



Manual 9

Emergency preparedness and response planning



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Background

Emergency preparedness and response is a mechanism to ensure that a particular country is prepared to respond to animal disease emergencies. The two fundamental components of animal disease emergency preparedness planning are the development of capabilities for early warning and for early reaction to disease epidemics (FAO, 1999). However, adequate preparation prior to an emergency occurring is essential to ensure that there is sufficient capacity, resources and legislative support to conduct the activities included in the emergency disease response plans (FAO, 2011).

There are a number of comprehensive guides to emergency preparedness and contingency planning (FAO, 1999; FAO, 2002; FAO, 2011). These are highly relevant to this manual and the material contained within the manual is largely based on the information contained in these documents. Given the existence of comprehensive literature on this subject, the current manual will provide a broad overview of the subject, together with some information relevant to SEACFMD member countries, but readers are urged to refer to the above documents for further detailed information. A number of contingency plans developed by different countries and made available on the web have also been included in the reference list at the end of this manual.

What is a disease emergency?

An animal disease emergency will often involve a transboundary animal disease (TAD), defined as an epidemic disease which is highly contagious or transmissible and has the potential for very rapid spread, irrespective of national borders, causing serious socio-economic and possibly public health consequences. An emergency might involve introduction of a TAD into a country previously free from that disease, or it may involve introduction of a new strain of disease, such as a new serotype or subtype of FMD, to which the local population has little or no immunity. Alternatively, an animal disease emergency may also involve resurgence of an endemic disease due to changes in epidemiological or environmental conditions (FAO, 2011). For a country at an advanced stage of FMD eradication within the whole country or zone, any outbreak of FMD (whether caused by endemic or exotic strains of FMD) should be regarded as an emergency, thus prompting implementation of an emergency response.

Emergency preparedness and response planning will help to optimise a country's response to a variety of disease emergencies such that diseases can be detected and controlled as rapidly and effectively as possible.

Animal disease emergencies: a national disaster?

Most countries have well-developed national disaster plans which allow essential government and non-government services and resources to be rapidly mobilized in response to a natural disaster (FAO, 2011). An outbreak of an exotic strain of FMD (or other TAD) shares many features with natural disasters, towards which national disaster plans are generally targeted: they occur suddenly and unexpectedly; they can have major socio-economic consequences; they may endanger human life; and they generally require a national response (FAO, 2011).

The Veterinary Authorities of SEACFMD Member Countries should explore the possibility of having outbreaks of certain, specified animal diseases included in the national disaster plan for that country. This may allow them to access key resources (including personnel) in case of an animal disease emergency. The national disaster plan is likely to already have arrangements in place for emergency funding and/or emergency dispatch of equipment and personnel to assist with disaster (or emergency) response. There may already be arrangements and relationships established to allow personnel and equipment from different government agencies, such as the military and the police, to assist with the disaster, including logistical support or enforcement of control measures implemented during an outbreak.

The reader should consult documents relating to disaster management and disaster response in general and also consult disaster response/management documents for their own country to assess whether it would be beneficial to attempt to have an animal disease emergency recognised as a national disaster, and how an animal disease emergency might be incorporated into the plan. It is important that, should an animal disease emergency occur, the management of that emergency remains with the Ministry responsible for animal health, with technical management from the Chief Veterinary Officer (or Director General of the Veterinary Services) and his/her designated staff, given that they have the technical expertise essential for making decisions relating to an animal disease emergency.

Emergency management

The different approaches to emergency management presented here are not intended as alternative approaches to the same problem, but should be seen as component parts of an overall approach to emergency management. For example, the emergency management framework presented below includes a comprehensive approach to emergency management which incorporates the emergency management cycle described below. Risk-based approaches represent a cornerstone of most approaches to emergency disease management.

Risk-based emergency management

The risk management approach to emergencies involves identifying hazards (e.g. an outbreak of a specific animal disease such as FMD, or a specific strain, such as FMD Pan-Asia 2, in a specific country or zone), and then estimating the probability and consequences of that hazard occurring (see Manual 1). Risk-based approaches to emergency management also allow for evaluation of existing risk mitigation measures and estimation of the impact of additional, or alternative, risk mitigation measures.

Assessment of risks posed by different hazards (i.e. different diseases) can also be conducted in order to identify high priority diseases which may then be the target of specific contingency plans and also may warrant the provision of priority funding for disease prevention and control measures. Risk-based approaches will generally be incorporated into most emergency management plans.

The emergency management cycle

The emergency management cycle refers to an emergency management approach that, rather than including only emergency preparation and response, also includes emergency prevention, detection, response and recovery (FAO, 2011). The most desirable outcome of emergency management is to prevent the emergency from happening in the first place and, therefore, prevention should form an integral part of the process of emergency management. However, it is rarely possible to prevent an event occurring with complete certainty. Therefore, measures must be taken to ensure that, should the emergency occur, it will be rapidly detected, the response will be rapid and effective, and that suitable measures are put in place to facilitate recovery after the emergency has passed. These components: prepare; prevent; detect; respond and recover make up the emergency management cycle. This concept has been applied to a number of emergency management and response plans in the literature (Bowman *et al.*, 1999;

de Guzman, date unknown). The emergency management cycle forms part of a comprehensive approach to emergency management, as outlined under the emergency management framework.

