







Foot-and-Mouth Disease Control in Southeast Asia through **Application of the Progressive Control Pathway** GCP/RAS/283 (ROK)

Proceedings of the FAO-OIE Training of Trainers Workshop in Field Animal Disease Outbreak Investigation and Management

5 – 7 November 2013 Bangkok, Thailand



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Abbreviations and acronyms

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ASEAN	Association of South East Asian Nations
ARAHIS	ASEAN Regional Animal Health and Information System
CSF	Classical Swine Fever
ECTAD	Emergency Center for Transboundary Animal Diseases
FAO	Food and Agriculture Organization of the United Nations
FAO RAP	FAO Regional Office for Asia and the Pacific
GIS	Geographical Information Systems
HPAI	Highly pathogenic avian influenza
ROK	Republic of Korea
ND	Newcastle Disease
OIE	World Organization for Animal Health
OIE SRR-SEA	OIE Sub-regional Representation for South East Asia
SEACFMD	South-East Asia and China Foot and Mouth Disease Campaign

Summary

The FAO and OIE co-organised a Training of Trainers Workshop in Field Animal Disease Outbreak Investigation and Management in Bangkok, Thailand from 5 - 7 November, 2013. A total of 48 participants attended the workshop. The 48 consisted of 33 animal health agency staff from 10 SEACFMD countries, 7 FAO RAP staff from Bangkok, 7 OIE SRR-SEA staff, and 1 from Australia.

The objectives of the workshop were to train epidemiologists from SEACFMD member countries in outbreak investigation and management, to provide participants with the capacity to train district-level staff, and to exchange experience in outbreak investigation and methodology.

The general format of the workshop was to present overview lectures in the morning and then to consolidate concepts and techniques by hands-on computer workshop sessions held in the afternoon. All participants received a USB device containing resource material. The first day provided an overview of animal infectious disease outbreaks and outbreak investigation methods. Time was spent emphasizing the importance of appropriate outbreak investigation methods and how good outbreak data can be used to enhance regional control efforts. The second day provided case studies. Then Participants were instructed on the process of identifying risk factors for FMD. During the third day, participants carried out backward and forward tracing analyses and were introduced to the concept of social network analysis as a means for understanding animal movement data. Participants completed workshop evaluation questionnaires.

Most of the participants were happy with the content and conduct of the course. It is recommended that an improvement for future workshops would be to get participants to bring their own outbreak data. As a follow up action, the FMD outbreak investigation training will be organized by the FMD-ROK project participating countries (Cambodia, Lao PDR and Vietnam).

1. Background

The OIE Sub-Commission for foot-and-mouth disease (FMD) in South-East Asia and China, in its 19th Meeting in Singapore in March 2013 identified a number of priority areas requiring attention for 2013 - 2014. One of these priorities is the conducting of outbreak investigation management and training. It was reasoned that this training will facilitate detailed investigation and control of outbreaks in each SEACFMD member country and a better understanding of the epidemiology of FMD. The FAO and OIE co-organised a Training of Trainers Workshop in Field Animal Disease Outbreak Investigation and Management in Bangkok, Thailand from 5 - 7 November, 2013. The aim of the workshop was to train key epidemiology staff in each SEACFMD member country in outbreak investigation and management skills. The intention is that these individuals will then be able to train district-level staff in their own countries in the future in outbreak investigation and management. A secondary aim of the workshop to was provide an opportunity for epidemiologists from SEACFMD member countries to share their own experience in outbreak investigation and methods with their colleagues.

2. Workshop objectives

The objectives of the workshop were as follows :

- To train key epidemiology staff in each SEACFMD member country in basic skills in Outbreak Investigation and Management (with a focus on FMD and Rabies).

- To train key epidemiology staff in each SEACFMD member country in Outbreak Investigation and Management in order to give this staff the ability to train district-level staff in Outbreak Investigation and Management

- To share experiences in outbreak investigation and methods in order to have all participants learn from their mutual experiences colleagues.

3. Methodology

The general format of the workshop was to present overview lectures in the morning and then to consolidate concepts and techniques by hands-on computer workshop sessions held in the afternoon. All participants received a USB device containing resource material (lectures, data sets, and software). Care was taken to ensure that all of the analytical procedures presented during the workshop were conducted using open source software and that copies of the required software were on the USB device distributed at the end of the workshop. At the end of the workshop, participants were requested to complete a questionnaire to evaluate the workshop.

4. Participants

There were 48 participants - 33 animal health agency staff from 10 SEACFMD countries : Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam), 7 FAO RAP staff from Bangkok, 7 OIE SRR-SEA staff and 1 from Australia. A list of attendees is included in Appendix A.

