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A guide to preparing for animal health emergencies

Third edition

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Contents

Foreword

Animal health emergencies arising from infectious diseases and other threats have a high potential to spread rapidly within a country or around the world. These events appear to be increasing as a result of growing animal populations, their concentration and market intensification, human and animal movements, and global trade. This trend is enhanced by the management capacity issues of animal health services as has been evident in the difficulties faced during the COVID-19 pandemic for field service delivery. Animal health emergencies globally impact the food security and livelihoods of nearly half of the 900 million people living in poverty who depend on livestock to survive. They can, therefore, significantly impede progress towards achieving the sustainable development goals. When high impact emerging and zoonotic diseases are involved, early and coordinated responses can prevent the next pandemic.

The Emergency Management Centre for Animal Health (EMC-AH) of the Food and Agriculture Organization of the United Nations (FAO) has been leading global animal health emergency management since 2006. The EMC-AH is a joint platform of the FAO Animal Production and Health Division, and the Office of Emergencies and Resilience, with the aim of improving coordination of actions to reduce the impact of animal health emergencies. The FAO EMC-AH aims to support all components of emergency management at the country, regional and international levels, addressing potential animal health emergencies in a diverse and dynamic environment.

A first FAO manual, *Good Emergency Management Practice: The Essentials* (*GEMP Essentials*), was published in 2011. A Technical Working Group led a review of the guide, which produced a new approach to GEMP, more inclusive of all types of animal health emergencies, including natural disasters, or non-infectious agents, released by accidental or deliberate actions. It also includes the use of the One Health approach in emergency management, involving all stakeholders in the process. EMC-AH aims to provide this new international *GEMP Essentials* guide to support the advancement of key components of emergency management as countries continue efforts to work and prepare together to minimize the impact of animal health emergencies. In addition to technical knowledge and support, the success of animal health emergency management depends on rapid mobilization of resources, timely and relevant decisions, coordinated implementation of national capacities and appropriate risk communication to all stakeholders. The importance of involving all levels of stakeholders in the emergency management process at national level is highlighted. This includes not only the policy leaders and advisers in regulation and control agencies, but also the leaders in animal industry associations, farmers associations and key stakeholders of the animal production value chain.

As animal health emergencies involving high impact diseases have consequences beyond national borders, the role of the regional economic communities in the process of emergency management is essential in facilitating and coordinating early warning, preparedness and

response at regional level. Finally, international organizations such as FAO, OIE and WHO have an essential advocacy role. They can convince countries and key actors to invest in preparedness and can provide support in developing their emergency management capacities and systems.

This guide will enable systematic planning and implementation of the different elements required to achieve a requisite level of preparedness for animal health emergencies. Starting from the peacetime phase, where preparedness is key, to dealing with each subsequent stage, this guide aims to build capacities of the veterinary services progressively to establish long-term resilience to deal with threats impacting food security and livelihoods.

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Abbreviations and acronyms

AH-EOC	Animal Health Emergency Operating Centre
AAR	after-action review
CC	critical competency (OIE PVS)
CVO	Chief Veterinary Officer
EMC-AH	Emergency Management Centre for Animal Health
EMPRES	Emergency prevention system for transboundary animal and plant pests and diseases
EWS	early warning system
FAO	Food and Agriculture Organization of the United Nations
FX	functional exercise
FSX	field/full-scale exercise
GEMP	good emergency management practice
IATA	International Air Transport Association
JEE	Joint External Evaluation
LEGS	Livestock Emergency Guidelines and Standards
NGO	non-governmental organization
OIE	World Organisation for Animal Health
PPE	personal protective equipment
PPEP	progressive pathway for emergency preparedness
PVS	Performance of Veterinary Services
REC	regional economic community
SOP	standard operating procedure
TADs	transboundary animal diseases
TTX	tabletop exercise
WAHIS	World Animal Health Information System (OIE)
WHO	World Health Organization

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Objective and scope of the good emergency management practice guide

CONTEXT

Animal health emergencies may be caused by a number of hazards, including outbreaks of high impact transboundary animal diseases (TADs), both terrestrial and aquatic. Emerging diseases can affect the ability to prepare adequately, and zoonotic diseases, with the involvement of humans and sometimes wildlife, can add incredible complexity. Humanitarian crises as well as natural disasters and chemical, biological, radiological or nuclear hazards may also result in animal health emergencies. These emergencies, whether occurring naturally, accidentally or deliberately, can have serious socio-economic impacts. Those involving zoonotic diseases can have public health consequences, including the potential for simultaneous impacts involving human and animal health as well as food security and safety. For zoonotic agents that develop the ability for human-to-human spread, early response to an animal health emergency could prevent the next pandemic. However, emergency preparedness capacity in many countries is inadequate and international coordination is too limited to fully address the risks and consequently reduce the impact of animal health emergencies.

OBJECTIVES

The core objective of this publication is to provide guidelines for countries and relevant local, national or regional organizations to strengthen their capability and capacity to manage any animal health emergency using good emergency management practice (GEMP). More precisely, the GEMP guide will:

- provide an overarching view on how to address animal health events that cause emergencies;
- set out in a systematic approach the elements required to achieve a needed level of preparedness for those emergencies;
- provide general practical guidance in the planning and implementation of the relevant actions to manage those emergencies.

The GEMP guide will assist countries in the development, implementation and monitoring of their own sustainable emergency management systems for animal health. It can be used as such by the Competent Authorities, or to organize workshops. These can include 'training of trainers' workshops to disseminate the best practices locally or more focused workshops targeting how to develop specific emergency response plans, or design and implement simulation exercises. It is a tool to support a continuous step-by-step improvement of countries' emergency management systems, especially in the framework of a

progressive pathway for emergency preparedness (PPEP), and to fulfil their international obligations in the application of international standards, especially those of OIE.

SCOPE

The scope of the GEMP guide includes all types of animal health events:

- animal diseases, infections or infestations, including emerging diseases and zoonoses;
- animal health emergencies as a consequence of natural disasters such as flood or drought, or industrial disasters such as nuclear accident or chemical pollution; for disasters affecting livestock, it should be read in conjunction with the Livestock Emergency Guidelines and Standards (LEGS) handbook (LEGS, 2014);
- feed contamination with animal or public health impact;
- food safety emergencies with animal implications.

The GEMP guide concerns all animals: terrestrial and aquatic, domestic and wild. It covers all functions of animals: food, leisure (companion and sport) and work (draught, workforce, search and rescue). It covers animal health events due to natural causes or intentional release of biological or chemical agents.

The GEMP guide has direct applications at country level for the Competent Authorities, and possibly sub-country level for the competent local animal health services, as well as at multi-country level for the continental or regional organizations with official mandates on emergency management, such as support or coordination. It can also be used indirectly at global level by competent international organizations in charge of capacity building, such as FAO, OIE, WHO, or by other relevant global agencies or even non-governmental organizations (NGOs). Other FAO tools[1] are more specifically targeted to field level organizations that need precise guidance on issues addressed in this guide.

CONTENT

The GEMP guide is not meant to give precise recommendations on specific activities related to animal health emergencies, but it does give a detailed overview of the processes to follow. It provides for the essentials of good emergency management practice for animal health, describing an emergency management system and the steps to build it. The guide outlines the emergency management actions that need to be implemented for each phase of an animal health event. The first and longest part of the guide addresses the peacetime phase, during which preparedness is the most important element. Unique aspects of animal health emergency management, such as the One Health[2] approach, and animal health events resulting from natural disasters and of intentional biothreat, are addressed specifically.

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[1] For these tools, see http://www.fao.org/ag/againfo/resources/en/pubs_ah.html.