The emergency management framework:

In this framework, four component approaches to disaster management are: the comprehensive approach, the all-hazards approach, the integrated approach and the prepared community approach (de Guzman, date unknown). The different approaches are outlined here:

Comprehensive approach

The comprehensive approach to emergency management involves development and implementation of strategies for different aspects of emergency management, i.e. prevention, preparedness, response and recovery (as described above).

All-hazards approach

This approach recognises that many aspects of emergency management will be the same, regardless of the specific hazard. Therefore, this approach increases efficiency by recognizing and integrating common emergency management elements across all hazard types and then supplementing these common elements with hazard specific sub-components to fill gaps only as required (Public Safety Canada, 2011). When applied to animal disease emergencies, insofar as possible, the same generic emergency management arrangements should be used, with disease specific guidelines only where necessary.

Integrated-approach

The integrated approach ensures that all organizations, including government, private sector and community organizations, are involved in emergency management. There may be different lead agencies depending upon the nature of the emergency (e.g. management of an animal disease emergency will be led by the Ministry of Agriculture, or equivalent Ministry responsible for animal health, with the technical lead taken by the Chief Veterinary Officer (or equivalent), for zoonotic diseases, these may be jointly led by Ministry of Agriculture and the Ministry of Health). This approach promotes multi-sectoral and inter-sectoral coordination and reduces duplication and inefficiencies (de Guzman, date unknown).

Prepared community concept

The prepared community concept is the application of emergency management approaches at the local level. For

natural disasters, for example, this can ensure that the community are able to manage the disaster locally and therefore create a level of self-sufficiency in response to a disaster. The prepared community for animal diseases will include training and public awareness amongst livestock keepers, traders, animal health workers, local veterinarians, etc. in understanding the risk of disease incursions, implementing risk mitigation measures, recognising unusual disease events or specific clinical signs and reporting those diseases. The community is the front-line in emergency animal disease detection and initial response (reporting). An informed and prepared community can make a significant contribution in reducing the likelihood and consequence of an animal disease emergency.

What is involved in emergency preparedness and response planning?

Emergency preparedness and response planning is just one part of emergency management and therefore should be viewed in the context of a comprehensive approach to emergency management (i.e. prepare, prevent, detect, respond and recover) (FAO, 2011). While the concept of prevention and recovery are important aspects of emergency management, these will not be covered further here but readers should consult references provided at the end of this manual for more information on these areas if required. The remainder of this manual focuses on emergency preparedness and response planning incorporating emergency preparation, detection and response.

Emergency preparedness involves all the planning which must take place before a disease emergency occurs in order to maximise the chances that the disease emergency will be detected and to ensure that a rapid and effective response can be made. This will include, but is not restricted to: ensuring that there is an effective surveillance system in place, particularly an effective disease reporting system, in order to detect disease emergencies (see Manual 6); identifying suitable personnel with required skill sets to conduct certain roles in the event of an emergency and ensuring that they receive adequate training to carry out this role; establishing a clear command structure within the Veterinary Services to be implemented in case of a disease emergency; establishing relationships with other government agencies, non-government organisations and private sector in order to develop inter-sectoral and inter-agency cooperation; securing the necessary resources (such as vaccines, animal handling equipment, disinfectants)

or ensuring that there will be adequate access to these as needed (i.e. making necessary arrangements with vaccine banks); ensuring there is adequate laboratory capacity to handle high numbers of samples that might be generated during an emergency (and make arrangements with other laboratories if necessary to increase capacity); ensuring that an adequate legal framework is in place to cover any disease control measures, etc. that may be needed in the event of an emergency; and making a financial plan, including how and from where funds will be accessed.

The list above includes just some components of emergency preparedness planning and it can be seen from this list that many of these arrangements and structures would take considerable time to prepare. Therefore, it is essential that these preparations are made prior to them being needed, such that they are ready and can be implemented immediately should an emergency occur. Any delay in responding to an emergency is likely to come at a high cost in terms of the number of animals affected and the increased time taken to eradicate the disease and resume normal business (including re-establishment of trade in animals and animal products).

All of the preparedness and response planning for a disease emergency should be captured in a number of documents which include: an emergency preparedness plan, a contingency plan, operational manuals (or standard operating procedures) and a recovery plan (see Figure 1 below for further information on these documents). This manual will focus on emergency preparedness plans, contingency plans and standard operating procedures, for more information on recovery plans, refer to the document by FAO (2011).

