively increase the level of FMD control to the point where an application for OIE-endorsement may be successful and the status sustainable. The activities depend on objectives of the National FMD control plan, and the FMD control plan is defined according to the PCP stage of the country. For example, when the country is in PCP Stage 2, the aim of the National control plan should be to progressively decrease the number of outbreaks, while when the country is in PCP Stage 3, the control plan has a more aggressive objective to attain the eradication of the virus. The FMD control plan to be submitted to the OIE for official endorsement has to comply with a series of criteria which are described in the OIE Terrestrial Animal Health Code and which correspond to an FMD situation and Veterinary Services capabilities attained at the end of PCP stage 3 . Details of principles, stage descriptions and standards are described in the PCP-FMD Guideline.

At the regional level, the Global FMD Control Strategy recommends activities to strengthen Regional GF-TADs Steering Committee initiatives on:

- 1) Coordination and harmonisation of National FMD Control Strategies, application of risk analysis methods and communication strategies;
- 2) Providing (international) expertise if required;
- 3) Development of sustainable epidemiology networks for regional surveillance;
- 4) Development of laboratory networks coordinated by a regional leading laboratory or reference laboratory;
- 5) Organisation of Regional FMD Roadmap meetings;
- 6) Establishment of vaccine banks and independent vaccine quality control centres where appropriate.

Some of the suggested activities such as convening Roadmap meetings, providing expertise, supporting laboratory networks, and coordinating FMD vaccine donation and post vaccination surveillance are on-going or in the planning phase. Other regional activities can be proposed and considered in the CC Meeting under the OIE/JTF Project for FMD Control in Asia and/or Regional Steering Committee Meeting on GF-TADs for Asia and the Pacific.

4.2 Component 2: Strengthening of Veterinary Services

Tools to be used:

- OIE Standards on the quality of Veterinary Services
- OIE PVS Pathway OIE Twinning Programme for laboratories and veterinary education
- Other tools described in the Annex 3 of Part A of the Global FMD Control Strategy (available on the OIE and FAO Websites)

Suggested activities

OIE Terrestrial Code Chapter 3.1 on the quality of the Veterinary Services describes standards of VS based on fundamental components.

OIE has also developed the “OIE PVS Pathway” to assist its Members in complying with OIE Standards. The OIE PVS Pathway is a multi-phased approach combining evaluation tools (diagnostic, prescription and monitoring phases) and capacity-building programmes (‘treatment phase’: legislation support missions, twinning programmes) aiming at strengthening Veterinary Services.

The ‘tool’ for the Evaluation of Performance of Veterinary Services (OIE PVS Tool) is used to assess the level of compliance of national VS with OIE standards on quality of the VS and to assess the progress made over time.

Although the OIE PVS Pathway is on a voluntary basis, Members are encouraged to use this concept in their respective country and create opportunities for understanding the its tool especially as it relates to the application of the FMD-PCP. A few Members progressing along the PCP pathway, in parallel, have to improve their VS to be able to fulfil the OIE criteria. Members should consider requesting PVS evaluation missions or follow-up missions and where indicated, also Gap Analysis missions.

The capacity building activities are important at the national level. In the Global FMD Control Strategy it is recommended that activities and training focus on the establishment of an appropriate institutional environment, which includes the required legal/regulatory framework and inter-Ministerial cooperation and delegation of activities under the supervision of the VS; contingency planning and emergency preparedness, including funding

of compensation; strengthening animal identification and movement controls as well as slaughterhouse surveillance; an effective prompt response mechanism preferably with rapid response teams; and effective management of resources and operations.

At the regional and international levels, activities should focus on coordination, as well as gaining support for disease-specific laboratory and epidemiology networks. Recommended activities include:

- 1) Supporting joint capacity building workshops to strengthen regional animal health expertise;
- 2) Participating in regional conferences on animal health;
- 3) Supporting relevant regional meetings of regional and international organisations; and
- 4) Participating in regional GF-TADs and roadmap meetings. Many of these activities have already been attended to.

4.3 Component 3: Prevention and control of other major diseases of livestock

Tools to be used:

- Tools and procedures to be used for implementing Components 1 and 2
- OIE Terrestrial Code and OIE Terrestrial Manual, disease specific chapters
- OIE and FAO References Centres and networks
- National, regional and international epidemio-surveillance systems and networks
- Vaccination
- Other tools described in the Annex 4 of Part A of the Global FMD Control Strategy (available on the OIE and FAO Websites)

Suggested Activities:

Activities to serve this component can be built on experiences or lesson learned from control or eradication program of other animal diseases, or from other countries or regions. For example PCP concept is now foreseen for other animal diseases.

Strengthening of some activities will have generic effects in enhancing animal disease control, such as animal movement management, biosecurity improvement, epidemiology-surveillance network, laboratory network.

These activities could be strengthened at national, regional and international levels.

4.4 Component 4: Regional Cooperation and Coordination

Tools to be used:

- Epidemiology networks, e.g., outbreak information, surveillance strategies and results as well as risk area indicators, type of vaccine being used and when possible, efficiency of vaccines in the field

- Laboratory networks, e.g., genetic and serological characterisation of circulating FMDV, vaccine matching, vaccine efficacy and quality or any other laboratories outside the region, provision of training opportunities in the region

Suggested Activities

“Regional Cooperation and Coordination” is a crucial component for Roadmap strategies 2 and 3. Possible cooperative activities are suggested such as, emergency vaccine sharing, financial support to countries with limited resources, joint research and joint surveillance. To efficiently prevent and control FMD in the Region, relevant epidemiological information should be shared in a more frequent, immediate and detailed manner among neighbouring Members based on mutual agreement. Types of information to be shared and how such information should be utilised is to be agreed in advance among Members. The OIE Regional Representation should facilitate such activities in respect of the regional FMD control plan, especially information sharing among Members.

Some activities under this component are on-going, for example NCP and CC meetings which serve as platforms to share information on National Strategy and experience in FMD control. In addition, bilateral or multilateral technical cooperation programme/projects on FMD control among neighbouring countries were established and have been continued such as FMD surveillance along the borders. In respect of research, leading FMD laboratories in the Region have on-going joint research projects and will share their project findings in FMD Scientific Meeting for East Asia. Topics for research and gap in knowledge were discussed and listed. New proposals or improvement of existing activities can be discussed during CC Meetings under the OIE/JTF Project on FMD Control in Asia, as well as at the Regional Steering Committee Meeting on GF-TADs for Asia and the Pacific.

4.5 Component 5: Funding and Resource arrangements

Tools to be used:

- National funding which is crucial to the control of FMD in this region
- Regional and international support
- OIE Twinning Programs for laboratories and veterinary education

Suggested Activities

Resource mobilization within the region to support FMD control in some strategic areas should be encouraged, as FMD prevention and control respects no national borders. It is unlikely that a single country can maintain long-term or permanent free FMD status without sufficient control in other countries and especially neighbouring countries.

Most Members have sufficient national funding to support in-country FMD control. In addition, there are several activities in East Asia that demonstrate resource mobilization

within the Region to support FMD control in some strategic areas and during the time of outbreaks. Examples are FAO projects on FMD Control funded by RO Korea, donation of FMD vaccine from Japan, and technical assistance from PR China for Laos, Vietnam and Myanmar. These and other related activities should be encouraged with better coordination and information sharing not only within East Asia, but also with neighbouring countries in the Region.

5. Roadmap Development

2011: The Inception Meeting of the OIE/JTF Project for FMD Control in Asia (December 2012, Tokyo) recognised activities and a framework of the Project, including the development of a FMD Roadmap. The Meeting recommended that the CVOs assign a contact person to participate in Roadmap drafting. After that an officer from each Project member was assigned by the respective CVO to participate in the development of a Roadmap for FMD Control in East Asia.

2012: During the first National Contact Person (NCP) Workshop (August, 2012, Tokyo), the NCP reported that as of August 2012:

- PR China is drafting a national control plan which is expected to be launched in 2013;
- Chinese Taipei currently has a Contingency Plan for FMD which need to be updated to include other components;
- Hong Kong SAR of PR China will discuss among authorities to develop a plan;
- Japan has existing FMD control plan, written in Japanese;
- RO Korea currently has an Action Plan for FMD Control, which may need to be updated to include all components; and
- Mongolia is drafting a FMD control plan.