[2] One Health is a collaborative, multisectoral and trans-disciplinary approach - working at local, regional, national and global levels, to achieve optimal health and well-being outcomes recognizing the interconnections between people, animals, plants and their shared environment; (for more on the One Health approach see https://www.onehealthcommission.org/en/why_one_health/what_is_one_health/). FAO, OIE and WHO have set a strategic direction to propose a long-term basis for international collaboration aimed at coordinating global activities to address health risks at the human-animal-ecosystem interface; (for more information see https://www.oie.int/fileadmin/Home/eng/Current_Scientific_Issues/docs/pdf/FINAL_CONCEPT_NOTE_Hanoi.pdf).

For the purpose of the GEMP guide, definitions provided in the glossaries of the *Terrestrial Animal Health Code* (OIE, 2019c; hereafter *Terrestrial Code*) and the *Aquatic Animal Health Code* (OIE, 2019a; hereafter *Aquatic Code*) are relevant, but some additional definitions are included to ensure consistency and facilitate understanding of some terms.

Other tools and experience are available through the EMC-AH website of FAO[3] or the OIE website.[4]

[3] ASee http://www.fao.org/emergencies/how-we-work/prepare-and-respond/emc-ah/en/.

[4] See http://www.oie.int/en/solidarity/emergency-management/planning-for-emergencies/.

Chapter 1
General principles of animal health emergency management

ANIMAL HEALTH EVENT AND EMERGENCY

What constitutes an emergency may not be obvious. An emergency is a situation related to an event or incident that is happening and to its consequences.

The term 'animal health event' refers to a single incident or a group of epidemiologically related incidents that have adverse consequences on the health of animals. It may be caused by a given disease, infection or infestation, or by physical or chemical contamination.

An animal health event may be the consequence of a natural phenomenon or of an accidental or deliberate action. It comprises susceptible animal species, and number and geographical distribution of affected animals and epidemiological units.

The term 'animal health emergency' refers to a state, triggered by an animal health event creating a major disruption or condition that can often be anticipated or prepared for, but is seldom accurately foreseen.

An animal health emergency requires immediate action, demanding decision and extraordinary measures to minimize the adverse consequences of the event. It is defined in time and space; it requires threshold values to be activated and it implies rules of engagement and an exit strategy.

Different types of animal health events can trigger emergency, such as: an exotic disease with an epidemic evolution, an endemic disease changing pattern and taking an epidemic evolution or becoming out of control, or an endemic seasonal disease showing a high peak above a specific threshold. The definition and triggers of an animal health emergency should be adapted to the local context, in accordance with a specific risk analysis and the potential socio-economic, public health and environmental impacts of the event.

ANIMAL HEALTH EMERGENCY MANAGEMENT: FUNDAMENTALS AND CORE COMPONENTS

Emergency management refers to the holistic organization and management of responsibilities, resources and actions for addressing all aspects of an emergency. It involves plans and institutional arrangements to engage and guide the efforts of public and private sectors in a systematic, comprehensive and coordinated way. A formally structured animal health emergency management system[5] will set out the elements required to achieve the

[5] According to ISO standards, a management system is the way in which an organization manages the inter-related parts of its activities in order to achieve its objectives. These objectives can relate to a number of different topics, including quality, operational efficiency, environmental performance, health and safety, and emergencies. For ISO 22320, emergency management is the overall approach to prevent and manage emergencies.

needed level of preparedness for animal health emergencies. It will provide for the planning and implementation of the relevant actions to manage those emergencies.

Any emergency management system should endeavor to include the following core components:

- strategic objectives depending on the country's situation and priorities;
- an adequate legislative framework;
- general definitions of roles and responsibilities;
- communication and coordination strategies and procedures;
- access to and mobilization of resources;
- plans that describe activities and procedures to prepare for, prevent, detect, respond to and recover from animal health emergencies;
- a monitoring and evaluation process.

It is important to stress that emergency management systems are built upon the routine work of the Competent Authorities. The quality of the daily work of the Veterinary Services, based on surveillance and control of priority diseases, is essential for good emergency management. Those day-to-day activities are fundamental to ensure good management of animal health emergencies. For instance, the absence of an effective field events surveillance or ante- and post-mortem inspection jeopardizes the detection of animal health events; the absence of traceability of the feed ingredients within the feed supply chain makes it difficult to manage an emergency involving toxin in feed; the absence of good coordination with the public health or environment authorities makes it complicated to manage a zoonotic or wildlife disease.

Animal health emergency management, therefore, is part of the quality of Veterinary Services, as described in Section 3 of the *Terrestrial Code* (OIE, 2019b). According to the *Terrestrial Code*, Veterinary Services should develop and document appropriate procedures and standards for all providers of relevant activities and associated facilities, including emergency preparedness for disasters which could have an impact on animal health and animal welfare. Animal disease emergency preparedness is described as an important element of the global animal health system. Evaluation of the quality of the system includes the presence in the veterinary legislation of emergency powers for management of disasters which could have an impact on animal health and animal welfare, and control of exotic disease outbreaks, including zoonoses, and the description and relevant details of animal disease emergency preparedness and response plans. Two critical competencies (CCs) of the OIE tool for the evaluation of Performance of Veterinary Services (OIE PVS Tool)[6] are directly related to emergency management: CC I.9 on emergency funding and CC II.5 on emergency preparedness and response (OIE, 2019b). Another one makes indirect reference to emergency management: CC I.6.A on internal coordination and chain of command (OIE, 2019b).

The animal health emergency management system of a country should be developed according to the existing capacities of Veterinary Services. Availability of resources (human, physical, technological and financial), current capabilities, types of organization and existing partnerships should be considered. Thus, before building an emergency management system for animal health emergencies, Competent Authorities should review their level of advancement regarding relevant OIE PVS CCs to ensure the adequacy of their country's system, including assessment of:

[6] The OIE PVS Tool is used by countries primarily to identify areas of relative strength and weakness within their national Veterinary Services, against relevant international standards. The PVS report aims to guide the prioritization of their policies, programmes, resourcing and structuring activities.

- day-one competencies of human resources and continuing education to maintain those competencies;
- technical independence and absence of political or private economic interference in decision-making;
- legislative framework, especially to allow rapid response;
- ability to conduct risk assessment;
- border control and export certification;
- quality of the chain of command for good and timely reporting and control measures implementation;
- ongoing clinical and syndromic surveillance in the field, and ante and post-mortem inspection at slaughter;
- access to proficient laboratories;
- access to immediate emergency funding;
- internal communication mechanisms;
- coordination mechanisms with other relevant authorities;
- consultation mechanisms with the main private stakeholders.

Not having full proficiency in all these competencies does not mean emergency management is not possible. However, a review will help countries prioritize to make the best possible use of the actual capabilities of the Competent Authority.

If there is an existing emergency management system, an assessment of CCs will also help to define the priorities that will strengthen it.

Annex I provides a table on CCs and emergency management. An OIE Gap Analysis[7] may help to set priorities for the Veterinary Services and animal health issues, thereby building or strengthening the relevant capacities for animal health emergency management.

ANIMAL HEALTH EMERGENCY MANAGEMENT: POLITICAL AND STAKEHOLDERS' COMMITMENT AND INVOLVEMENT

The success of managing animal health emergencies depends on the will and commitment of key decision-makers in the country to fully engage in the process, including but not limited to, rapid and relevant decision-making, mobilization of needed resources, efficient coordination of mobilized national capacities, and frequent communication to the public, professional stakeholders and the country partners. It is crucial to involve the relevant decision-makers at the early stages of emergency management.

Policy leaders and advisers in national ministries of agriculture, health, finance, emergency management, law enforcement and others should engage proactively in the development of emergency preparedness plans. Early involvement and commitment of top-level officials will facilitate the decision-making process in matters of high political impact, such as cessation of exports, closed borders and limited or controlled population movements. Leaders representing animal industries, farmers, animal value chain operators and other private sector players should also share in the responsibility of decision-making, preparation and funding. Annex II provides guidance on advocacy for investment in emergency preparedness.

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[7] The OIE PVS Gap Analysis is a carefully structured exercise undertaken with the national Veterinary Services to determine their priority goals, as well as strategies, activities and investments required to achieve these objectives.