Necessary components of emergency preparedness and response plans

The following descriptions are taken from FAO (2011) and outline the documents which should be included in emergency preparedness and response plans. This also outlines the difference between a preparedness plan and a contingency plan.

1. **Emergency preparedness plan:** This outlines what a government needs to do before an outbreak of a disease happens in order to be prepared (i.e. getting ready).
2. **Contingency plan:** This details what a government will do in the event of an incursion of a disease, beginning from the point when a suspect case is reported (i.e. responding).
3. **Operations manual:** This is a comprehensive set of instructions (also called standard operating procedures [SOPs]) produced by the government that instructs field staff and others how to undertake specific tasks required by the contingency plan (i.e. how to implement the response).
4. **Recovery plan:** This is the plan for the safe recovery

Figure 1: Components of emergency preparedness and response plans (FAO, 2011)

Rapid detection and rapid response

A key objective of emergency preparedness and response planning is to achieve rapid detection of a disease emergency and a rapid response to that emergency. Two of the major contributors to the eventual size of an epidemic is the length of time between a pathogen entering a country, and when that pathogen is detected and reported (**detection**) and the time between receiving the first report and implementing effective control measures (**response**). Emergency preparedness and response plans and activities aim to minimise delays in detection and response through, *inter-alia*: good surveillance; support of an informed community; and structures, plans and resources in place to launch an effective response. Mechanisms for rapid detection and rapid response should not be disease specific but rather should improve the capacity of a country to detect and respond to any animal disease emergency.

Rapid detection (early warning)

Early warning mechanisms enable rapid detection of the introduction of, or sudden increase in, the incidence of FMD (or other animal diseases) before it develops to epidemic proportions and causes serious socio-economic consequences. The mechanisms include a number of initiatives, mainly based on disease surveillance, disease reporting and epidemiological analysis. By establishing and maintaining an effective surveillance system to detect disease outbreaks and monitor the prevalence of disease (through a combination of passive and active surveillance), and with analysis of the resulting data, the Veterinary Services will gain an improved understanding of the distribution and behaviour of disease outbreaks (and of infection) and will consequently be better equipped to detect incursions of exotic diseases or increased prevalence of endemic diseases. While this manual focuses on FMD outbreaks, training and early warning mechanisms should also detect unusual disease events which could signal an outbreak of a previously unknown disease.

The following mechanisms should be in place as part of an early warning system for animal disease emergencies. These will contribute to rapid detection, reporting and diagnosis of animal diseases:

- good farmer and public awareness programmes for FMD and other high-threat transboundary animal diseases, focusing on disease recognition and reporting procedures (see also Manual 6 on surveillance);
- good relationships between farmers and other stakeholders and the veterinary services to optimise disease reporting and ensure that stakeholders are aware of what will happen after a report is made (i.e. the consequences of reporting and not reporting) (see also Manual 6);
- existence or establishment of rapid emergency disease reporting mechanisms from the field (farmers, para-vets, local vets, etc.) to the Veterinary Services headquarters;
- existence or establishment of an emergency disease information system (see also Manual 7);
- compensation arrangements should be in place and relevant stakeholders made aware of the circumstances under which this will be paid;
- sustained active disease surveillance, to supplement the passive surveillance system (disease reporting) based on close coordination among livestock owners, field and laboratory/epidemiology veterinary services, and the use of techniques such as participatory epidemiology techniques, serological surveys and abattoir monitoring to supplement field searching for clinical disease (see also Manual 6);
- training of local or field veterinary officers, animal health workers, private veterinarians, agricultural extension officers, local authorities and livestock owners in the clinical and gross pathological recognition of FMD and other serious epidemic livestock diseases; collection and transportation of diagnostic specimens (in the case of veterinary staff); and the need for prompt action;
- appropriate laboratory diagnostic capabilities, sample collection, and dispatch for FMD within provincial and national veterinary laboratories to allow rapid diagnosis (see Manuals 9 and 10);
- strong linkages between national laboratories and regional and world reference laboratories (see Manual 10);
- effective national epidemiological capabilities to support emergency preparedness and disease management strategies;
- prompt and comprehensive international disease reporting by the veterinary authority to OIE and particularly to regional animal health organizations (see Chapter 1.1. of the OIE *Terrestrial Animal Health Code*, 2016) ;
- close liaison with veterinary authorities in neighbouring countries both at a national level and at a local level near shared borders, particularly for the purpose of early-warning.

Rapid Response (early response)

The period of time from when an animal disease emergency is detected to when an effective response is launched and the disease is eliminated (or where the disease situation returns to where it was prior to the emergency) may be referred to as the response time. Minimising response time is essential to achieving control of a disease outbreak before it is allowed to spread significantly and cause serious socio-economic consequences. However, the success of a rapid response in controlling an FMD outbreak remains dependent on rapid detection. Failure to detect a disease outbreak in a timely manner could allow significant early spread of a disease, meaning that the extent of the outbreak is such that it would be difficult to control even if an effective response is launched immediately upon detection of the disease.