5. Workshop proceedings

5.1. Introduction

The training workshop was officially opened by Dr Ronello Abila (Sub-Regional Representative for South East Asia, OIE), Dr Carolyn Benigno (Animal Health Officer, FAO RAP) and Dr Tritsadee Chaosuancharoen (Director General, Department of Livestock Development, Thailand) who welcomed participants to the workshop.

The workshop facilitator (Dr Mark Stevenson) presented the course structures which concerned the following : lectures covering the main subjects, exercise sessions to practice skills and techniques covered in lectures, and outbreak investigation and management manual to be used as reference. The teaching program was coordinated by Dr Mark Stevenson from Massey University (New Zealand). Individual lecture sessions were provided by Jan Hinrichs (FAO, Bangkok), Dr Kyaw Naing Oo (Myanmar), Dr Karoon Chanachai (Thailand), Dr Phan Quang Minh (Viet Nam), Dr Naheed bin Mohammed bin Hussein (Malaysia), Dr Nguyen Van Long (Viet Nam) and Dr Karan Kukreja (OIE, Thailand). The agenda is provided in Annex B.

5.2. Day 1

The first day provided an overview of animal infectious disease outbreaks and outbreak investigation methods. Time was spent emphasizing the importance of appropriate outbreak investigation methods and how good outbreak data can be used to enhance regional control efforts. Participants were introduced to software tools, documents and web sites of use for carrying out outbreak investigations. The afternoon session of Day 1 introduced participants to basic descriptive techniques for outbreak investigation (mapping, plotting of epidemic curves) using Quantum GIS and Epi Info according to the distributed manual. Following are summaries of presentations during day 1.

The overview of outbreak investigation technique was conducted by Dr Kyaw Naing Oo. The main areas of the presentation were the objectives and logical steps of outbreak investigation. He briefly discussed the important measures to be carried out in each of the following steps : preparation for outbreak investigation, establish outbreak definition, verifying an outbreak, implement emergency control, tracing, collecting samples, data analysis, and reporting.

Dr Karoon Chanachai presented a case study regarding FMD. It was a study conducted in 2011 in which vital information was gathered to help investigators to come up with proper procedures in dealing with an outbreak.

Dr Karanvir Kukreja gave a presentation regarding the use of outbreak data to enhance regional disease control effort. He explained the ARAHIS, which is a web based platform and database for disease information sharing and analysis. This platform was developed to support veterinary services by regional disease information on FMD, HPAI, CSF, Rabies and ND. He also emphasized that the information is used regionally for risk assessment, dissemination of risk information, selection of vaccine strains based on the risk, and identification and validation of priority areas for design and support of initiatives based on risk.

5.2 Day 2

The first lecture session of Day 2 provided a description of an outbreak of rabies in Myanmar. The second lecture session provided an introduction to how participants might go about assessing the economic impact of FMD disease in their own countries. The late-morning sessions on Day 2 covered the formal process of outbreak investigation: initial information gathering and preparation and verifying that you actually have a problem. The afternoon session of Day 2 was a continuation of the analysis of the outbreak data presented on Day 1. Participants were instructed on the process of identifying risk factors for FMD (using $2 \ge 2$ contingency tables in Epi Info) and assessment of confounding. Following are summaries of presentations during day 2.

The presentation on initial information gathering and preparation was made by Dr Mohamed Naheed Md. Hussein. He started with what initial information should be gathered during an outbreak investigation. This includes important details recorded in office log books, specific forms or other recording systems as this information can provide valuable clues about the nature of disease, location and the extent and time frame of an outbreak. He emphasized that investigators should ensure that they are well prepared for field activities by making sure that they have necessary equipment and information.

Dr Kyaw Naing Oo presented a case study regarding Rabies Outbreak Investigation in Myanmar last 2013. He mentioned that rabies has been endemic in Myanmar for many years but majority of the cases are still unreported. In addition, he emphasized that the importance of prompt and effective investigations of diseases of public health significance regarding Rabies.

Dr Jan Hinrichs gave a presentation on the economic impact of FMD. He introduced participants to a number of different approaches for making economic impact assessment. He emphasized that Value Chain Impact Assessment Steps are to firstly identify the affected value chain actors (farmer, trader, processor); secondly quantify the losses from mortality, morbidity and control measures for each value chain actor; thirdly estimate the number of actors for each type of value chain actors within a district and finally calculate the total loss based on losses per value chain actor and affected actors in a district. He also informed participants that a value chain study for disease control requires the understanding of the production systems and their respective value chains and evaluation of disease transmission risks caused by the behavior of value chain actors. Finally, he mentioned that the use of FMD impact assessment included resource allocation and advocacy for funding, identification of FMD control compliance incentives (benefit and cost distribution for different stakeholders/institutions), estimation of required control costs for planning and identification /characterization of important stakeholders for an enabling environment.