The NCPs discussed the development of a Regional Roadmap for FMD Control in East Asia and agreed on:

1. The outline of content to be included in the Roadmap;
2. PCP stage based on self-evaluation and the 5-year projection of progress along PCP pathway;
3. Process for the development of the Roadmap and endorsement;
 - 3.1 NCP workshop agreed on outline and content of the Roadmap as well as process to get endorsement (Aug, 2012)
 - 3.2 OIE-AP prepares the first draft according to the content provided by NCPs. The draft will be electronically circulated to CVOs and NCPs for comments. The comments will also be shared to establish a common view among Members.
 - 3.3 The (revised) first draft will be presented at the First Coordination Committee Meeting (CC Meeting) (November, 2012)
 - 3.4 The draft Roadmap will be revised again based on the feedback from the CC Meeting

3.5 Main content of the Roadmap is expected to be approved by CC in 2013

3.6 Country information and PCP stage, in the annexes, can be updated each year

4. Providing information as requested to be incorporated in the Roadmap; and

5. Proposing the first draft of the Roadmap to the Coordinating Committee in November, 2012.

NCPs performed the PCP self-evaluation exercise and established the provisional PCP stage of Members. Five-year projections are depicted in Appendix 4. It has been circulated to CVOs for validation.

Following the NCP Workshop, the First Coordination Committee Meeting was convened in November, 2012. The Meeting endorsed the recommendations and report of the NCP Workshop, including the process to develop the Roadmap and the proposed outline of content, as well as proposed additional information to be included in the revised version of the Roadmap.

The Meeting recommended that:

- National FMD Strategic and Control Plans be developed in each Member Country to control FMD and to speed up official applications for OIE endorsement; and
- National Contact Persons be appointed by OIE Delegates to participate in drafting the FMD Roadmap for East Asia, providing information as requested, and being a contact point regarding activities of the Project. National Coordinators will be the contact persons in country Members of SEACFMD Sub-regional Commission.

2013: The 2nd NCP Meeting was convened back-to-back with the 2nd CC Meeting in Ulaanbaatar, Mongolia (6 and 7 October, 2013). The NCPs agreed to propose the draft Roadmap for FMD Control in East Asia for endorsement by the Coordination Committee, with the appendices being reviewed and updated annually. In addition the NCPs recommended that a schematic presentation reflecting the expected achievements of each Member should be prepared, which would assist countries on the way forward, indicating the time lines, what needs to be achieved and what needs to be done to achieve the goals as well as what are the indicators to monitor and evaluate the progress.

The 2nd CC Meeting adopted, with minor amendments, the proposed draft Roadmap for FMD control in East Asia, and recommend that country profile, PCP stage, and National FMD Control Strategies / Program of Member Countries be annually reviewed and updated. The CC Meeting endorsed the recommendations and report of the second NCP Meeting, including update of country profiles and PCP stage classifications, the process to develop/update National FMD Control Strategies, National Official control programme for FMD and the proposed time frames. The 2nd CC Meeting also recommended that National FMD Strategic and Control Plans be developed by each Member, with possible assistance from OIE/JTF Project on FMD Control and OIE Regional Representation in order to meet the working timetable for the endorsement by the World Assembly of Delegates.

2014: *(This part is updated by May 2015)*

Expanded 3rd CC meeting of National Contact Persons of OIE/JTF Project on FMD Control in Asia was convened in Lanzhou, China on 24-25 September 2014. NCPs discussed on development of The Roadmap for FMD control in East Asia and agreed on to accept the modifications of the Annex of the Roadmap, based on updated information provided by NCPs; endorses the proposed activities of OIE/JTF Project on FMD Control in Asia for the year of 2014-2015 and encourage the countries to conduct socio economic impact studies in their countries.

Therefore, this meeting recommends to continue close collaboration and institutional coordination between OIE/JTF Project for FMD Control in Asia and SEACFMD Campaign as well as with other projects and organisations to ensure a complementarities; better information sharing on relevant FMD related topics, especially information on circulating viruses, be promoted and implemented in East Asia; strengthening communication on and harmonising FMD related activities between Veterinary Services and all relevant stakeholders, including donors, while recognising the importance of small holder's collaboration for better controlling the disease; the direct and indirect costs associated to FMD being better quantified so that Veterinary Services have the relevant information to advocate the need to invest in sustainable FMD control; and participation of members in SEACFMD Sub-commission Meeting, and participation of Russia to OIE/JTF Meeting on FMD Control in Asia be encouraged.

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Appendix 1: Country Profiles

COUNTRY PROFILE OF PR CHINA

(Appendix 1: Country profile of PR China, as updated by July 2015)

1. Agencies or organisation responsible for FMD prevention and control

Veterinary Bureau, Ministry of Agriculture, subordinate institutions, local government of animal husbandry and veterinary department, Animal disease control center, Animal health supervision institution.

2. FMD diagnostic network in the country, region, state or province

National Foot and Mouth Disease Reference Laboratory Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences is the country key laboratory for the diagnosis of FMD.

Prefectural animal disease prevention and control centres are in charge of field investigation and clinical diagnosis, Provincial animal disease prevention and control centres are in charge of primary diagnosis by conventional RT-PCR, real time PCR and ELISA, while National FMD Reference laboratory make a definite diagnosis of FMD.

3. Samples submission to OIE Reference Laboratory(ies)

Yes. All positive samples submitted to the OIE Reference Laboratory (Lanzhou Veterinary Research Institute)

4. FMD control measures and contingency program

4.1 FMD control measures:

Compulsory vaccination

A species-based vaccination strategy shall be specified. Specifically, ruminants, such as cattle and sheep/goats, shall be vaccinated with inactivated type O and Asia I vaccines; dairy cattle and breeding bulls shall be vaccinated with inactivated type O, Asia I and A vaccines; and pigs shall be vaccinated with type O vaccines.

Surveillance and early-warning

The establishment of disease reporting system

Inspection and supervision

The requirements for animal movement shall be tightened. Livestock production and distribution of live animals shall be encouraged for FMD free zones. Designated passage and market access system will be applied, and slaughtering and animal movement within the local

areas will be encouraged. It is strictly prohibited to move animals and animal products out of the infected areas.

Outbreak response

In case of outbreaks, response activities will be conducted immediately in accordance with the *Technical Code for Foot and Mouth Disease Control*, including blocking the infected areas, culling all infected animals and cohort animals, and disposing them with hazard-free methods, so as to control the disease in line with the principle of “early detection, rapid response, strict measures and small scope”. Based on the serological surveillance results, emergency vaccination will be practiced for susceptible animals in the threatened areas. Emergency epidemiological investigation will be carried out to track the source and analyze the spreading risk.

Prevention of exotic diseases

Joint control actions in the border areas will be enhanced, and the long-term mechanism for exotic animal disease control will be improved, so as to prevent introduction of exotic diseases stringently.

Biosecurity management

Good biosecurity practices shall be applied in all stages from animal production to marketing, to form routine sanitation, cleaning and disinfection systems.

Supervision over animals which die of disease in all stages from animal production to marketing will be intensified.

Assessment and recognition of FMD free Status

The system for assessment and recognition of FMD-free status will be developed and improved to provide better assessment procedures and criteria. The application for FMD freedom recognition can be submitted when any animal population or area meets the national criteria for FMD freedom with or without vaccination.

4.2 Contingency program:

Measures for outbreak spots

All infected animals and herds within the outbreak spot shall be culled and destroyed, and the died and culled animals as well as their products shall be subject to biosafety disposal in accordance with the national standard.

The contaminated or suspected feces, bedding, feed, sewage, etc. shall be subject to biosafety disposal in accordance with the regulations.

The contaminated or suspected contaminated transportation facility, appliances, housing and field, shall be strictly disinfected.

The livestock and their products that are sold 14 days before the outbreak shall be traced, culled and shall be subject to biosafety disposal.

Measures for outbreak area

Warning signs shall be set up around the outbreak area, and animal inspection and disinfection station shall be set up at traffic intersection accessing to the outbreak area; the personnel, vehicles and related articles entry and exit of the outbreak area shall be disinfected.