ANIMAL HEALTH EMERGENCY MANAGEMENT: PRIORITIZATION AND STRATEGIES

Any animal health emergency management system and related strategies to strengthen the capacities for emergency management should be designed in accordance with the situation. Competent Authorities should prioritize and categorize the animal diseases, hazards or threats of concern through an impact assessment.[8] This assessment should take into account epidemiological patterns and their potential consequences in terms of the impact on the economy, food security, public health, society and the environment as well as the availability and consequences of the relevant control measures for each impact. The main output will be to have a list and categories of priority animal diseases and animal health events justifying the emergency management system as well as specific emergency preparedness and response plans.

The development and upgrading of the emergency management system often requires several years to address governance, investment, definition of procedures and training. A strategic action plan can be drafted to schedule the needed activities to prepare the emergency management system and to increase the level of preparedness gradually. The PPEP continuum can provide guidance to build this strategic action plan. Annex III provides further information on the PPEP.

The strategic action plan for emergency management is a part of the strategic planning of the Veterinary Services and should be aligned with the goals of the country's animal health policies. For example, there should be no specific emergency management action plan for a disease for which there is no official control programme.

ANIMAL HEALTH EMERGENCY MANAGEMENT: INTERSECTORAL COORDINATION

Apart from the Veterinary Services, the emergency management system should involve all authorities that could have any role in the management of an emergency. A mapping of all agencies and stakeholders involved, with a clear definition of their respective responsibilities and roles should be a preliminary step in building the emergency management system.

There are certain essential government services that are included in responding to national disasters which can have important roles in animal health emergencies. These services include, among others, the 'natural' partners academia and public health and environment authorities, but also police/law enforcement, defence forces, public works departments and national or provincial general emergency services or civil security.

Academia can provide scientific support, especially for diagnostic and risk assessment.

Public health authorities are involved systematically in events linked to a zoonotic disease, and are competent in food safety events. The WHO Joint External Evaluation (JEE),[9] which is used to assess the level of implementation of the WHO International Health Regulation within a country, can also provide valuable information in terms of the capacity of a country to manage a zoonotic animal health event (WHO, 2018).

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[8] More information on listing and categorization of priority animal diseases, including those transmissible to humans, can be found at https://www.oie.int/en/solidarity/global-studies/categorisation-of-animal-diseases/.

[9] A JEE is a voluntary, collaborative, multi-sectoral process to assess country capacities to prevent, detect and rapidly respond to public health risks. The JEE helps countries identify the most critical gaps within their human and animal health systems and can be used in conjunction with the OIE PVS Tool.

Environment authorities can assist in investigations in wildlife.

Law enforcement can assist in applying the necessary animal health control measures, such as enforcing quarantine and restricting livestock movement, and protecting staff if necessary. They can also intervene in case of suspicion of deliberate criminal action at the origin of the event.

Defence forces can provide support for transporting personnel and equipment to disease outbreak sites, particularly when these sites are inaccessible to normal vehicles. They can also provide food and shelter, protect intervention staff in areas with security problems and provide communication facilities between national and local emergency response headquarters and field operations.

Public works can provide earth-moving and disinfectant-spraying equipment and expertise in the disposal of slaughtered livestock in eradication campaigns.

Civil security general emergency services can provide facilities, logistical support and communications.

It is essential, therefore, to begin to build any emergency management system with intersectoral coordination in mind and as a permanent background.

Furthermore, most countries have national disaster plans that allow essential government and non-government services and resources to mobilize rapidly in response to a disaster. It is important to assess the level and the procedures of the national disaster plan developed for the management of other emergencies such as those involving public health or disasters induced by natural hazards including floods, earthquakes, major fires or droughts.[10] A strong case can be made for the official recognition of animal health emergencies as a natural disaster. The establishment of linked or common procedures with the national disaster plan will facilitate the emergency management and its coordination.

ANIMAL HEALTH EMERGENCY PHASES AND EMERGENCY MANAGEMENT ACTIONS

Whatever the country system and whatever the type of emergency, good emergency management practices should address all phases of an animal health event causing that emergency, along the timeline and the epidemiological presentation of the health status continuum of an animal population. These four phases can be called ‘peacetime’, ‘alert’, ‘emergency’ and ‘reconstruction’.

The term ‘peacetime phase’ refers to the period of time prior to a specific animal health event when no extraordinary or emergency actions are necessary in relation to that event. It means, for example, that there may be peacetime on the front of one disease, while being emergency on the front of one or more other diseases.

The term ‘alert phase’ refers to the period of time when the level of risk due to an animal health event requires close observation of all activities, rapid transmission, sharing and assessment of relevant information, and quick precautionary action to address an impending emergency. The alert phase is the period when a threat is advancing or has been identified. It can be triggered for example by a suspicion of an autochthonous case of a

[10] See also the United Nations Office for Disaster Risk Reduction (UNDRR) Sendai Framework for Disaster Risk Reduction 2015-2030, at https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030.

priority disease or by confirmed outbreaks in the vicinity of a country or in trading partner countries. During that alert phase, an early warning system (EWS) is used.

The term 'emergency phase' refers to the period of time calling for immediate action to avoid or mitigate direct and indirect losses caused by an animal health event. Although this is the only phase designated 'emergency,' the entire event is addressed by emergency management.

The term 'reconstruction phase' refers to the period of time following the emergency phase and dedicated to the re-establishment of animal populations, the recovery of pre-emergency (human and animal) health levels (including efforts to reduce risk factors), the relaunching of animal production systems, value chains and trade, the restoration of livelihoods and the support to other socio-economic aspects impacted by the animal health event. The animal health status recovered may be different from that which existed before the event. The reconstruction phase is also used to implement post-experience assessment, or after-action review (AAR).

All through the animal health event, five types of emergency management actions should be implemented: 'prepare', 'prevent', 'detect', 'respond' and 'recover'. These actions are implemented in accordance with their relevance for each phase of the animal health event causing an emergency.

The action 'prepare' refers to the development and implementation of strategies, policies, programmes, systems and analyses prior to an animal health emergency, in order to prevent, detect, respond to, and recover from, that emergency. Prepare is the predominant action of emergency management during peacetime, but it is also important during reconstruction.

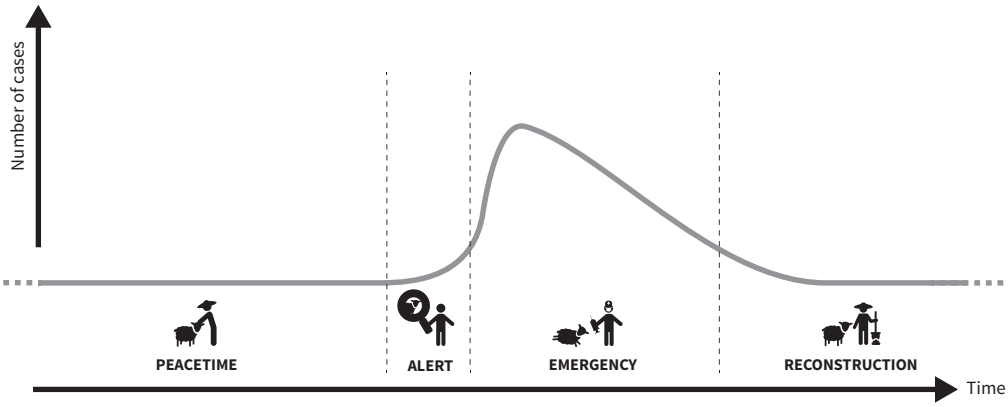
The action 'prevent' refers to the implementation of activities, programmes and systems that enable an organization to avoid, preclude or limit (mitigate) the impact of an animal health event. Prevent is an action of emergency management that is key during the alert phase to avoid the event becoming an emergency, but it also applies as a general measure during the other phases.