A rapid response will depend upon a number of mechanisms being in place in preparation for a disease emergency. It should be emphasised that the mechanisms and structures outlined below should be prepared prior to any emergency, to ensure arrangements are already in place and can be rapidly mobilised if and when an emergency occurs. These include, but are not restricted to, the following:

- development of clear national emergency disease response plans (contingency plans and standard operating procedures), both generic and for specific identified high-risk diseases;
- establishment of a national animal disease emergency planning committee, which will contribute to development of the above plans (see FAO, 2011 for details of suggested membership);
- establishment of a consultative committee on emergency animal diseases who are responsible for implementing the national animal disease response plans (see FAO, 2011 for details of suggested membership);
- sufficient diagnostic capacity for testing high numbers of samples at the national level and, ideally also at local level, during an outbreak;
- development of relationships/linkages with reference laboratories and, in some cases, agreements with neighbouring countries to share laboratory capacity;
- establishment of relationships/linkages with other government agencies, non-government organisations and the private sector (e.g. livestock farmers' organisations, veterinary practitioners, livestock traders, commercial farming companies, animal product processors and exporters) to ensure support and to contribute resources and/or personnel if necessary;
- inclusion of priority epidemic livestock diseases in national disaster plans so that emergency resources

(monetary, equipment and personnel) may be accessed during an animal disease emergency (see earlier section);

- legislation in place which encompasses any necessary measures to be taken during an animal disease emergency (see Manual 2 on legislation);
- funding arrangements in place which allow for rapid release of adequate funds to launch the initial response to an animal disease emergency, and then sources of funding for on-going disease control measures;
- planned structure of command within the Veterinary Services to aid rapid reporting and rapid response;
- all personnel should be trained in their role and should have had opportunity to practice this role through simulation exercises;
- if vaccination is part of the response plan for FMD, access to vaccines of suitable quality, meeting OIE standards of potency and safety (*OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*) and containing appropriate antigenic strain(s) for emergency use, which should be available rapidly as needed (the OIE FMD vaccine bank is able to supply eligible SEACFMD Member Countries with vaccines for emergency use (see Manual 4));

Elements of an emergency preparedness plan

This section of the manual is based on information provided by FAO (2011), and provides a brief summary of each component of an emergency preparedness plan, including those mechanisms described above as necessary for rapid detection and rapid response to animal disease emergencies. It also provides a structure on which to base development of an emergency preparedness plan, and demonstrates how contingency plans and standard operating procedures fit within the overall emergency preparedness plan. The reader is referred to FAO (2011) and other manuals in this series for further detail on each of the components listed below:

1. **Human resource preparation:** It is necessary to determine the different skills needed in order to respond to a disease emergency and to ensure that suitably skilled personnel would be available in case of a disease emergency. This may require training to be conducted as part of preparation, or agreements made with different groups such as private veterinary associations, other government agencies, military, etc. whereby they may release personnel from their usual duties in order that they can assist with the emergency response.

2. **Risk analysis:** Risk analysis is a very important component of emergency management. It should be conducted to determine which diseases are higher priority in terms of the risk they pose to a particular country and therefore which ones require preparedness planning. It can also help to prioritise resources towards higher risk diseases. The process of risk assessment will also help to determine the most likely pathways through which a disease incursion might occur, and therefore will help with planning preventive measures (see Manual 1).
3. **Legal framework:** In order to conduct many of the components of a response to an emergency animal disease (such as movement restrictions, culling of livestock, etc.), certain legal powers will be needed. It can take time to establish adequate legislation and so it is important that this is put in place prior to an emergency otherwise delays in response are likely while legal powers are sought.
4. **Financing:** Ensuring that adequate funds will be available if an animal disease emergency occurs is an essential part of emergency preparedness. It is important, not only that funds are available, but also that they can be accessed rapidly in order to prevent delays in response. The finance plan should identify the source of funds, and the conditions for their release. The finance plan should include both ongoing costs (surveillance, risk analysis, etc.) and costs that are likely during an emergency (e.g. costs of control) (FAO, 2011).
5. **Compensation policy:** A compensation policy is an essential part of any control policy that may involve the destruction of animals or property. Details of compensation, such as: the level of compensation paid (and how this is determined), how it is paid (i.e. cash or replacement livestock) and when it is paid should be carefully considered. Compensation should be seen as mostly an incentive to encourage rapid reporting of disease (FAO, 2011) and the value should, therefore be set at a level which achieves this incentive. For example, under-compensation may lead to livestock keepers concealing diseased animals and not reporting, whereas over-compensation could lead to people purposefully infecting animals, or reporting animals as diseased when they are not.
6. **Surveillance system:** An effective surveillance system should be in place to ensure rapid detection of incursions of exotic diseases or changes in the epidemiology of endemic diseases, such as: increased geographical spread; increased number of outbreaks; change in hosts affected, etc. The surveillance system should encompass both active and passive surveillance (see Manual 6), with disease reporting being key, as this is the main way in which diseases will be detected and reported from the

field. A functioning and sensitive surveillance system is essential to emergency preparedness and response given that any delay in detection is likely to impact significantly on the extent and impact of an outbreak (FAO, 2011).