Susceptible animals within the outbreak area shall be quarantined; strengthen the continuous disease monitoring and epidemiological investigation, carry out the risk assessment; according to the immune situation of susceptible animal, urgent vaccination shall be carried out, and all the vaccination information should be recorded. Any animals with clinical signs or positive result shall be immediately culled and subject to biosafety disposal according to the state-specified standards.

The feces or suspected contaminated feed, bedding, sewage, etc. shall be subject to biosafety disposal according to the regulations; the suspected contaminated things, transport facilities, appliances, housing and field shall be strictly and thoroughly disinfected.

The transportation, housing and field appliances and the ground shall be strictly and thoroughly disinfected.

The live pigs, cattle, sheep and other livestock markets shall be closed, and the susceptible animals and their products are prohibited from entry and exit of the outbreak area.

Measures for the threatened areas

According to the immune situation of susceptible animal, urgent vaccination should be carried out, and all the vaccination information should be recorded. Strengthen the monitoring of livestock farms, slaughterhouses and market so as to timely grasp the outbreak information.

Control of wild animals

Get the information of The distribution and disease situations of the susceptible animals in the outbreak area, the threatened area and the surrounding area shall, and according to the epidemiological investigation and surveillance results, corresponding measures shall be taken to prevent the wild boar, Mongolian gazelle and other wild cloven-hoofed animals from contacting with farmed livestock. The local forestry department shall regularly report the relevant information to the competent veterinary authority.

5. Compensation plan

China has developed the policy of compensating farmers over losses due to livestock being killed for FMD. The compensation subsidy is jointly shared by the government (80 %) and farmers (20%). The central budget respectively bears 40%, 50% and 60% of the total government shared culling subsidy of the east, middle and west region.

6. Measures adopted after the end of outbreaks

6.1 Epidemiological investigation;

6.2 Encourage and assist farmers recovering of production.

7. Main challenges encountered during the implementation of FMD control

7.1 There are still a many animals being raised by the traditional free-ranging practice;

7.2 Large scale and frequent long-distance transportation of animals.

8. Suggestions to improve FMD control in the country:

Improve disease monitoring and early warning capabilities, the sudden epidemic emergency management capacity, supervision on animal movement and law enforcement capacity

9. On-going studies or research on FMD.

Virus-like particles vaccine research, Reverse genetic manipulation, marker vaccine, virus receptor research

10. Suggested topics or activities for technical collaborations

China is a Member of SEACFMD.

COUNTRY PROFILE OF CHINESE TAIPEI

(Appendix 1: Country profile of Chinese Taipei, as updated by June 2015)

1. Agencies or organisation responsible for FMD prevention and control

Bureau of Animal and Plant Health Inspection Quarantine (BAPHIQ), Council of Agriculture, is the central authority in charge of FMD prevention and control.

The Prefectural Livestock Disease Control Centres (LDCCs) are the local authorities responsible for FMD prevention and control, and enforce the related activities and emergency response.

Animal Health Research Institute (AHRI), Council of Agriculture is the only national laboratory responsible for FMD surveillance, case diagnosis and confirmation as well as epidemiological investigation and data analysis.

2. FMD diagnostic network in the country, region, state or province

The national laboratory (AHRI) takes charge of FMD diagnosis and case confirmation. Two regional laboratories at Agricultural Technology Research Institute (ATRI) and National Pingtung University of Science and Technology (NPUST) are responsible for routine NSP antibody surveillance of ruminants.

As the suspected case with vesicular diseases was observed or found, the veterinarian or farm owner/keeper shall make a report to the LDCC compulsorily in accordance with the law. The LDCC conducts clinical inspection and epidemiological investigation immediately when the suspected case has been notified. If the case seems to be FMD after investigation, the LDCC shall notify BAPHIQ at once, collect samples and send them to AHRI for final (confirmatory) diagnosis simultaneously. The result of serological and virological tests will be feedback to BAPHIQ and the LDCC for early response and disease control.

3. Samples submission to OIE Reference Laboratory (ies)

AHRI sent O/FMDV/YL/2009 (O-TAIWAN), O/FMDV/KM/2012 (O-SEA) and O/FMDV/PH/2012 (O-Taiwan) to Pirbright lab, FMD world reference laboratory, in June 2009, May 2012 and November 2013 to evaluate the R1 value of vaccines used in the field. In addition, AHRI also sent probang samples and sera to Pirbright lab, FMD world reference laboratory, in May 2015 to confirm the serotype of infection. AHRI has its own budget for submissions.

4. FMD outbreak control measures and emergency response plan

- Movement restriction: restriction shall be conducted on the infected farm.

- Modified stamping out policy: culling of clinical infected animals and animals which kept in the same pen. The other animals with normal condition within the affected farm shall be vaccinated with one dose of vaccine compulsorily.
- Disinfection: the activities would be carried out on the affected premises, areas and epidemiological-linked establishments.
- Inspection and epidemiological investigation on surrounding farms kept cloven-hoofed animals within the 3-km radius area of the infected farm at the time when FMD case was confirmed: any suspect case or epidemiological evidence were detected or linked, the corresponding farm would be movement restricted for 14 days for further sampling and actions.
- Emergency use of vaccination: monovalent inactivated serotype O vaccines were used for blanket vaccination. Commercial vaccines and antigen bank of serotype Asia-1, A and O (100 thousand doses of commercial vaccine for each serotype and 750 thousand doses of antigen for each serotypes, respectively) are stockpiled for emergency use for the incursion of other serotype strain of FMDV.
- Public awareness and educations on owners/keepers of animals, veterinarians and stakeholders.

5. Compensation scheme

The compensation scheme is in accordance with the law (Statute for Prevention and Control of Infectious Animal Disease).

The municipal and county (city) competent authority shall set up a valuation committee to decide the prices of animals and objects, and compensate according to the following standards:

- For sacrificed animals because of suspected or possible infection, compensation shall be made within the evaluated price.
- For sacrificed animals because of infection, compensation shall be made within three- fifth of the evaluated price.

6. Post-outbreak activities:

- Epidemiological investigation and study are conducted to determine the potential source of outbreak or infection routes to block the pathway.
- Executing vaccine matching test to evaluate the efficacy the vaccine if necessary.
- Implementing targeted surveillance to check viral activities in the field.
- Conducting studies or research on FMD.

7. Major constraints when implementing FMD control measures:

- Low biosecurity level on family farms or small scale farms.
- The wrong way to preserve and use the vaccines with the result of low/ insufficient efficacy or protection.

- Some opportunistic farmers are reluctant to follow the vaccination program.
- Small amount of pigs would be delivered out the livestock auction markets for slaughter, providing a possible risk of spreading.

8. Suggestions to improve FMD control in the country:

More (constantly) educations, awareness campaigns, on-site assistances and incentive measures are conducted to encourage the owners/keepers to follow the vaccination campaigns, to carry out on-farm biosecurity measures, and to make disease report instantaneously.

It's necessary to conduct and intensify activities on FMD active surveillance on cloven-hoofed animal farms and livestock auction markets to evaluate the efficacy of vaccination policy (the SN titer expression of vaccinated animals) and to detect suspect case (NSP antibody) for early response.

In order to make sure of well herd immunity of small scale farms kept cloven-hoofed animals, it's useful to arrange the contracted or official veterinarians to conduct the compulsory vaccination campaigns.

COUNTRY PROFILE OF HONG KONG SAR OF PR CHINA

(Appendix 1: Country profile of HongKong SAR of PR China, as updated by June 2015)

1. Agencies or organisation responsible for FMD prevention and control

Agriculture, Fisheries and Conservation Department, HKSAR (AFCD) oversees and advises on prevention, control and implementation.

2. FMD diagnostic network in the country, region, state or province

The Tai Lung Veterinary Laboratory (TLVL) of AFCD is main laboratory.

Samples from slaughterhouses and local farms will be collected by the Food and Environmental Hygiene Department, HKSAR (FEHD) and AFCD respectively and submitted to TLVL for FMD testing.

3. Samples submission to OIE Reference Laboratory(ies)

Samples have been submitted to Institute for Animal Health, Pirbright Laboratory (Pirbright) for further analysis. TLVL has budget for sending the samples.