The action 'detect' refers to the implementation of activities, programmes, and systems to either identify an incursion, emergence or re-emergence, or spread of a hazard, or define the level of presence or demonstrate the absence of the hazard. Detect is particularly important during the alert and emergency phases to know where to respond. It is also important in peacetime in terms of readiness, and in the reconstruction phase to help recover a favourable animal health status.

The action 'respond' refers to the implementation of activities, programmes, and systems aimed at the rapid containment and eventual elimination of the cause of an animal health event, and at the mitigation of its negative consequences. Respond is the action of the emergency phase. However, it is also possible to respond pre-emptively during the alert phase.

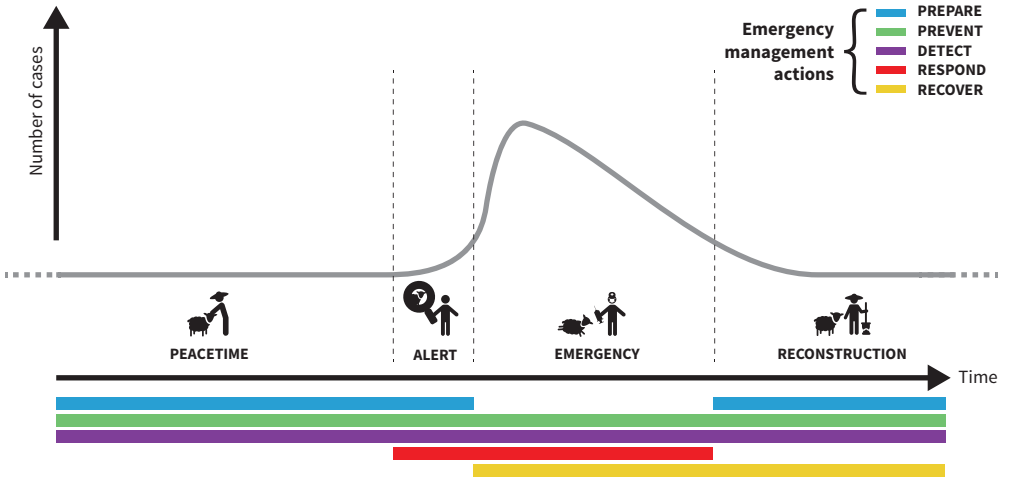
The action 'recover' refers to the action of implementing activities, programmes, and systems to relaunch animal production systems, value chains and trade, to restore livelihoods, and to support other impacted socio-economic aspects. Recover is predominant during the reconstruction phase but can be activated before the end of the emergency phase, especially if that phase is long-lasting or concerns large parts of the territory.

FIGURE 1
Phases of an animal health event causing an emergency



Source: Authors

FIGURE 2
Emergency management actions implemented at each phase of an animal health event causing an emergency



Source: Authors

Figure 1 shows the four phases as a consecutive sequence in time along a typical 'epidemic curve'.

Figure 2 shows the emergency management actions that should be implemented at each phase.

The different levels of emphasis of each action depending on the phases are shown in Table 1.

TABLE 1
Level of emphasis of each action according to the phase of the animal health event (+ = minimal emphasis, ++++ = maximum emphasis)

	Peacetime	Alert	Emergency	Reconstruction
Prepare	++++	++		+++
Prevent	++	++++	+++	++
Detect	++	++++	+++	++
Respond		+(+)	++++	
Recover			+	++++

There can be overlaps between phases: the alert phase may begin in one or more epidemiological units or areas, while others remain in the peacetime phase; the reconstruction phase may begin in some epidemiological units or areas while others remain in the emergency phase. Furthermore, a zone can be in a peacetime phase for some species or events, but in an emergency phase for others.

Emergency management utilizes a risk analysis approach before, during and after animal health events, and addresses the whole duration of the event, even though only one phase is called 'emergency'.

Chapter 2

Animal health emergency management in peacetime

THE EMERGENCY MANAGEMENT ACTIONS IN PEACETIME PHASE

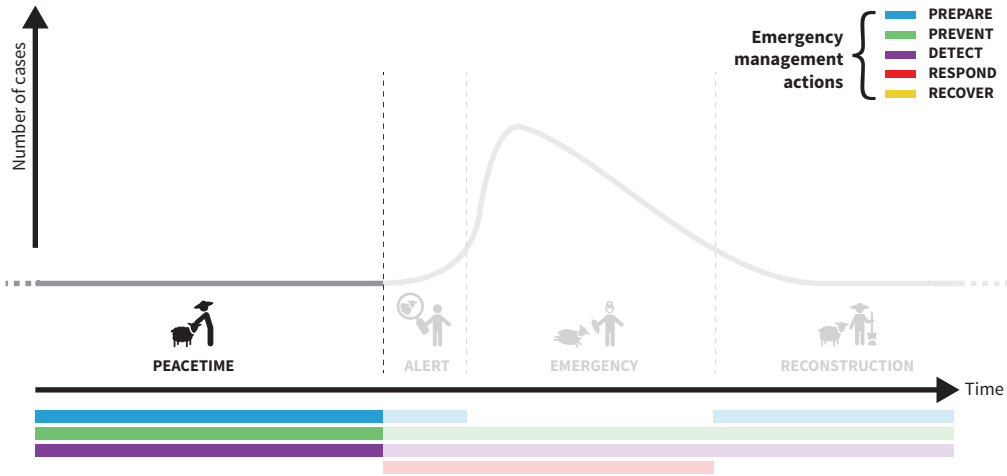
The peacetime phase (Figure 3) is essential and is too often disregarded given that all actions implemented during alert, emergency or reconstruction phases depend on the way they were prepared during peacetime.

Therefore, 'prepare' is the most important action during peacetime. But for this period to remain peaceful, a key action is to 'prevent' specific animal health events from happening. Moreover, to anticipate and be aware of what is happening in real-time, another key action is to 'detect' any occurrence of those events (Table 2).

PREPARE FOR EMERGENCY IN PEACETIME: GENERALITIES

Preparing is building capacity and capability to cover the foreseen needs for the management of events that are likely to occur. Preparedness actions during peacetime aim at reaching a state of operational readiness in anticipation of an animal health event that would trigger an emergency.

FIGURE 3
Peacetime and associated emergency management actions



Source: Authors

TABLE 2
Level of emphasis of each action during peacetime

	Peacetime
Prepare	++++
Prevent	++
Detect	++
Respond	
Recover	

But preparing is first answering the key questions: what, why, who, how? It is essential to know what the emergency management system is expected to protect and why. Data on livestock, production systems, value chains, trade exchanges, movement of animals and goods should be collected to be able to perform an impact assessment, a prioritization and analysis of risks, and, possibly, to develop a case for advocacy. In parallel, an evaluation of the size, organization and capabilities of Veterinary Services helps to distribute the possible roles, as well as to identify and engage key stakeholders from both the public and private sectors. Only then is it possible to define the strategies and objectives of the policies of preparedness.

And the key words for emergency preparedness during peacetime are: planning, equipping, training and testing. To prepare adequately, a continuous cyclic series of actions should be implemented to develop or modify plans, equip the plans for operations, train everyone who has a role in implementing the plan, and to test the plan, equipment and training through a series of exercises. Figure 4 shows this 'emergency preparedness cycle'. It is figured as a spiral where the point of arrival is different from the point of departure, as if it is well applied, the preparedness activities will eventually improve the level of readiness of the country.

The status of preparedness of an animal health emergency management system can be assessed along a PPEP continuum (see Annex III).