In order to demonstrate to international bodies such as the OIE and/or to trading partners that an adequate surveillance system is in place, a country should record all reports of suspected cases of a particular disease (even if they turn out to be negative) in order to demonstrate that reports are being made and that the surveillance system is functioning. An absence of reports, rather than being taken to mean that the disease is absent, can indicate that the surveillance system is not functioning adequately.

While the emphasis here is on passive surveillance (disease reporting) some active surveillance may also be used to help detect FMD. However, detecting FMD through active surveillance will usually be delayed compared to a well-functioning disease reporting system. Further information on surveillance is provided in the manual on surveillance and in FAO (2011).

7. Contingency plans and operational manuals

Contingency plans and operational manuals are the essential instructions for what should be done and what is required when an animal disease emergency happens. These are outlined in detail in FAO (2011) and FMD specific contingency planning is described in FAO (2002). A contingency plan should contain information on all that should occur when an outbreak is first suspected and will include such things as: investigating the report of a suspect case, sample collection and submission, laboratory capacity and how this will be increased to cope with an outbreak, outbreak investigation procedures, initial control measures, compensation mechanisms, where and how to access necessary equipment, roles and responsibilities, including reporting lines, etc. Basically, the contingency plan is an action plan, the implementation of which is triggered by reporting of a suspected case of a notifiable disease, in this case FMD. A number of examples of FMD contingency plans are available for reference (Animal Health Australia, 2014; DEFRA, 2016)

The operational manuals or standard operating procedures are detailed instructions for implementation of different aspects of the contingency plan and might include such things as: sample collection and submission; personal decontamination; vaccine storage; transport of vaccine from a local disease control centre, etc. The Australian animal disease contingency plans (AUSVETPLAN (Animal Health Australia, 2015) contain several detailed standard operating procedures and provide a useful reference.

It is important that the contingency plan and operational manuals remain as living documents and, as such, are regularly reviewed and revised based on changing circumstances or disease risks. During development of contingency plans and for training purposes, simulation exercises may be used to test parts of the plan, to ensure that people understand the role they are to play within the response. This may lead to the review of the strategy and/or modification of the plan if needed, to ensure optimal performance.

8. Establishing and maintaining relationships

This section refers to establishing and maintaining relationships with different stakeholder groups and involvement of those groups in developing contingency plans. Stakeholder groups should include all those who will be required to contribute resources and all those who will be affected by control measures (FAO, 2011). This should include, but is not restricted to: other government ministries, local authorities, agencies, organizations (national and international) and projects which will be expected to provide manpower, equipment or funding. By including these stakeholders in planning and through establishing relationships they should gain a feeling of ownership for the response plan and therefore offer greater support in its implementation.

In addition, by developing these relationships during the planning phase there is time for all people involved to clearly understand the role they (or their organisations) play in the emergency response.

9. Response training and simulation exercises

This part of the emergency preparedness and response planning involves training all people involved in the response to a disease emergency to ensure that they are able to carry out their role effectively and to ensure that they are aware of the command structure in which they will operate and to whom they should report. Training is a vital component of emergency preparedness and response and it is important to repeat training regularly to ensure that people's skills remain current and to allow for any turnover in staff which may alter the role of certain individuals. It will also be necessary to train more than one person for each role (particularly key roles) in case an individual is unable to take part in the emergency response (FAO, 2011)

Simulation exercises allow people to practice their role and also provide a method of testing response plans and identifying and addressing any areas of weakness. These should also be conducted on a regular basis and should usually involve testing of only small components of the plan and their integration with other parts of the plan, rather than the whole plan at one time.

10. Public awareness

Public awareness campaigns help to ensure that unusual disease events or specific signs of disease will be detected and reported by the public (including livestock farmers, traders, veterinary para-professionals, etc.). The public awareness campaign should include details on disease recognition, reporting procedures (when to report and to whom) and the consequences of reporting (or not reporting) suspected cases of disease. This is a very important component of the emergency preparedness and response plan as it targets the livestock keepers (and others with regular contact with livestock) who represent the front-line in disease detection. See manual on communication and public advocacy strategies and FAO (2011) for more detailed information.

11. Updating disease plans

As described above, these documents should be regarded as living documents and reviewed and revised in light of changing circumstances, risks, etc. The conditions under which these plans might be changed are listed by FAO (2011). Any updating of the plans should be clearly documented and the most recent version be clearly distinguishable from earlier versions. This is important to ensure that everyone is using the most up-to-date version of the plan. Further training, simulation exercises, etc. may need to be conducted in order to update personnel on the altered plans and to test that the plans still function properly.