4. FMD outbreak control measures and emergency response plan

- Diagnosis and serotype typing of outbreak strains
- Mass vaccination with multivalent Serotype O vaccine(s)
- Biosecurity advice

5. Compensation scheme

Nil

6. Post-outbreak activities:

Post outbreak investigation including sampling, advice, and vaccine recommendations.

7. Major constraints when implementing FMD control measures:

- Slaughterhouse practice.
- On farm quarantine and biosecurity practice

8. Suggestions to improve FMD control in the country:

Clean source of importation, quarantine, farm and slaughterhouse biosecurity.

9. On-going studies or research on FMD.

The phylogenetic analysis and vaccine matching provide information of the circulating strains and vaccine performance which enable us to discuss with vaccine manufacturer and give advice to the farmers.

At present, FMD type O was the circulating FMD serotype in our region and both topotype Cathay and SEA were isolated in Year 2010 and 2011 while Cathay was isolated in 2013 and 2014.

Result of vaccine matching of a positive case in Feb 2014 suggested that both O1 Manisa and O-3039 strains in the original FMD vaccine (AFTOPOR) were not protective against the isolate. In the meeting with the vaccine manufacturer, they suggested and agreed adding one more vaccine strain — O-4720 to make AFTOPOR better efficacy and potency against the circulating strain.

10. Suggested topics or activities for technical collaborations

OIE reference laboratory provides external quality assurance programme for detection and diagnosis of FMD.

COUNTRY PROFILE OF JAPAN

(Appendix 1: Country profile of Japan, as updated by June 2015)

1. Agencies or organisation responsible for FMD prevention and control

At ordinary times, Animal Health Division in Ministry of Agriculture, Forestry and Fisheries (MAFF) is the national Veterinary Authority which has primary responsibility for preventing FMD. The Division is planning, coordinating, and guiding any matters concerning animal health in coordination with international organisations, prefectural governments and National Institute of Animal Health (NIAH), which is designated as the national reference laboratory for FMD. It also supports prefectural governments and their local veterinary service centres, and holds training courses for local veterinary officers. Local veterinary service centres in prefectural governments actually impose control measures at the front line and give guidance to livestock producers.

Once a case of FMD is confirmed, we immediately establish a Task Force for FMD Control in MAFF, which holds then primary responsibility for controlling FMD. The Task Force determines control policies after consultation with the advisory committee and administers control measures in coordination with related Ministries, prefectures, producer societies and NIAH. Local veterinary officers in local veterinary service centres implement control measures in principle. According to situations, however, reinforcements are mobilised to the site from all over the country including the central government, Animal Quarantine Service, other prefectures, government related organisations, livestock related organisations and veterinary colleges and universities and the Self-Defence Forces to be involved in FMD control.

Animal Quarantine Service, which belongs to MAFF, administers export and import animal quarantine according to the Domestic Animal Infectious Disease Control Law, and other national and international standards, including OIE Code in coordination with the Veterinary Authorities of trade partners.

2. FMD diagnostic network in the country, region, state or province

NIAH is the national reference laboratory for FMD in Japan, which is the only authority to diagnose it. When farmers or private veterinarians report suspicious cases of FMD to local veterinary officers of prefectures, the officers visit the farms immediately, then after consulting the clinical symptoms including digital pictorial data of the gross lesion with the prefectural and national Veterinary Authorities, submit collected samples to NIAH for analysis.

3. Sample submission to OIE Reference Laboratory(ies)

NIAH sent the sequence information and the FMD virus strain itself isolated in Japan to the Institute for Animal Health in the United Kingdom (Pirbright laboratory, OIE/FAO Reference Laboratory for FMD) to compare with those isolated in other countries.

4. FMD outbreak control measures and emergency response plan

- a. Stamping out policy: An epidemiological unit applied for FMD control is fundamentally defined as a farm. Livestock, cloven hoofed animals namely cattle, water buffalo, deer, sheep, goat, pig and wild boar, which are confirmed or suspected to be infected with FMDV as well as those kept in the same farm or contacted in the past 7 days are all destroyed. In addition, farms which keep livestock raised by the same personnel of the affected farms are recognised as epidemiologically related farms and all livestock kept there are also destroyed.

In case it is difficult to prevent the spread of FMD by stamping-out at infected farms and movement control, Minister of Agriculture, Forestry and Fisheries can designate zone-based destruction of the healthy livestock to slow down and prevent expansion of the spread, namely *precautionary culling*.

- b. Movement control zones: Movement control measures are applied to both categories of *movement restriction zones* established within 10 km around the affected farms, range of which can be either enlarged according to the farm and animal densities or reduced at later stages, and *shipment restriction zones* established within 10km surrounding the *movement restriction zones*. The movement, in general, or shipment of the followings are prohibited: livestock, both live and dead animals, milk expressed in affected farms and those within 1 km radius, semen and embryos collected within past 21 days, bedding, feed, and excrement, and equipment used in handling the livestock. In addition, the followings are restricted: holding livestock markets and other events that gather livestock and pasturing within both zones, and operation of the abattoirs within the movement restriction zones. Disinfection stations for vehicles and passers-by are set such as at around the affected farms and surrounding borders of each restriction zone. On the condition that freedoms of the *movement restriction zones* are confirmed by the clinical and serological tests, the movement and shipment restrictions are successively lifted 21 days after completion of the stamping-out, disposal and disinfection.
- c. Emergency vaccination: Vaccination against FMD is prohibited in Japan. MAFF exceptionally decides emergency vaccination and use of anti-viral material when making decision on *precautionary culling*. The vaccinations are applied to the animals designated for *precautionary culling* and conducted from the rim to the centre of the area in principle and prioritising pigs. All the vaccinated animals are destined for destruction. In recent years, oil adjuvanted inactivated FMD vaccines effective against

type O (O1-Manisa), type A (A-Malaysia 97) and type Asia 1 (Asia 1-Shamir) are stored in Japan for emergency. The types and quantity of stocks are determined by an expert meeting, taking FMD situations in the world into account.

5. Compensation scheme

According to the Law, MAFF fully compensates livestock owners for the loss incurred by stamping out and *precautionary culling* including those with emergency vaccination. The compensation is reduced accordingly in case of any violation of the Law taking into account biosecurity measures of the livestock owners, timing of the notification, cooperation to the control measures undertaken by the local governments. In addition, MAFF gives compensation for the loss caused by the movement and shipment restrictions.

6. Post-outbreak activities:

- a. FMD freedom surveillance: Each movement restriction is to be lifted 21 days after the control measures including stamping-out, disposal and disinfection of all outbreaks in the zone are completed. Prior to the lifting, FMD freedom surveillance and intensive disinfections are to be conducted in the zone. The surveillance is composed of clinical inspections targeted at all susceptible animals kept in farms in the zone except farms keeping only less than 5 heads of deer, sheep, goats, swine or wild boars, as well as serological tests based on randomised sampling of susceptible animals in the zone. The sampling is to be carried out at level sufficient to detect 10% prevalence within the herds of each farm with at least 95% level of confidence.
- b. The final FMD freedom surveillance: The final FMD freedom surveillance is conducted to prove the absence of FMD virus infection/circulation in Japan after all movement restrictions are lifted. The surveillance is designed according to the OIE Code, taking the actual FMD situations into account.
- c. Wildlife surveillance: Hunting of wildlife is prohibited in Japan in principle. Exceptionally permitted is restrictive hunting that aims at culling out noxious wildlife against agriculture and forestry. For wildlife surveillance, test samples are collected from susceptible wild life which is exceptionally hunted under the above mentioned framework. The samples are submitted to the NIAH which conducts genetic and serological tests.

7. Major constraints when implementing FMD control measures:

The Veterinary Authorities of Japan has learnt a lot of lessons from the FMD event in Japan in 2010. The main lessons are;

- a. Coordination among the central government, the prefecture and the municipalities were insufficient, which brought about unnecessary confusions.

- b. The biosecurity standards were not well followed by farmers. In addition, the standards were not practical.
- c. Early detection and early notification were not executed. The infection spread due to oversights of the cases and delayed notifications.
- d. Preparations for control measures including arrangements for burial sites were incomplete. It took several days after confirmations of the cases to destroy and bury the animals because the determination of disposal sites required time.
- e. The emergency vaccinations were too late due to lack of compensation system for the losses by destruction of vaccinated animals.