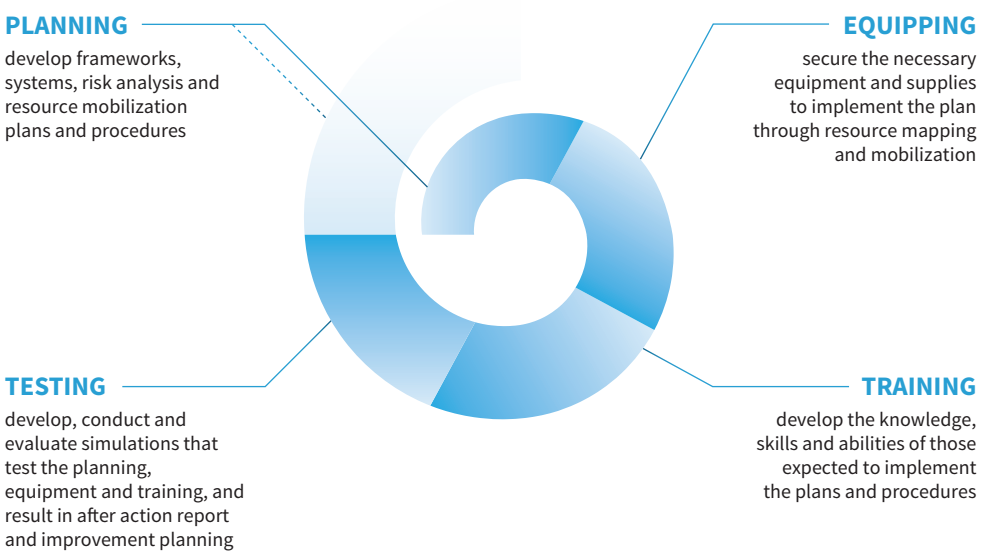
Prepare for emergency in peacetime: planning

The first and most important activity of the emergency preparedness cycle is planning. This consists in developing a methodical sequence of actions that will achieve specific emergency management goals, saving valuable time, effort and resources during the emergency phase.

Planning, which is acting, should be preeminent during peacetime, so that when an emergency comes it does not become a crisis. Arrangements need to be in place for each phase and decisions made about what is to be done, why, by whom, when and how.

An emergency preparedness plan is a document or series of documents outlining the overall strategy of preparation for emergencies. It includes the related collection of legislation, regulations, policies, frameworks, programmes, systems, analyses and information. The plan identifies priorities and describes organizational roles and responsibilities. It outlines procedures and planning activities, as well as resources required to reach a level of readiness to prevent, detect, respond to and recover from an animal health emergency. It can include a global concept of operations describing the characteristics of the system from the viewpoint of the end users.

FIGURE 4
The emergency preparedness cycle



Source: Authors

Plans are not paper documents but living sets of processes. An emergency preparedness plan describes the processes that should be developed, from legislation and governance down to operational documentation, such as standard operating procedures (SOPs), codes of practice, or formal agreements with involved public and private partners. An emergency preparedness plan provides definitions of animal health emergencies in the context of the country, and based on risk analysis. It identifies, prioritizes and categorizes animal health events that have the potential to cause an emergency. It includes thresholds and triggers for both the declaration of the emergency and the launching of emergency response plans.

An emergency preparedness plan includes a number of specific separate elements of emergency management preparedness, notably: financial arrangements, training programmes, surveillance plans and an EWS, emergency response plans and recovery plans. All these separate elements are linked by the overall logic of the preparedness plan.

Among those elements, an emergency response plan (often called a 'contingency plan' or 'emergency intervention plan')[11] refers to a document or series of documents (including response operational manuals) used during the 'emergency phase' and comprising the relevant measures, concept of operations, procedures, information and tactics that should be implemented to respond to a specific animal health event. The plan should be developed,

[11] The use of the term 'emergency response plan' in this guide is motivated by the fact that whatever plan is drawn up should be easy to understand, actionable and doable. Experience shows that 'contingency plans' have often been too theoretical, too vague, not funded and not actionable. The term emergency response plan is also clearer and more easily translated into other languages.

compiled, disseminated and maintained before the emergency, and ideally tested during the peacetime phase, as part of the preparedness effort.

Any plan is developed by a Competent Authority. In most cases, it is developed at the national level. However, when appropriate, some components can be developed at the subnational or supranational level.

Planning: general procedures of an emergency management system

The overarching animal health emergency preparedness plan should define and explain the emergency management system procedures for priority high-impact animal diseases and other animal health threats.

It should cover all general processes needed for the management of an emergency including:

- a concept of operations describing the system, its mission and objectives;
- general procedures for declaring an animal health emergency and for the activation and deactivation of the emergency response plans, including definition of thresholds for activation;
- general procedures for establishing an Animal Health Emergency Operations Centre (AH-EOC);
- formalization and maintenance of agreements with other national authorities and agencies, neighbouring countries, main stakeholders and international organizations such as FAO, OIE or regional organizations;
- a national surveillance framework including the epidemiological surveillance of the different animal populations (domestic animals, wildlife) and rumor tracking;[12]
- overall protocol for a rapid and transparent reporting of suspected cases of priority animal health events from the field to national Veterinary Services, and notification to OIE, as applicable;
- data management rules and systems (including information and reporting systems);
- veterinary laboratory procedures for diagnostic services, including collection and transport of samples;
- a framework for SOPs to guide the prevention and response measures, which should be adapted in the emergency response plans;
- general policies and guidelines for compensation;
- procedures to define and a possible list of key indicators for the monitoring of the response;
- policy and programmes for training and simulation exercises.

Planning: legislative framework and funding

Legislation is the fundamental element of preparedness planning. It should provide the needed legal power and framework to the Competent Authorities to ensure the obligation to veterinarians, paraprofessionals, animal owners and keepers, and other relevant people

[12] For more information on surveillance, see the FAO manual on animal health information systems and surveillance, available at http://www.fao.org/3/i2415e/i2415e00.pdf and the 2021 *Guidelines for designing animal disease surveillance plans* (available at http://www.fao.org/3/cb3252en/cb3252en.pdf).

to report suspected cases of priority animal health events, and the possibility of emergency actions, such as those involving movement or property, that may entail some legal rights, including:

- mobilization of required personnel and laboratories;
- restriction or standstill of movement of animals, products and people;
- isolation and possible killing and destruction of animals;
- seizure and destruction of products and materials;
- entrance into premises for epidemiological investigations, including sampling of animals and products;
- border control and trade restrictions;
- compulsory vaccination or treatment of animals;
- possible other necessary animal health control actions;
- the existence of a specific information management system and chain of command for the enforcement of emergency decisions;
- the possible direct communication with neighbouring countries, as well as regional, continental and international organizations;
- the availability and access to specific funds to support emergency actions.

Funding sources and the authority to mobilize funds to support the response actions are key components of planning. Experience has shown that delay in obtaining finances is one of the major constraints on a rapid response to animal health emergencies. Funds are not necessarily in the hands of the national Veterinary Services or Competent Authorities, but, as is often done by governments in cases of disaster, assurance that funds can be rapidly accessed should be provided through adequate legislation developed in the peacetime phase. Administrative arrangements should describe the funding mechanisms.

Other sources of public or private funds (including national or international donors) may be identified and agreements written prior to the emergency in order to provide extra-budgetary funding. The legal framework may also provide for specific private insurance that will reduce the public funding of compensation schemes.

The emergency funds should be clearly intended to:

- develop and maintain the emergency preparedness plan to include risk analysis, specific equipment and supply stocks, training of personal and simulation exercises, development and maintenance of the information management system;
- finance the upsurge of activities of the animal health services (in terms of personnel, equipment and consumables) during alert and emergency phases;
- provide compensation for animal owners, especially in case of compulsory culling and destruction.

Financial planning is therefore an essential part of preparedness and the financial plan should be drawn up in accordance with an assessment of the estimated funds needed.

The emergency preparedness plan should define in advance the conditions under which funds may be used. In most cases, some funds are already in the national or local budgets and can be mobilized immediately as the emergency response is launched. Other funds would be subject to release only once specified conditions have been met, such as thresholds related to spread of the disease. Some funds, such as those for compensation, can be used after the emergency phase, typically during the reconstruction phase.

Planning: governance and chain of command

Fighting an animal health emergency is, in many respects, like a military operation and demands the same level of discipline. As in those operations, rapid decisions must be made based on analysis of the best information available from all sources. There needs to be the ability to make those decisions and the capacity to convert those decisions into clear orders, which can be conveyed down the chain of command to those who are charged with the responsibility of carrying them out. Those in command need to have the ability to know that orders have been carried out and with what results. Therefore, the governance system of Competent Authorities should include a clear chain of command in case of emergency.