Emergency preparedness and response planning for SEACFMD Member Countries

SEACFMD Member Countries which have achieved OIE recognition of freedom from FMD, would have needed to demonstrate a level of emergency preparedness as part of their application for status recognition. The OIE Terrestrial Animal Health Code, while not requiring a specific emergency preparedness planning document, does require that the Veterinary Services can demonstrate preparedness in areas such as: legislation (listing all relevant veterinary legislation in place); laboratory capacity for FMD diagnosis (or details of arrangements with other laboratories to conduct this diagnosis if necessary); details of contingency plans and operational guidelines; and demonstration and documentation of an effective surveillance system, including details of the reporting structure within the country (see Article 1.6.6. of the OIE Terrestrial Animal Health Code, 2016). These requirements indicate that preparedness planning (including contingency planning) would make up

an important component of any application to the OIE for recognition of disease freedom.

Similarly, those countries which have achieved, or are seeking, OIE endorsement of a control program for FMD, are required to provide, as part of their application to the OIE, an emergency preparedness and response plan which would be implemented in case of FMD outbreaks (see Article 8.8.39. of the OIE Terrestrial Animal Health Code, 2016).

For those SEACFMD Member Countries which are not currently seeking OIE recognition of disease status or official endorsement of a control plan, development of an emergency preparedness and response plan for FMD will be a valuable exercise as it not only helps to develop a plan for detection and response to FMD outbreaks, but it can also highlight gaps and areas of weakness where further work is needed to improve preparedness. For example, if one considers the disease reporting procedures it may be noted that there is no clear reporting structure in place and that livestock keepers are not aware of what they should do if they suspect a disease. By identifying important weaknesses, work can then be targeted at making improvements in these areas in order to strengthen reporting of suspected FMD outbreaks (see Manual 6).

In addition to the benefits that preparedness and response planning can have on the ability of the Veterinary Services to detect and respond to outbreaks, there will also be improved capacity to detect and respond to other animal disease emergencies. As described under the 'all-hazards' approach to emergency management, many components of emergency preparedness and response (i.e. surveillance, legislation, command structure, financial planning, etc.) may be generic and, therefore, capacity to detect and respond to a variety of animal disease emergencies will be improved through development of preparedness and response plans for a single disease such as FMD.

Countries which occupy mainland South-East Asia and China share extensive land borders. The market forces operating in this region drive cross-border movement of livestock between countries, the majority of which currently occurs via unofficial routes (see Manual 5). This movement of FMD susceptible livestock throughout the region means that occurrence of FMD in one country is likely to increase the risk of FMD outbreaks in other countries which are linked by livestock trade pathways. For this reason, countries in the region should collaborate through early warning systems, by which one country experiencing an outbreak of disease notifies other countries so that they can strengthen measures to prevent entry of disease or

increase surveillance in order to increase the chance that any new disease incursions will be rapidly detected and controlled (see Manuals 6 and 7). There are other ways that neighbouring countries can cooperate in emergency preparedness and response, which will be covered in a later section of this manual.

Emergency response: focus on animal movement controls during an outbreak

Given the importance of animal movements in the spread of FMD, and the extent of trade-related livestock movement in South-East Asia and China, this section has been included to provide additional insight into planning animal movement controls in case of FMD outbreaks in SEACFMD Member Countries. While the information included here, and the references provided, are largely concerned with FMD outbreaks in countries historically free from FMD, the principles still provide a useful guide for FMD endemic countries making decisions on animal movement controls as part of their FMD control/eradication strategy. Where a country was previously free from FMD and wishes to rapidly regain its status, movement restrictions are often used in combination with stamping-out and/or emergency vaccination. For countries where FMD is endemic, movement restrictions may be used alone or in combination with vaccination.

The movement restrictions applied during an outbreak should include live (FMD susceptible) animals, vehicles, people (to the extent that it is possible to control movement of people) and other equipment or animals which may act as fomites/vectors for disease spread. The initial size of a movement control area to be applied around an outbreak should be decided as part of the emergency preparedness and response planning process, including how the restrictions will be implemented and enforced.