The presentation on verifying an outbreak was made by Dr Phan Quang Minh. He explained that the first stage of an outbreak investigation is to confirm whether a suspicious group of cases, a single case, or an emerging trend actually represents an outbreak. It was emphasized that confirmation of an outbreak can be linked to the three confirmation steps : when a diagnosis is correct, when conformed cases are increasing, and the increase represents an outbreak. These steps do not necessarily occur in this order, and may occur simultaneously. In many outbreaks (particularly common event outbreaks) these steps may be self evident and quickly dispensed with, but should be given on-going consideration. Working through these steps methodically is of most value when investigating unusual or unexpectedly increased numbers of cases of illness not normally associated with outbreaks.

5.3 Day 3

The morning lecture sessions of Day 3 were a continuation of the material presented during the late morning sessions of Day 2: implementation of emergency control measures, backward and forward tracing, collection of samples and communication of information to stakeholders. In the afternoon participants carried out backward and forward tracing analyses and were introduced to the concept of social network analysis as a means for understanding animal movement data. The workshop concluded with a session on the reporting of outbreak investigation findings to stakeholders. Following are summaries of presentations during day 3.

Dr Kyaw Naing Oo gave a presentation on emergency control measures and biosecurity. He covered topics concerning control measure, the principle of transmission and how to treat the affected animals. He stressed that effective control measures should reduce contact between infectious and susceptible animals, reduce the number of susceptible animals and decrease the number of infectious animals. In addition, he mentioned that whether the disease occurs depend on the host, the agent and the environment. Finally, he discussed the treatment of affected animals.

Dr Mohamed Naheed Md. Hussein gave a presentation on the collection of specimens for FMD Diagnosis. He explained FMD diagnosis principles, the determination of aging FMD lesions, and the guideline for collecting samples. In addition, he provided detailed information regarding collection of different kinds of samples such as milk, serum, and probang. Finally, he instructed the participants on how to process and send samples.

Dr Nguyen Van Long gave a presentation on communicating information to stakeholders. He briefly explained that communication procedures during the outbreak investigation. The first step is for the investigator to communicate the information collected and intervention should be applied. Next, the investigator should communicate with infected farms/households as well as surrounding farms and households. He also stressed the need for communication because it facilitates outbreak investigation and allows more effective application of intervention measures.

Dr Mark Stevenson gave a presentation on backward and forward tracing. He emphasized that through tracing the investigator will identify other affected or at risk areas, implement emergency control measures in newly-infected area and identify possible sources and routes of spread to guide measures to prevent future outbreaks. He provided information on how to trace the source and the spread of an outbreak using two tracing windows. One is tracing window for sources which introduced disease into the location. The other is tracing window for spread which introduced disease spreading to other location.

6. Workshop evaluation

All workshop participants were provided with a workshop evaluation questionnaire. Completed questionnaires were received from 19 participants. A summary of the questionnaire responses is provided in Table 1.

Question	Response
Country of origin	Laos (n = 2), Thailand (n = 2), Viet Nam (n = 4), Cambodia (n = 3),
	Philippines ($n = 3$), Singapore ($n = 2$), Myanmar ($n = 1$),
	Malaysia (n = 2).
Length of the course appropriate?	Too short $(n = 4)$, Just right $(n = 15)$.
Number of participants appropriate?	Just right $(n = 17)$, Too many $(n = 1)$.
Were the right people invited?	Not answered $(n = 3)$, Yes $(n = 12)$, Other $(n = 4)$.
Trainer knowledge?	Exceptionally knowledgeable $(n = 4)$, Knowledgeable $(n = 15)$.
Could trainers convey their knowledge?	Exceptionally well $(n = 4)$, Good $(n = 12)$, Satisfactory $(n = 3)$.
Quality of support material?	Exceptionally good $(n = 4)$, Good $(n = 13)$, Satisfactory $(n = 2)$.
Will you use the resource material after this workshop?	Yes a bit $(n = 7)$, Yes a lot $(n = 12)$.
Will you apply the lessons learned from this workshop?	Yes a bit $(n = 5)$, Yes a lot $(n = 14)$.
Was the exercise on describing outbreak data appropriate?	Yes $(n = 14)$, Yes a lot $(n = 5)$.
Was the exercise on confounding appropriate?	Yes $(n = 11)$, Yes a lot $(n = 8)$.
Was the exercise on tracing appropriate?	Yes $(n = 11)$, Yes a lot $(n = 6)$.
Do you feel confident to train your colleagues in this area?	Yes with limitations $(n = 9)$, Yes $(n = 10)$.

 Table 1: Summary of responses to the workshop evaluation questionnaire

A summary of the free-text comments from the questionnaire are as follows.

How could the workshop have been done in a more interesting or appropriate way?