Government has the ultimate responsibility for the control of animal health emergencies and this responsibility is often devolved to the minister and ministry responsible for animal health (for example, agriculture, livestock, public health). In any case, the country's Chief Veterinary Officer (CVO), who is often the head of Veterinary Services, should have the overall technical responsibility for preparing for and managing animal health emergencies.

Indeed, the CVO supervises the development of animal health policies and their legal framework, takes decisions for official control programmes, supervises and monitors operations and updates programmes. The CVO should also plan finances and advocate for investment and support from the political decision-makers.

However, the animal health operations and activities are implemented at the local level by the field Veterinary Services, which include private sector professionals such as veterinarians and technicians. This involvement occurs particularly when there is a demand for more personnel during an emergency response. Furthermore, the production sector, which is most directly concerned with animal health events and potential emergencies, should be involved at all stages, if possible, in order to maintain coordination with the national and local authorities. This is a key element to ensure acceptance of control measures and their implementation without delay or resentment.

In addition, in many countries the authority and responsibility for the delivery of animal health services has been devolved to provinces or regions. This structure may result in the senior veterinary officer in the region (sometimes called the 'local CVO') being answerable to an administrative or political superior rather than to the national CVO.

Therefore, there must be efficient mechanisms in place for the transmission of information and instructions from the headquarters right down to the 'front line' in the field and laboratory. Equally important is an efficient mechanism for the transmission of information and responses from the field and laboratory to headquarters.

The CVO should ensure that legislative provisions guarantee a permanent chain of command that is in place to manage any priority animal health event from the central headquarters to the field level, effectively and efficiently. The CVO should also verify the capacity of the Veterinary Services to implement the emergency response plans, down to the specific response operations and SOPs.

The preparedness plan should establish a clear structure of bodies with defined roles, responsibilities and duties for the daily work of the Veterinary Services, depending on their level of command. Even if it may be desirable to use systems with which people are already familiar, emergencies usually cannot be addressed effectively in the same manner as daily work and the best chain of command may not be the one that normally operates in the country.

That is why a specific emergency chain of command should be defined in advance, to be used during the emergency phase. For this to function well, it is essential to have a clear understanding of who will be responsible for what precise activities and to specify a single chain of command and line of communication so that all those involved understand what they have to do, from whom they will receive direction and to whom they will refer. Typically and schematically the chain includes all levels, from the national central level (governmental administration comprising the National Veterinary Authority) to the local field level Veterinary Services, which include public and private field teams and laboratories. All defined levels and links should be clearly described in the preparedness plan, including the operational teams that undertake the field work, implementing the procedures contained in the emergency response plans and operation manuals, including private veterinarians, para-veterinary professionals and even animal owners and keepers.

An internal coordination for emergency response within and outside of the Veterinary Services should be established through an AH-EOC if possible and in accordance with the capacity of the country. The preparedness plan should describe its specific roles and responsibilities and the needed coordination mechanisms with the normal chain of command of the Veterinary Services. The AH-EOC[13] should be based on the following principles: modular structure, scalability, integration of logistics and operations, and multidisciplinary elements. Procedures for establishing the AH-EOC should include:

- purpose and scope;
- organizational structure and roles for each position;
- identification and involvement of stakeholders to be incorporated, and their roles and responsibilities;
- activation of central multisectoral collaboration for incident coordination with other agencies and ministries;
- mechanism for command and control of field activities, to include rapid response teams, incident command and coordination with local authorities.

Moreover, it is critically important to develop coordinated and efficient mechanisms for the rapid sharing of emergency disease reports and key epidemiological information with other relevant agencies and stakeholders or their representatives. Using the mapping of all agencies and stakeholders, the preparedness plan should define adequate arrangements, including the definition of roles and responsibilities, to be applied at the local and regional levels as well as at the national headquarters. This plan can imply the development of public-private partnerships[14] with animal production industries, farmer organizations, breeder associations, Veterinary Statutory Body[15] or consumer associations. The mapping can also identify supranational agencies that could support the management of an animal health emergency and justify an external coordination, especially in terms of a provision on surge capacity.

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[13] FAO develops and publishes guidance on AH-EOC.

[14] The OIE has published guidelines on public-private partnerships in animal health services, available at https://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/PPP/oie_ppp_handbook-20190419_ENint_BD.pdf.

[15] The role of a Veterinary Statutory Body is to oversee the quality and competence of veterinarians in a country. A guide for twinning of Veterinary Statutory Bodies has been published by the OIE and is available at https://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/VSB_Twinning_Guide.pdf.

In order to prepare for animal health events of a zoonotic nature, including when vectors or wildlife are involved, the national governance should follow a One Health approach, where authorities in charge of animal health, public health and the environment are linked through formal agreements and operational procedures. These will allow them to grasp the whole picture of the event and to coordinate the preparedness and response actions. Internationally, FAO, OIE and WHO have developed a guide to respond to zoonotic diseases, which can serve as a template for countries (WHO, FAO and OIE, 2019).

Finally, the animal health emergency chain of command can be included in a wider chain of command for disaster management. In serious situations, certain essential government services, such as parts of the armed forces or civil rescue services are included in the response operations and their participation can greatly assist the Veterinary Services. In situations regarded as natural disasters, the top of the chain of command can be transferred to the authority legally competent for disaster management. In all cases, coordination with those services is key for an operational chain of command.

Planning: risk analysis

Risk analysis is needed to determine which animal health event would require emergency preparedness and to what extent. It helps in terms of prioritizing the threats, preparing for them and defining adequate response plans. During peacetime, regular updates of the risk analysis are needed to detect changes in threats, such as the introduction of new pathogenic agents, changes in the distribution and virulence of known agents, and changes in possible routes of introduction or spread. With this information, adaptations can be made to the preparedness plan and relevant response plans. While risk analysis is applied at each phase of an emergency, it is essentially required for preparedness in the peacetime phase.

Risk analysis is a step-by-step, systematic process, described in various validated international documents and guidelines, notably OIE's *Handbook on import risk analysis for animals and animal product* (OIE, 2010). It comprises the following components:

- hazard identification: identify the hazards that threaten the country;
- risk assessment: evaluate the likelihood of an animal health event occurring and its consequences to the country; assess its potential to trigger an emergency and determine what diseases and other animal health events justify an emergency response plan;
- risk management: develop options for prevention, mitigation or control, including emergency response measures;
- risk communication: exchange information and opinions on the result of the risk analysis with authorities (risk managers) and stakeholders to reach a consensus on the risk analysis and on the preparedness and response plans.

The risk analysis should be regularly updated according to the evolution of the situation and of the value chain (including trade flows and animal movements, mapping of the actors and evolution of practices).

- The first main output of the risk analysis is, for each priority hazard, threat or emerging animal health event, the definition of occurrences and thresholds that would trigger the activation of different phases of the emergency management. Examples include:

- alert: a priority disease absent from the country is confirmed in a neighbouring country close to the border;
- alert: there is suspicion of the first case of a priority disease previously absent from the country;
- emergency: there is confirmation of the first case of a priority disease previously absent from the country;
- alert/emergency: there is a significant increase (thresholds) or abnormal evolution (hosts, areas) of the incidence or virulence of a priority disease present in the country;
- alert/emergency: there is high and concomitant frequency of decreased animal production performance with no known cause in many epidemiological units (thresholds);
- end of emergency/reconstruction: there is a significant decrease of the incidence or virulence of a priority disease present in the country.

Another main output of the risk analysis is the definition of the goals of emergency response. It must be done on a case-by-case basis depending on the category of the disease hazard (for example, recovery of disease or hazard-free status or control of the disease to an acceptable level).

Annex IV provides a more detailed description of the application of risk analysis in animal health emergency preparedness.