Veterinary Services should be prepared to revise movement restrictions in light of results from initial outbreak investigations and continued surveillance. It is generally preferable to apply movement restrictions over a larger area initially and, pending results of initial investigations and surveillance, progressively remove controls from non-infected areas. This should ensure that the outbreak is contained within the initial control area. The size of the movement control area initially applied may depend upon a number of factors including, but not restricted to:

- The effectiveness of early detection/reporting, i.e. the likely delay between the start of an outbreak and implementation of control measures. Where delays in detection/reporting are likely, a larger movement control zone should be implemented as spread from the initial outbreak is likely to have occurred by the time the Veterinary Services become aware of the outbreak and control measures are implemented.
- The epidemiology of the virus in the area, including: likelihood for persistence in the environment, potential for airborne spread, livestock density/livestock husbandry systems, livestock trading pathways, etc.
- Experience from previous outbreaks (i.e. from outbreak investigation reports).
- Risk analysis/modelling of disease spread in the area concerned, or areas similar in terms of FMD epidemiology.
- Level of immunity in the population (resulting from previous infection or vaccination) (Ferrari, *et al.*, 2016).
- Livestock movement networks (including existence of high-risk areas such as livestock markets).
- Other control measures in place: i.e. emergency ring vaccination or movement standstills, such as those used as a preventive measure, such as in the UK where policy dictates that when animals (cattle, sheep, goats) are brought onto a farm, no animals (of these species) may leave the farm for 6 days (pigs are subject to a 20-day movement standstill) (DEFRA, 2013). This is intended to avoid the spread of infectious diseases through rapid movement of livestock through different holdings as occurred in the UK during the outbreak of FMD in 2001 (Gibbens, *et al.*, 2001).

Schley *et al.* (2009) and USDA APHIS (2013) both highlight the need to balance the extent of livestock movement controls applied in order to stop the spread of FMD while allowing ‘continuity of business.’ Continuity of business is defined by USDA APHIS (2013) as the management of non-infected premises, non-infected animals and non-contaminated animal products in an FMD outbreak. This helps to facilitate agriculture and food industries in maintaining business operations, while also mitigating the risk of disease spread. Similarly, Schley *et al.* (2009) described that, while the nationwide ban on animal movement during the UK FMD outbreak in 2001 played an important role in controlling the disease, significant costs were incurred as a result of these movement bans (including slaughter of animals for welfare reasons where they could not be moved to adequate housing/grazing, and delayed time to slaughter). Therefore, these factors should

be taken into account when determining the extent of livestock movement controls during an outbreak of FMD.

In order for movement controls to be implemented effectively during an outbreak, it is important that stakeholders, including farmers and members of the public, are educated in areas such as: the impacts of FMD on livestock and livelihoods, the benefit of achieving early control of an outbreak, the modes of transmission of FMDV, the reasons for different control measures applied, any compensatory mechanisms in place and any consequences of failing to comply with movement restrictions and other control measures.

A number of references are included here to provide insight into application of movement restrictions during an FMD outbreak. It should be noted that several of these references are based on studies relating to FMD-free countries where introduction of the disease to a naive population is likely to result in more rapid spread than an outbreak where FMD is endemic and there is a baseline level of immunity. However, the methods used in these studies and associated discussions provide a useful guide for both FMD-free and endemic countries (Van Halderen and Stevenson, date unknown; Roth, 2013; Schley, *et al.*, 2009).

International cooperation

There are a variety of ways in which a regional approach to emergency preparedness and response may be applied in South-East Asia and China. There are a number of factors present in this region, specifically, which could be useful for international cooperation on emergency preparedness and response, such as: existence of a structure for regional coordination and cooperation via the SEACFMD Campaign; the region includes countries at varying stages of FMD control, including countries that are recognised by the OIE as FMD free countries, thus providing a spectrum of expertise and experience to support collaboration; countries in mainland South-East Asia and China are linked through livestock movements and are therefore vulnerable to spread of FMD between these countries (providing an incentive to cooperate in emergency preparedness); and presence of regional reference laboratories for FMD.

Given that incentives exist for countries to cooperate on emergency preparedness and response in the region, and that some existing structures might help to facilitate this cooperation, the list below outlines some of the ways in which countries might cooperate in this area. This list is not exhaustive and other means of cooperation might be explored:

CASE EXAMPLE: FMD TABLETOP SIMULATION EXERCISE (Philippines)

Assessing the disease preparedness skills of the Veterinary Services' frontline officers in responding to FMD disease incursion through FMD TABLETOP SIMULATION EXERCISE

In the Philippines, the last FMD outbreak of serotype O Cathay topotype occurred in Quezon province in Luzon in December 2005. In May 2015, Philippines was recognized as an FMD-free country without vaccination. To maintain freedom, an emergency preparedness plan has been developed to enhance the capacity of frontliners in the Veterinary Services in the event of an incursion. A Comprehensive



Scenario-Induced Simulation Exercise (CSI-Simex) was built as an integral part of the plan.

A series of CSI-Simex was conducted throughout the country in 2015, specifically, in Pampanga, Laguna, Iloilo and Davao, to assess the soundness and efficiency of responses of field personnel when given an outbreak scenario. Participants were veterinarians of the Department of Agriculture–Regional Field Offices and of the Local Government Units. The said exercise revolved around a scenario-induced framework where reactions are measured based on set Standard Operating Procedures and fitted against time.

Prior to the simulation, a pre-test composed of 20 questions was conducted among the participants to determine their baseline knowledge regarding FMD. Most of the participants got a score of 15 and below which proved the need for a continuing education on FMD programs and procedures.