8. Suggestions to improve FMD control in the country:

The Law was amended on 4 April 2011 with high priority in the parliament. Japan developed Ministerial Orders and amended related guidelines for its full enforcement from 1 October 2011. The main points of the amendment are the followings:

- a. Strengthening quarantine measures: Animal quarantine officers have been given authority to ask questions to people entering Japan and to conduct disinfection of their goods if necessary.
- b. Notifying animals showing certain clinical signs: Owners or veterinarians shall notify the prefectural governor of animals that show certain clinical signs when they find it out.
- c. Securing burial sites: Burial sites or other methods such as incineration shall be primarily secured by farmers, and prefectural governors shall support them if necessary.
- d. *Precautionary culling* and compensation for the loss: The provisions have been incorporated into the Law.

9. On-going studies or research on FMD.

Since 2011: The NIAH is advancing research on FMD prevention with an antiviral agent of T-1105, discrimination of the antibody by natural infection from that by vaccination, rapid identification of FMD infection, development of rapid diagnosis kits for FMD as well as analysis of pathogenesis of FMDV O/JPN/2010 strain.

10. Suggested topics or activities for technical collaborations

The NIAH, as OIE Collaborating Centre for Diagnosis and Control of Animal Diseases and Related Veterinary Products in Asia, is always open for technical collaborations with OIE Reference Laboratories for FMD in Thailand and China and Members within Asian region.

COUNTRY PROFILE OF REPUBLIC OF KOREA

(Appendix 1: Country profile of Republic of Korea, as updated by June 2015)

1. Agencies or organisation responsible for FMD prevention and control

Organisations for FMD control are largely divided into those of central government, municipal government.

- MAFRA (Ministry of Agriculture, Food and Rural Affairs): establishment and management of emergency headquarters and quarantine strategies.
- QIA (Animal and Plant Quarantine Agency): fine scientific tests, epidemiological investigation, on-site technological support.
- Municipal government: culling of FMD infected or FMD suspicious animals, movement controls, disinfection, vaccination, etc.

2. FMD diagnostic network in the country, region, state or province

Major veterinary services responsible for the prevention and control of FMD are General Animal Health Division of MAFRA, QIA, and Provincial Veterinary Services of municipal governments. Their activities are supported by Livestock Health Control Association, National Agricultural Cooperative Federation, veterinary colleges and the Korean Veterinary Medical Association.

General Animal Health Division and Animal Health Management Division are mainly under control of veterinary services in Livestock Policy Bureau, MAFRA. Their main tasks include the implementation of the Veterinarian Law and Pharmacist Law (for animals), and enforcement of the Domestic Animal Contagious Disease Prevention Law,

QIA is an executive agency of the MAFRA, with the headquarters located in Anyang. Its main tasks are the control and prevention of major animal diseases, border quarantine, quality control of veterinary medical products and research and development for these missions.

Each of the 9 provinces and 8 cities has its own veterinary service, which is responsible for the prevention and control of major animal diseases, meat and milk hygiene, and animal welfare within their authority. These services include the National Livestock Research Institute and animal health laboratories.

3. Samples submission to OIE Reference Laboratory(ies)

Whenever there was FMD outbreak, we sent samples to OIE World Reference Laboratory (Pirbright, UK) with our own budget.

4. FMD outbreak control measures and emergency response plan

- Stamping out of the animals showing clinical symptoms
 - Test and cull or preventive cull
 - Vaccination: Monovalent or Multivalent (e.g. O+A+Asia1)
- Mass vaccination (National vaccination)
 - O1 Manisa Monovalent vaccine : Dec. 2010 ~ September 2011
 - Trivalent vaccine(O+A+Asia1) : September 2011 ~ present
- Movement control
 - implemented on infected farms and the control zones composed of the protection zone (within 3km radius of infected farm), the surveillance zone (between 3 to 10 km radius), and the management zone (between 10 to 20 km radius)
 - Lifted when the clinical and serum examinations after 3 weeks of last culling of animals of animals in outbreak farms.

5. Compensation scheme

Compensations are paid to the owners of culled animals and the compensation amount with consideration of market prices of livestock. If the farm owner failed to report the discovery of FMD- suspect animals or fulfil the obligations, compensations are accordingly reduced by 20-80%.

6. Post-outbreak activities:

Prompt control measures including culling on infected farms and neighbouring farms (preventive culling included), strict movement control, disinfection, were taken in accordance with the SOP for FMD. The SOP specifies detailed control procedures, including emergency measures and tasks of relevant government agencies depending on FMD outbreak situation; measures at the time of discovery of suspected animals and highly suspected animals; procedures for sample collection/sending/diagnosis; on-site disease control guidelines; culling/incineration/burial guidelines; washing/cleansing/disinfection guidelines, and guidelines for operation of movement control checkpoints. Given Korea's specific control conditions, the SOP was divided into two cases: FMD with vaccination and FMD without vaccination.

7. Major constraints when implementing FMD control measures:

Experience showed that the effectiveness of disinfectant declines at extremely low temperature during winter. And some farmers had lack of interest about bio-security.

8. Suggestions to improve FMD control in the country:

To prevent a reoccurrence of FMD, “Livestock industry advancement and Livestock disease control system improvement” measure was made. Intensified disease control measures have been established and carried out, including vaccination, nation-wide disinfection or surveillance programs, strengthened border quarantine inspection, establishment of rapid reaction system for an emergency, etc. ROK need to prepare multivalent vaccine due to neighbour countries have various serotype of FMD.

Each countries need to cooperate with each other and set up a international hot-line for sharing information. Exchanging sequence analysis of FMD and vaccine strains are important for collaboration.

COUNTRY PROFILE OF MONGOLIA

(Appendix 1: Country profile of Mongolia, as updated by June 2015)

1. Agencies or organisation responsible for FMD prevention and control

On a **national level**, various partners are involved. Once the State Central Veterinary Laboratory has confirmed an outbreak of FMD, SCVL informs the CVO, who then informs the Minister of MoFALI, as well as GASI and NEMA. Following this notice, the NEMA convenes to coordinate the FMD control measures. The NEMA operates directly under the Vice-Prime Minister, as discussed earlier in Chapter 2. The NEMA releases the necessary funds for FMD eradication activities from the National Emergency Reserve.

VABA and GASI jointly issue a decree designating the boundaries of the outbreak zone, the buffer zone, the protection zone and the disease-free zone. The decree also indicates the disease control measures that are taken in each zone (details about the measures can be found in Chapter 7.3).

NEMA assists the national authorities, in particular VABA, to implement the disease control measures in the different zones. It mobilizes support of the police force and local veterinary officers. NEMA can also mobilize additional human resources from other, non-affected areas to support in the implementation of disease control measures.

VABA, GASI and NEMA have branches on an aimag (province) level. Officials in the provincial offices go into the field to implement the measures decided by the organisations on the national level. The provinces can request additional human, technical or financial resources from the organisations on the national level when the required resources for the implementation of the measures exceed the available local capacities.

On the soum level (smallest administrative unit), an emergency commission will be established. This commission is responsible for the coordination and implementation of disease control measures on a local level. The staff from the SVU and private veterinarians in the soum assist in the implementation of the disease control measures. Funds needed by the soum are supplied by the provincial budget for emergencies. When the available funds are not enough to cover the needs, the soum governor can make a request to the province for additional funds, which subsequently requests funds from the organisations at the national level.

According to the laws and legislation, the veterinary authorities have the right to keep animals isolated to examine, test and vaccinate them and even destroy the animals without delay whenever a disease outbreak occurs. Provincial services of NEMA, GASI and VABA implement FMD control measures in particular provinces, according to

“Regulation on control with Foot and Mouth Disease”.

2. FMD diagnostic network in the country, region, state or province

State Central Veterinary Laboratory (SCVL) is the national FMD reference laboratory and conducts routine and emergency diagnostic and surveillance tasks for FMD.

FMD laboratory diagnosis is carried out in Mongolia, both at central level and at provincial level. The province veterinary laboratories are designated for preliminary diagnosis and surveillance of infectious diseases, including FMD. In case of an initial positive or suspect result, further confirmatory testing is conducted at the SCVL using OIE recommended tests.