Planning: emergency response plans

For certain priority animal health events, specific emergency response plans should be developed in detail in advance so that the response is correct and implemented rapidly. There is no ideal 'one size fits all' format for an emergency response plan and no single list of requirements as plans will vary depending on the situation and suitability for each country. Given that every country has its own unique set of circumstances, the content of any emergency response plan needs to be tailored to best meet the requirements of individual countries.

The plan is only produced to be of use to those who develop it. However, there are certain elements that are required in any emergency response plan if it is to have the required effect of enabling the rapid control of an event. Annex V describes their nature and structure and proposes a template.

The emergency response plan is the actionable face of all the elements that have been defined in the preparedness plan, such as funding mechanisms, incident command and SOPs. The plan should be concise, achievable and readily understood.

The main content of an emergency response plan should include:

- a specific process (based on predefined triggers and thresholds) for the declaration of the event as an emergency and for the initiation of the response plan;
- the concept of operations for the response to the event, including the description of the user organization, its mission, goals and objectives;
- strategies, measures and options for response as well as incident coordination and incident command system, including specification of possible AH-EOC;
- specific procedures for coordination with other agencies (such as public health authorities in the case of zoonotic disease, or law enforcement authorities in the case of suspicion of malevolent act);

- templates of regulatory texts that will be needed for response and activation of the control measures, such as animal and product movement controls, compulsory testing or culling, and compulsory disinfection;
- specific rules and SOPs for investigations according to the animal health event (such as disease or contamination) and the circumstances of the event (including natural pathways, illegal trade or movements, intentional release of a pathogenic agent;
- specific SOPs for critical response actions such as measures at the border, adapted biosecurity, deployment of a rapid response team, sanitary measures such as stamping out or vaccination, targeted surveillance, sample collection and shipment, rapid risk assessment to adapt the response measure, and responder safety and health;
- specific rules for compensation and procedures for loss evaluation;
- measures to ensure continuity of operations during the emergency such as feed supply and animal product deliveries, depending on the control measures;
- identification of the specific key indicators to monitor the response;
- epidemiological indicators including morbidity, mortality, incidence and prevalence (individual and for epidemiological units);
- indicators of control measures including the number of animals slaughtered, number of vaccinated animals and number of checkpoints;
- specific real-time and on-the-spot training for upsurge personnel;
- a health and safety plan to prevent responder injury or illness (including due to mental stress).

Planning: prepare the recovery, including exit strategy and compensation

Exit and restocking strategies are often not well developed in the emergency preparedness plan and the emergency response plans. Anticipation of exit strategies and restocking should be ensured during peacetime. There are two points that should be defined:

- the criteria that permit the initiation of the recovery period and the reduction or lifting of control measures, such as restrictions of movement or intense surveillance;
- the conditions needed to ensure a restocking with animals free of the disease according to the risk represented by the pathogens; for example, the certification of the free status of some farms supplying grandparents' and parents' stocks during peacetime will ensure safe sourcing during the recovery period.

A compensation policy is the cornerstone of any control policy that will require the killing of animals or the seizure or destruction of property. It must be stressed that compensation should be seen mostly as an incentive to encourage the rapid reporting of an event, which will limit its spread and, eventually, its cost. Compensation arrangements that are either inadequate or too generous can encourage behaviours that are counterproductive and may damage control efforts. To avoid this possibility, compensation should be considered not only in the budgets for preparedness, but also in the implementation procedures for recovery.

General principles that should guide a compensation policy include the following:

- Animals that are killed may represent to the owner both a direct capital loss and a loss of valuable future genetic capital;
- Most loss incurred by producers is the consequence of ongoing production during the outbreak rather than the value of the animals killed;

- Compensation should be paid for animals that are killed as part of a compulsory culling campaign, whether they are infected or are killed as at-risk contacts or for welfare purposes;
- Compensation should also be paid, if possible, for non-animal products and property that are destroyed as part of a compulsory campaign, such as feed or breeding material;
- Since one of the major roles of compensation is to encourage the early reporting of disease, compensation should not be paid for animals that have already died or have been killed by the producer before the disease is reported and confirmed;
- For compensation to be effective, it needs to be paid soon after the losses are incurred;
- Cash compensation is best paid directly to the actual livestock keeper or beneficiary of the culled livestock (to avoid corruption and theft);
- Compensation should be differentiated from support for restocking.

Planning: information and reporting systems

Management of information is crucial for animal health emergency management and, although data are collected and analysed across all phases of the event, information and reporting systems should be organized during peacetime and included in the preparedness plan and the response plans. Day-to-day activities of the Veterinary Services may not require a high level of precision, but the good management of an animal health emergency necessitates accurate data.

During peacetime, the needed data on animals should be collected and updated in accordance with risk analysis. These data may include:

- a census of animal populations such as livestock, pets and wild animals, even if the details and accuracy differ widely (data can range from an exact census to data on geographical distribution or density of animal populations);
- registries and mapping of farms or other breeding or rearing establishments, preferably by epidemiological units (and with the use of the Geographic Information System (GIS) framework if possible);
- records of movements of animals within the country and trade with other countries;
- description of the animal production systems and value chains, including key non-breeding/rearing activities, such as: feed millers, live animal markets, slaughterhouses/abattoirs, dairy collectors and processing units, meat processors, by-products units, wholesale and retail;
- description of traceability systems used in animal production, if any (from live animals to processed products and by-products);
- data on accessibility of resources, including human resources (name and contact details), equipment and consumables (stock and storage facilities, vaccine banks).

Mechanisms and procedures should be defined to maintain and update these data and to facilitate the access to private data if needed. To achieve this goal there needs to be coordination between the respective responsible authorities in the country including, for example, customs authorities for international trade, economic authorities for food producers, breeders' associations for animal identification, unions of animal processors for traceability data.

These mechanisms can be operated through a regular transfer of data to the Veterinary Services database or by allowing these services facilitated and immediate access to the data.

In the case of external sources of information, whether public or private, an agreement should define authorization of the access to data and compliance with the regulations of data protection. The agreement should also define the conditions of sharing or access to the data and information with the different parties according to their needs: data recipient, nature of the data and information sent, frequency of sharing of data or information.

Furthermore, the way the data are to be used to implement and monitor the emergency management system should be defined. In particular, key indicators should be defined to assess the risk and the epidemiological situation, as well as to monitor the response actions and their impact on the control of the animal health event. If needed, one or more dedicated databases may be developed, and the needed resources to manage the data collection and analysis (such as laptops, tablets and smartphones) should be identified.

Planning: communication and community engagement

During peacetime, a communication plan should be established considering the objectives to attain before and during the emergency.

Advocacy and outreach should be extended to political decision-makers at different levels, to advocate for the needed resource investments and organizational decisions for preparedness. Annex II describes how advocacy should be developed.

Risk communication should be made towards the relevant stakeholders and possibly the greater public. Messages in peacetime should focus on the assessment of risk and risk pathways, and on the prevention and biosecurity measures. These messages can include public awareness campaigns and information at borders (airports, seaports etc.), as well as targeted messages to animal health professionals and organizations of the animal production value chain (including livestock breeder/keeper communities). This information is needed to maintain vigilance against incursion and knowledge about how to detect and report an animal health event.

Specific communication should be in place for use during the alert and emergency phases. This communication material should be prepared in advance with key information and should target:

- decision-makers, to facilitate the process of decision-making;
- stakeholders concerned by the emergency, to ensure their commitment (funding and actions) in accordance with the emergency response plan;
- the public (for example, in the form of draft press releases), to inform them about the situation and the reality of risks, such as the level of exposure for humans, relevant measures to protect themselves and control measures determined by the authorities.

During peacetime, a channel of communication adapted to the chain of command should be prepared to ensure real time and objective information. The communication channels can be a website platform, specific newsgroups (such as field veterinary practitioners and local authorities) and telephone numbers. Contact points should be identified in the most appropriate mass media (that is, newspaper, radio, television). These contact points should be regularly contacted and given up-to-date information to maintain their interest and to ensure the credibility of their sources.