During the simulation, the groups were assigned a scenario wherein they were required to respond to a situation as prompt as possible. The goal for the groups is to address the outbreak reported in their area at the soonest time with the Protocol for Outbreak Management for farms/ slaughterhouses/auction markets as the key answer.

Some groups recommended premature or inappropriate measures and were given corresponding red scenario cards wherein complications were added and resulted in a delay in controlling the outbreak. This emphasized the importance of knowing the protocol in order to address FMD incursions at the soonest time for incursion of FMD virus is threatening given the country's status of no vaccination.

Groups which gave the correct measure/s were given blue scenario cards with hints on the next step in the control program and thus were able to immediately and effectively contain the outbreak. This proved their disease preparedness skills in responding to disease emergencies.

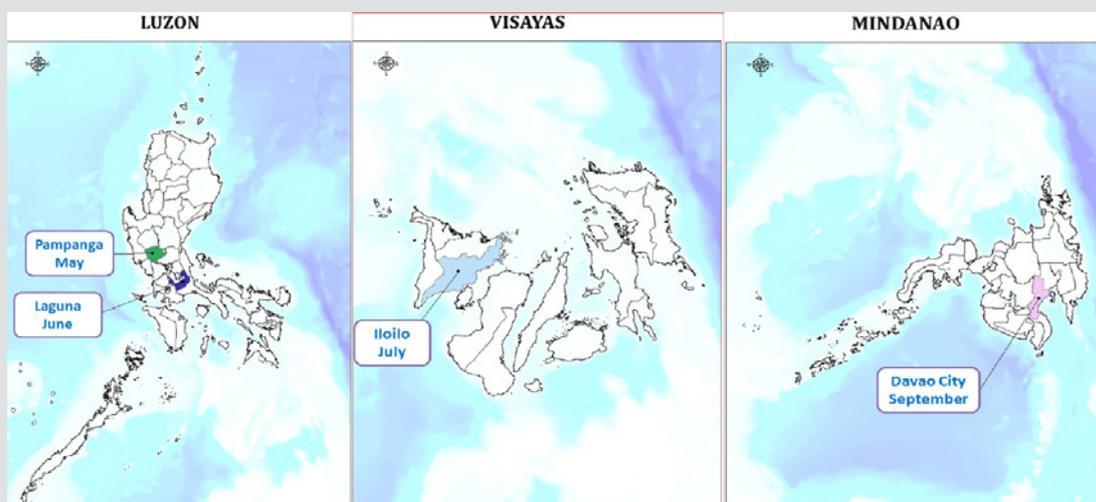


Figure 1A: Maps showing the location of FMD tabletop simulation exercises conducted in the Philippines in 2015.

- Cooperation on emergency funding for certain animal disease emergencies, i.e. establishing an emergency fund to which a number of countries contribute but which may be accessed by a single country based on a disease emergency which fulfils certain criteria. Sharing the cost of controlling an outbreak in this way reflects the fact that controlling an outbreak of FMD in one country is likely to be in the best interests of other countries, particularly those to which the affected country is linked through livestock movements. A well-defined mechanism and governance structure for rapidly accessing, overseeing and administering this funding, when needed, should also be established.
- Training of personnel can be conducted in a regional manner. This may include sending veterinarians from one country in the region to receive training in another country, for example: sending staff to a specialist laboratory for training; sending field staff from an FMD free country to observe/investigate an FMD outbreak in an endemic country; sending staff for specific training to countries in which staff have strengths in areas such as epidemiology; shared training in such areas as border control, disease recognition, reporting process, along border areas to improve linkages between local staff on either side of a border and to combine the cost of training.
- Sharing laboratory capacity. As part of emergency preparedness, linkages can be made between laboratories in neighbouring countries whereby samples could be sent to the neighbouring country for testing if the local labs do not have sufficient capacity or where they may become overwhelmed by the number of samples generated during an outbreak.
- Inter-laboratory proficiency testing. This process is already being conducted amongst the laboratories of the SEACFMD Member Countries through the SEACFMD LabNet, and with the Regional Reference Laboratories for FMD, via global Proficiency Testing conducted by WRL FMD (see Manual 10).
- Early warning of FMD outbreaks. Early warning is a key area where neighbouring countries can work together to reduce the risk of FMD spreading into new areas. When an FMD outbreak is suspected in one country, a warning should be issued to other countries in the region warning them of the suspected outbreak and therefore allowing them to increase measures to prevent and detect entry of the disease (see Manual 7).
- There may also be cooperation during an animal disease emergency whereby personnel, equipment or other resources are shared between countries to allow an optimum response to a disease outbreak. This could involve secondment of specialists to the affected country or provision of supplies such as disinfectants or equipment such as vehicles.
- Sharing of data, knowledge and expertise when conducting risk analyses.

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Manual 9

Emergency preparedness and response planning



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