More time required for software presentations. Role play case studies; more examples and actual disease investigation data. More case studies and group work; more practical exercises; more time for practice. Conduct a simulation exercise during a field trip. More guidance on how to teach the concepts introduced in the workshop when participants return to their own countries.

What follow-up capacity building measures would be useful ?

All the lessons learned were very good. Give a lot of practical questions about 2 by 2 tables and confounding. Collection of samples Conduct an in-province workshop on FMD outbreak investigation. Should have follow up training courses on particular topics such as spatial analysis, social network analysis, sampling and surveillance. Useof epidemiology tools.

Other comments on the workshop :

A good course.

Conduct a meeting or workshop 1-2 times per year to allow colleagues to learn from each other. Please provide support to allow the manual translated into local languages. More time required to become familiar with the course software. Hands on practical sessions of most use — we remember better when we do something rather than just listening. More role play and case studies to allow participants more fully understand each of the topics.

Overall, most of those that responded to the questionnaire reported that they were happy with the content and conduct of the course. Given the broad range of backgrounds and experience amongst the participants (e.g. field staff, laboratory staff, post graduate students, university academics) it is to be expected that some did not find the quantitative sessions to their immediate liking. For future courses of this type it appears that participants would appreciate more time for the practical sessions using real (i.e. regional) outbreak data. A number of respondents mentioned that a field trip would be useful.

7. Recommendations

An improvement for a future workshop would be to announce its date in advance to give participants sufficient time to select suitable data sets.

An important part of these workshops is 'learning' from colleagues. If participants from individual countries were to bring their own data sets to a workshop, time should be provided to allow participants to present the results of their investigations to the rest of the group.

8. Follow up action

The FMD outbreak investigation training will be organized by the FMD-ROK project participating countries (Cambodia, Lao PDR and Vietnam).

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DAY 1 (November 5, 2013)		
08.30 - 09.00	Course Registration	
09.009.30	Opening Ceremony	Dr Ronello Abila Dr Carolyn BENIGNO Department of Livestock Development Thailand
09.30 - 10.00	Morning Tea	
10.00 - 10.30	Course Introduction and Expectations of Participants	MS
10.30 - 11.00	Outbreak Case Study (FMD) There's a disease problem in your district – What can you do?	NMH
11.00 - 12.00	Overview of Outbreak Investigation Techniques	KNO
12.00 - 12.30	Use of outbreak data to enhance regional disease control efforts	КК
12.30 - 13.30	LUNCH	
13.30 - 14.00	Software Installation – Introduction to Exercise Sessions, practical	KNO, KC, MS, NMH, PQM
14.00 - 14.30	Afternoon Tea	
13.30 - 16.30	Describing an FMD outbreak in terms of individual, place and time, practical	MS

Day 2 (November 6, 2013)		
09.00 - 09.05	Lecture Summary — day 1	MS
09.05 - 09.30	Outbreak case Study (Rabies)	KNO
09.30 - 10.00	Economic Impact of FMD	Н
10.00 - 10.30	Morning Tea	
10.30 - 11.45	Step 1: Initial Information Gathering and Preparation	NMH
11.45 – 12.30	Step 2: Verifying that you actually have a problem	PQM
12.30 - 13.30	LUNCH	
13.30 - 13.45	Confounding (review).	MS
13.45 – 15.00	Describing FMD in terms of individual, place and time, practical	MS
15.00 - 15.30	AFTERNOON TEA	
15.30 - 15.45	Decompounding	MS
15.45 – 16.30	De-confusing confounding: herd-level risk factors for FMD, practical	MS
16.30 - 17.00	Herd-level risk factors for FMD — summary of key points, practical	MS

Day 3 (November 7, 2013)			
09.00 - 09.05	Lecture Summary — day 2	MS	
09.05 - 09.30	Outbreak Case Study (FMD)	кс	
09.30 - 10.30	Step 3: Implementation of emergency control	кло	
10.30 - 11.00	Morning Tea		
11.00 - 11.45	Step 5: Collection of Samples	NMH	
11.45 - 12.30	Step 6: Communicating Information to Stakeholders	NVL	
12.30 - 13.30	LUNCH		
13.30 -14.00	Step 4 : Backward and forward tracing.	MS	
14.00 - 15.00	Tracing Exercise	MS	
15.00 - 15.30	Afternoon Tea		
15.30 - 16.30	Preparation of Outbreak Investigation Reports	MS NVL	
16.30 - 17.00	Course Summary and Close	KNO, KC, MS, NMH, PQM	

KNO: Dr Kyaw Naing Oo KC: Dr Karoon Chanachai JH : Jan Hindrich MS: Dr Mark Stevenson NMH: Dr Naheed bin Mohammed bin Hussein PQM: Dr Phan Quang Minh