The State Central Veterinary Laboratory (SCVL) is the head institution of the National Veterinary Laboratory Network, which includes 22 provincial laboratories, located at centre of each province.

3. Samples submission to OIE Reference Laboratory (ies)

In the past 10 years, SCVL has sent more than 100 sera and tissue samples from seven FMD outbreaks to the OIE Regional Reference Laboratory for Foot and Mouth Disease in Vladimir, Russia for confirmatory diagnosis and molecular FMDV characterization.

4. FMD outbreak control measures and emergency response plan

Control measures:

The main components of the current national FMD control and eradication strategy in place are:

1. Outbreak investigation
2. Movement control: quarantine in outbreak and surrounding area with animal and transport movement control, according to the Law of Animal and Plant Quarantine, 2003 and The instruction to control FMD, Ministerial Decree, No. A/93, 2014.

In establishing a quarantine regime, international standards, requirements for Mongolian livestock, related characteristics and the geographical situation have to be considered. A quarantine or isolation zone shall be divided into *outbreak*, *suspected*, *protection* and *healthy* zones. Control measures in each zone depend on the disease pattern, area of spread and outbreak magnitude.

Movement control measures are to be adopted for movement in:

- Outbreak zone: which are established on the base of outbreak and epidemiologic units and movement is prohibited.
- Suspected zone: This zone shall define herders with flocks that do not share pasture and water resources, that may be infected but do not show clinical signs and are just outside of the outbreak area. The border of the ‘suspected zone’ shall be

determined and quarantine regimes and control points implemented. Protection zone: This zone is isolated from the outbreak area. A quarantine regime and restriction rules are implemented. The radius of the zone shall be based on administrative borders, geographical barriers and railway networks and guards and check points have to be maintained on a permanent basis. People and livestock are not allowed into the 'protection zone' after cases have been confirmed. This includes herders who have no suspected FMD cases in their flock.

- Healthy zone: This zone encompasses an area outside the 'protection zone' that is considered non-infected. In the event that several outbreak foci are determined in one soum but distant from each other, all the zones have to be established around each one.
3. An epidemiological unit applied for FMD control was fundamentally defined as local families who have same source of pasture and water. Animals which are confirmed to or suspected to be infected with FMDV are to be destroyed. Clinical and serological surveillance have been conducted since suspected case of FMD.
 4. Ring vaccination for the areas outside of the FMD free zone without vaccination, according to the instruction to control FMD. Ministerial Decree, No. A/93, 2014.

Emergency vaccination: An important component of the FMD control strategy in the rest of Mongolia was and is the vaccination of all susceptible livestock populations in high risk areas with the objective of maintaining stable herd immunity. Vaccination is carried out by the delegated private veterinarians of affected and adjacent areas and is supervised by the public veterinarians of provincial veterinary services, which distribute the vaccines to the soums. Vaccination is compulsory and free-of-charge; the private veterinarians are paid by the Government for vaccination services. For routine vaccination, to be delivered within a limited period of time to protect livestock in an emergency epidemiological situation, supporting staff, such as undergraduate veterinary students and retired veterinarians are invited to assist in the vaccination campaign and engaged on contract basis.

5. Since 2000, Russian ARRIAH-made mono "O-type" inactivated vaccine has been used at six-month intervals in the zones set up around the FMD outbreaks of 2001, 2002 and 2004. In 2001, bivalent "O" and "A" types were used. In 2005, Asia-1 type FMD vaccine from Russia (ARRIAH) and since 2006, Indian (Indian Immunologicals) tri-valent (O, A, Asia-1-types) vaccine have been applied in FMD high-risk areas, mostly in the eastern part of Mongolia. Additionally, 200000 doses of Merial-made AFTOVAXPUR Mono O vaccine for bovine, which was supplied by IAEA, were used for emergency control during the FMD spread in the Eastern part of Mongolia in 2010. In 2011, 10.4 million doses of FMD type O and A vaccine have been supplied by the Government of the Russian Federation and 1.68 million doses of FMD vaccine, type O and Asia 1 have been supplied by the Government of PR China as technical assistance

to Mongolia. In 2014, emergency vaccination have been applied in risk area supported by OIE vaccine bank followed by routine vaccination in targeted area particularly in Eastern part of Mongolia serological and clinical surveillance in livestock herds according to OIE Guidance and observation of movements of the Gazelle population in outbreak and surrounding areas

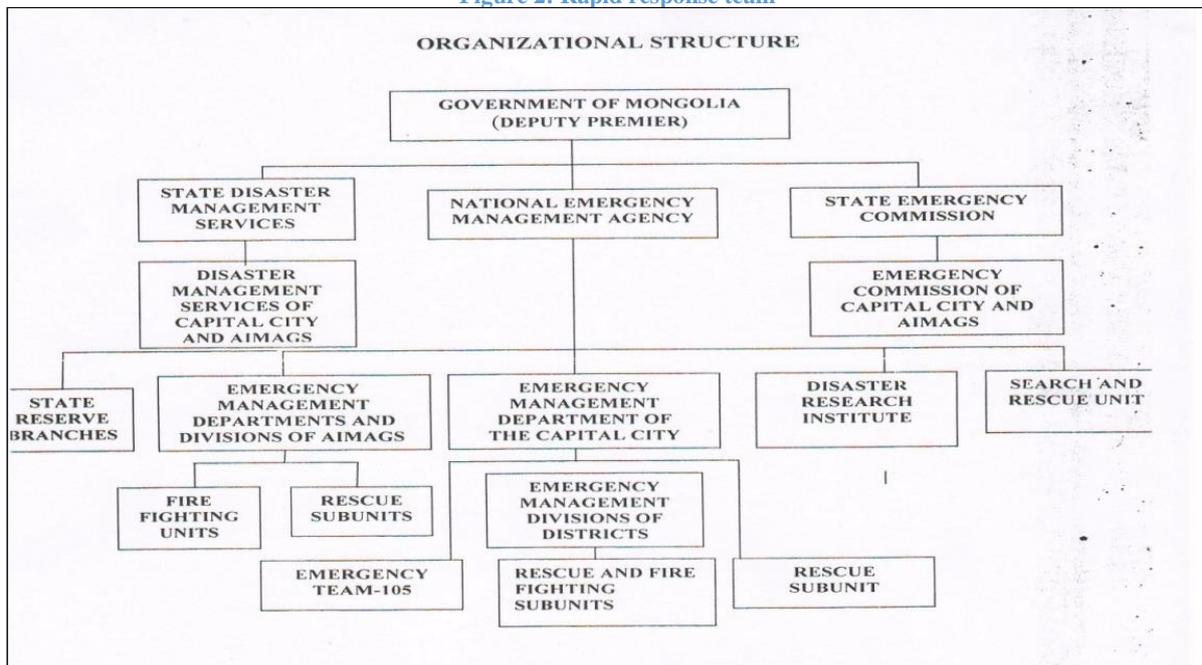
6. improvement of public awareness through social media: TV, radio, newspaper etc..
7. cooperation with OIE and other organisations.

Rapid response to disease outbreak

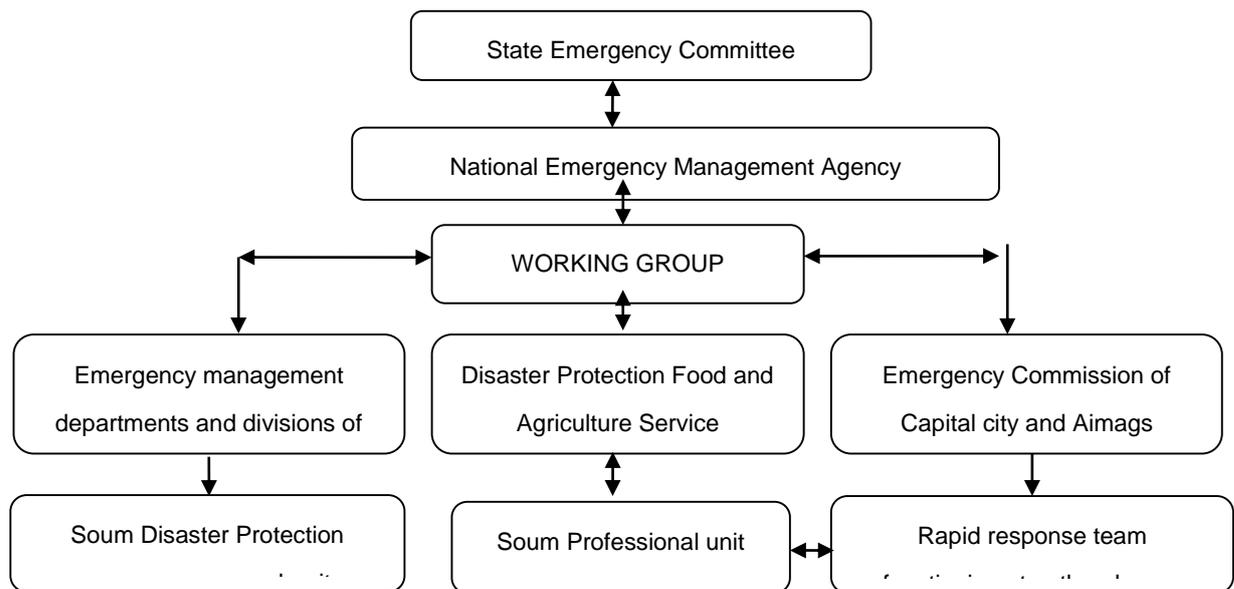
According to the Law on ‘Disaster Protection’, Chapter 3, Article 19, a ‘Rapid Response Team’ has to be assigned by the decision of the Prime Minister to organize and coordinate sectors and enterprises that are involved in an operation in the outbreak area. Decisions of the Rapid Response Team must be enforced by organizations, enterprises and citizens who live in an affected administrative unit and operational costs will be funded from State reserves.

Figure 1: Organisation of National Emergency Response

Figure 2: Rapid response team



Rapid response team:



GIA-VAB coordinates the activities of professional organizations and directly and indirectly connects these organizations' activities.

5. Compensation scheme

In Mongolia, a compensation of 90% of the livestock market value is paid following the destruction of compulsory culling due to any TAD, according to the Law of Protection Animal Health and Genetic Pool.

6. Post-outbreak activities:

Surveillance is applied:

- a. FMD freedom surveillance: Each movement restriction is to be lifted 28 days after the destruction of the last outbreak in the zone is completed. Prior to the lifting, FMD freedom surveillance and intensive disinfections are to be conducted in the zone. The surveillance is composed of clinical inspections target at all susceptible animals kept in herds in the affected and neighbouring area as well as serological tests based on randomised sampling of susceptible animals in the zone. The final FMD freedom surveillance is to be conducted to prove the absence of FMD virus infection/circulation in Mongolia after all movement restrictions are lifted. Sampling is carried out level of sufficient to detect NSP and qualify for free from FMD.
- b. Serological surveillance is applied after vaccination in order to monitor coverage of vaccination.

7. Major constraints when implementing FMD control measures:

Major constraints to implement control for FMD measures are following:

- Chain command of CVO is not possible to be enforced. Structure of national veterinary service should be improved)
- Lack of epidemiological analysis and trained epidemiologist.
- Information sharing network. In some area (especially summer place for herders) mobile or internet network is limited.
- Epidemiological situation of FMD in neighbouring countries is sporadic. For example FMD outbreak suddenly occurred in the western part of the country (Sagsai soum Bayan-Ulgii) after 11 years of Altantsugts soum Bayan-Ulgii province. Since 2000, the most of cases were detected as different subtypes of FMDV ensure it is more likely that incursion is related to the outside sources.
- Laboratory capacity on diagnosis of FMDV. Vaccine matching test capacity is not introduced at State laboratory.
- Best qualified vaccine purchase is limited.

8. On-going studies or research on FMD

2010: Analysis of the 2010 outbreak of FMD in Mongolia, WB "AHIP" Project

2011-2012: FAO TC project on the identification of pathways of transmission of Foot and Mouth Disease in Mongolia

2013-2014: Risk assessment for the introduction and spread of FMD in Eastern and Western Region of Mongolia, SDC "Animal health project"

CMC-Animal health Mission- Rapid assessment FMD in Mongolia, 2010 and 2014

9. Suggested topics or activities for technical collaborations

- To fulfil vertical chain command of CVO of Mongolia in veterinary field (structure of national veterinary service)
- Proper outbreak investigation: there is lack of trained epidemiologist who can conduct proper outbreak investigation and source tracing as well as quarantine measures are limited to conduct research or study in outbreak area.
- Epidemiological data analysis for outbreak and surveillance data in use of spatial analysis.
- Identifying epidemiological unit and strengthening quarantine measures. Mongolia has purely nomad livestock system and mixed herd that may lead difficulties to

control animal movement and identify proper epidemiological unit. Securing burial sites. Use incinerators for culled animals' carcasses.

- Improving culling method of infected animals in order to qualify animal welfare requirements.
- Information sharing network with neighbouring countries and other related organisations on TAD.

Appendix 2: Laboratory Capacity

Appendix 2.1: List of OIE Collaborating Center, OIE Reference Laboratory for FMD Diagnosis in Asia, and Leading Laboratory of Members

OIE Collaborating Centre	National Institute of Animal Health of NARO 6-20-1 Josui-honcho, Kodaira Tokyo 187-0022 Tel: 81-42-321-1441 Fax: 81-42-325-5122
OIE Reference Laboratory for FMD Diagnosis in Asia	Lanzhou Veterinary Research Institute Chinese Academy of Agricultural Sciences Xujiaping 1, Lanzhou, 730046 Tel: 86-931-8342515 (office), 8342681(Lab) Fax: 86-931-8340977
	Regional Reference Laboratory for Food and Mouth Disease in South East Asia (RRL) Packchong, Nakhonratchasima 30130, Thailand Tel: (6644) 279112 Fax: (6644) 314889, (6644) 313869
PR China	Lanzhou Veterinary Research Institute Chinese Academy of Agricultural Sciences Xujiaping 1, Lanzhou, 730046 Tel: 86-931-8342515 (office), 8342681(Lab) Fax: 86-931-8340977
Chinese Taipei	Animal Health Research Institute Council of Agriculture 376, Chung-Cheng Road, Danshuei District New Taipei City 25158, Taiwan, R.O.C. Tel: 886-2-26212111 Fax: 886-2-26225345
Hong Kong SAR of PR China	Veterinary Laboratory Division Agriculture, Fisheries & Conservation Department Tai Lung, Veterinary Laboratory, Lin Tong Mei, Fan Kam Road, Sheung Shui, New Territories, Hong Kong SAR Tel: 852-2461-8791 Fax: 852-2461-8421

Japan	Exotic Disease Research Center National Institute of Animal Health National Agriculture and Food Research Organization 6-20-1 Josui-honcho, Kodaira Tokyo 187-0022 JAPAN Tel: 81-42-321-1441 Fax: 81-42-325-5122
RO Korea	Foot and Mouth Disease Division Animal and Plant Quarantine Agency 175 Anyangro, Manangu Gyeonggi 430-757 Tel: 82-31-467-1719 Fax: 82-31-467-1865
Mongolia	State Central Veterinary Laboratory Zaisan, Khan-Uul district, P.O.B - 53/03 Ulaanbaatar - 17024 Mongolia Tel: 976-7011-1050 Mobile: 976-99999139

Appendix 2.2: Capability of FMD diagnosis in each level. (National, Regional, Provincial/state laboratories)

1. PEOPLES REPUBLIC OF CHINA *(as updated by October 2014)*

Methods in OIE Terrestrial Manual	NO	Yes	National Ref. lab	Regional	Province/ State
DIAGNOSTIC TECHNIQUES					
1. Identification of the agent					
1.a. Virus Isolation (If your answer is “Yes” please specify cell culture you use. Cell culture: ...BHK21 and baby mice.....)		√	√		
1.b. Immunological Methods					
• ELISA		√	√		√
• Lateral flow device test		√	√		√
• Complement Fixation Test		√	√		
c. Nucleic acid recognition methods					
• Agarose gel-based RT-PCR		√	√		√
• Real time PCR		√	√		√
2. Serological test					
2.a. Virus Neutralization Test		√	√		
2.b. Solid-phase competitive ELISA		√	√		
2.c. Liquid-phase blocking ELISA		√	√		√
2.d. Non-structural protein (NSP) antibody tests					√
• Indirect ELISA		√	√		√
• Enzyme-linked Immuno-electrotransfer blot assay (EITB)		√	√		
VACCINE MATCHING TEST					
a. ELISA		√	√		
b. 2-Dimensional Virus Neutralization Test		√	√		
c. Complement Fixation Test					
d. Expected percentage of protection (EPP)		√	√		

2. Chinese Taipei (as updated by June 2015)

Methods in OIE Terrestrial Manual	NO	Yes	National Ref. lab	Regional	Province/ State
DIAGNOSTIC TECHNIQUES					
1. Identification of the agent					
1.a. Virus Isolation (If your answer is "Yes" please specify cell culture you use. Cell culture: <u>BHK-21 and EBK cell</u>)		√	√		
1.b. Immunological Methods					
• ELISA		√	√		
• Lateral flow device test	√				
• Complement Fixation Test	√				
c. Nucleic acid recognition methods					
• Agarose gel-based RT-PCR		√	√		
• Real time PCR		√	√		
2. Serological test					
2.a. Virus Neutralization Test		√	√		
2.b. Solid-phase competitive ELISA	√				
2.c. Liquid-phase blocking ELISA		√	√		
2.d. Non-structural protein (NSP) antibody tests					
• Indirect ELISA		√	√	√	
• Enzyme-linked Immuno-electrotransfer blot assay (EITB)	√				
VACCINE MATCHING TEST					
a. ELISA	√				
b. 2-Dimensional Virus Neutralization Test		√	√		
c. Complement Fixation Test	√				
d. Expected percentage of protection (EPP)		√	√		

3. Hong Kong SAR of PR China (as updated by June 2015)

Methods in OIE Terrestrial Manual	National Ref. lab		Regional lab		Province/ State lab	
	Yes	No	Yes	No	Yes	No
DIAGNOSTIC TECHNIQUES						
1. Identification of the agent						
1.a. Virus Isolation (If your answer is "Yes" please specify cell culture you use. Cell culture: ...BHK-21, IBRS-2.....)			√			
1.b. Immunological Methods						
• ELISA			√			
• Lateral flow device test				√		
• Complement Fixation Test				√		
c. Nucleic acid recognition methods						
• Agarose gel-based RT-PCR			√			
• Real time PCR			√			
2. Serological test						
2.a. Virus Neutralization Test				√		
2.b. Solid-phase competitive ELISA				√		
2.c. Liquid-phase blocking ELISA				√		
2.d. Non-structural protein (NSP) antibody tests						
• Indirect ELISA				√		
• Enzyme-linked Immuno-electrotransfer blot assay (EITB)				√		
VACCINE MATCHING TEST						
a. ELISA				√		
b. 2-Dimensional Virus Neutralization Test				√		
c. Complement Fixation Test				√		
d. Expected percentage of protection (EPP)				√		

4. Japan (as updated by June 2015)

Methods in OIE Terrestrial Manual	National Ref. lab		Regional lab		Province/ State lab	
	Yes	No	Yes	No	Yes	No
DIAGNOSTIC TECHNIQUES	√			√		√
1. Identification of the agent	√			√		√
1.a. Virus Isolation (If your answer is “Yes” please specify cell culture you use. Cell culture:	√			√		√
1.b. Immunological Methods	√			√		√
• ELISA	√			√		√
• Lateral flow device test	√			√		√
• Complement Fixation Test		√		√		√
c. Nucleic acid recognition methods	√			√		√
• Agarose gel-based RT-PCR	√			√		√
• Real time PCR	√			√		√
2. Serological test	√			√		√
2.a. Virus Neutralization Test	√			√		√
2.b. Solid-phase competitive ELISA		√		√		√
2.c. Liquid-phase blocking ELISA	√			√		√
2.d. Non-structural protein (NSP) antibody tests	√			√		√
• Indirect ELISA	√			√		√
• Enzyme-linked Immuno-electro transfer blot assay (EITB)		√		√		√
VACCINE MATCHING TEST	√			√		√
a. ELISA	√*			√		√
b. 2-Dimensional Virus Neutralization Test	√*			√		√
c. Complement Fixation Test		√		√		√
d. Expected percentage of protection (EPP)		√		√		√

* Capabilities depend on serotype.

5. Republic of Korea (as updated by June 2015)

- No regional FMD lab under the QIA or MAFRA
- Only three provincial vet. labs are eligible for doing Aby ELISA and nucleic acid detection tests (Real-time PCR and Agarose gel-based RT-PCR) for the suspected cases.
- All provincial vet. labs are doing ELISA (SP and NSP) to perform the national serosurveillance project which is organized by MAFRA(QIA).

Methods in OIE Terrestrial Manual	National Ref. lab		No Regional lab		Province/ State lab	
	Yes	No	Yes	No	Yes	No
DIAGNOSTIC TECHNIQUES						
1. Identification of the agent						
1.a. Virus Isolation (If your answer is "Yes" please specify cell culture you use. Cell culture:	√ (BHK21, IBRS-2, ZZ-R, LFBK)					√
1.b. Immunological Methods						
• ELISA	√					√
• Lateral flow device test	√				√ (all)	
• Complement Fixation Test		√				√
c. Nucleic acid recognition methods						
• Agarose gel-based RT-PCR	√				√ (three)	√
• Real time PCR	√				√ (three)	√
2. Serological test						
2.a. Virus Neutralization Test	√					√
2.b. Solid-phase competitive ELISA	√				√	
2.c. Liquid-phase blocking ELISA	√					√
2.d. Non-structural protein (NSP) antibody tests	√				√	
• Indirect ELISA	√				√	
• Enzyme-linked Immuno-electro transfer blot assay (EITB)		√				√
VACCINE MATCHING TEST	√					
a. ELISA		√				√

b. 2-Dimensional Virus Neutralization Test	√*					√
c. Complement Fixation Test		√				√
d. Expected percentage of protection (EPP)		√				√

* under establishment process with R&D

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6. Mongolia (as updated by June 2015)

Methods in OIE Terrestrial Manual	National Ref. lab		Regional lab		Province/ State lab	
	Yes	No	Yes	No	Yes	No
DIAGNOSTIC TECHNIQUES						
1. Identification of the agent						
1.a. Virus Isolation (If your answer is "Yes" please specify cell culture you use. Cell culture:)	√					√
1.b. Immunological Methods						
• ELISA	√				√	
• Lateral flow device test	√				√	
• Complement Fixation Test	√					√
1.c. Nucleic acid recognition methods						
Agarose gel-based RT-PCR	√					√
Real time PCR	√					√
2. Serological test						
2.a. Virus Neutralization Test		√				√
2.b. Solid-phase competitive ELISA	√				√	
2.c. Liquid-phase blocking ELISA	√					√
2.d. Non-structural protein (NSP) antibody tests						
• Indirect ELISA	√				√	
• Enzyme-linked Immuno-electrotransfer blot assay • (EITB)		√				√
VACCINE MATCHING TEST						
a. ELISA		√				√
b. 2-Dimentional Virus Neutralization Test		√				√
c. Complement Fixation Test		√				√
d. Expected percentage of protection (EPP)		√				√

Appendix 3: National FMD Control Plans

- PR China (*Drafting, will be launch 2013*)
- Chinese Taipei (*currently has Contingency Plan*)
- Hong Kong SAR of PR China (*will discuss to develop*)
- Japan (*existing*)
- RO Korea (*currently has Action Plan*)
- Mongolia (*existing*)

Appendix 4: Roadmap timetable

Provisional PCP Stage (as of October 2013)

	2011/12	2012/13	2013/14	2014/15	2015/16
PR China	3	3	3	3	3
Chinese Taipei	3	3	3	4*	4/5
Hong Kong SAR	1	1/2	2	2/3	3
Japan	Maintain FMD Free status without vaccination				
RO Korea	3	4*	4*	4/5	5
Mongolia	3	3	3	4	4

4* Chinese Taipei and RO Korea aim to regain FMD-free status with vaccination.