Prepare for emergency in peacetime: equipping

The second activity in the preparedness cycle is to equip the plans. Managers responsible for their respective plans should assess the needs, get the key resource persons, and secure the necessary equipment and supply to implement the plan through resource mapping and mobilization.

Resources should be considered to be personnel, equipment, supplies, and financial and other means necessary for the implementation of the plans, including upsurge for a protracted response. The first step is to define the needs and the ways of supply through:

- assessment of the resources readily available and budgeting of the resources needed to implement the preparedness plan, including specific response plans according to realistic and credible animal health emergency scenarios;
- definition of the conditions for rapid access to the needed resources with a commitment of the suppliers: immediate acquisition, pre-contracts with suppliers that define the condition of mobilization of the needed resources, contracts for the provision of human resources;
- signing of contracts and agreements with suppliers and partners.

Apart from the permanent staff in Veterinary Services, resources include:

- vehicles, fuel and remote communication for field activities, including field investigation;
- material for animal quarantine and clinical inspection;
- equipment for incident coordination and information systems, including infrastructures (servers, computers, internet access) and databases;
- material for live animal and post-mortem sample collection and submission to laboratories, including packaging and shipping supplies in accordance with International Air Transport Association (IATA) standards in case a shipment to a foreign or international laboratory is needed;
- equipment, reagents, consumables for the diagnostic laboratories;
- resources for rapid response teams, including personal protection equipment (PPE), equipment for depopulation (such as mobile electrocution units, captive bolts), for disposal (such as mobile incinerators, bulldozers) or for cleaning and disinfection;
- upsurge of human resources from the private sector or from other authorities (local authorities, other agencies).

The strategy of sourcing should be to acquire or to sign pre-contracts to acquire sufficient resources on time, that cannot be stored, including:

- pre-contracts for sourcing of reagents or vaccines; an efficient solution is to ensure the access to vaccine banks when they exist (such as OIE vaccine banks for rabies or PPR);
- pre-contracts for access to services such as the disposal of dead animals, killing of animals, laboratory testing and external training.

It is important to assess the cost/benefit ratio of stockpiling supplies during peacetime, as well as the possibility of rapid raising of stocks during the alert phase.

Prepare for emergency in peacetime: training

After the emergency preparedness plan and specific emergency response plans have been written and adequately resourced with personnel, equipment, supplies and financing, all stakeholders who have been assigned actions in the plans should receive adequate training in

the functions they are expected to perform. Training is needed on a regular basis to maintain specialized awareness and the skills needed to execute the emergency response plans.

Each organization should consider what training options are applicable to their stakeholders and plans. A multi-year training programme is the most effective and sustainable option for personnel regularly involved in preparedness and response. It should be adapted to the role of the different actors with more intense training required for the key managers of the response. Rapid, on-time training is an option for operational staff involved in practical acts such as vaccination or disinfection.

While all stakeholders need to be trained to fulfill their role and responsibilities in the plans, there should be a special focus on:

- executives and policy-makers on advocacy and the cost-benefit of strategies;
- managers in charge of emergency management systems, through GEMP training;
- personnel that could be involved in the response.

The training programme should be developed in relation to the needs identified and integrated as part of the global training strategy of the Veterinary Services. Specific emergency management training includes:

- incident coordination training, for AH-EOC members; it can include regional and international aspects of coordination;
- incident management (command and control) training for field activities, for emergency managers from national and subnational authorities;
- staff stress management training for emergency managers coordinating the field activities;
- for official animal health officers, veterinarians and veterinary paraprofessionals training in clinical examination and identification of priority animal health threats, as well as in animal health event investigations and sanitary measures;
- for veterinary laboratory personnel, training in procedures for sample collection, packaging and shipping to reference laboratories; it can include training in IATA standards

Any efficient training programme implies:

- a clear conception of pedagogic material that considers, for example, the need for a rapid transfer of know-how in the field during the first stage of the alert. New technologies such as e-learning are helpful;
- a focus on key competencies and key procedures for each role and position;
- the training of trainers in addition to the training of end users;
- joint training with other agencies and with the relevant actors of the private sector.

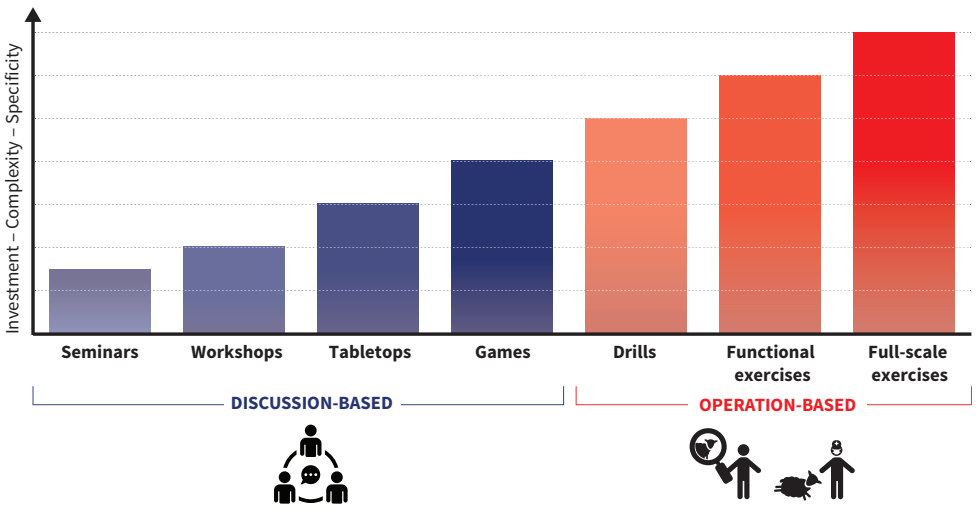
Verification of the implementation of a continuing education programme and review of the competencies of the key staff are part of the regular review of the emergency management system.

Prepare for emergency in peacetime: testing

The final activity in the preparedness cycle is to conduct exercises to test the emergency preparedness plan and, particularly, the emergency response plan for specific animal health events, in order to assess whether the resources and training provisions are operational.

Plans are best challenged through simulation exercises that verify the capacity to manage a particular animal health event from the alert phase through to recovery. Simulation

FIGURE 5
Level of preparation and capacity per exercise



Source: WHO Simulation exercise manual (WHO, 2017)

exercises are not training, but are practical exercises designed around a credible and realistic scenario.

Different kinds of exercises requiring varying levels of preparation and capacity can be organized depending on the expected objective (Figure 5). The OIE has published guidelines on simulation exercises which outline how to develop, organize and use them (OIE, 2020).

Some exercises, described below, are purely dedicated to response activities.

A tabletop exercise (TTX) uses a progressive simulated scenario, together with a series of scripted injects to make participants consider the impact of a potential animal health emergency on existing plans, procedures and capacities. A TTX simulates an emergency situation in an informal, stress-free environment. The purpose of a TTX is to strengthen readiness to manage a health emergency, through facilitated group discussions. A TTX can be used to:

- develop or review a response plan;
- familiarize participants with their roles and responsibilities;
- identify and solve problems through a facilitated and open discussion.

A drill is a coordinated, supervised exercise activity, normally used to test a single specific operation or function in a repeated fashion. The purpose of a drill is to practise specific skills, operations or functions, as an individual or in a team. The drill helps those involved to practise and perfect one small part of the response plan, and should be as realistic as possible, employing any equipment or apparatus necessary to carry out the function being drilled. Drills can be used to:

- train staff with procedures, tools or (new) equipment;
- test a specific operation (for example, AH-EOC telephone tree);
- exercise and maintain current skills;
- develop new policies or procedures.

A functional exercise (FX) is a fully simulated interactive exercise that tests the capability of an organization to respond to a simulated event. The exercise tests multiple functions of the organization's operational plan. It is a coordinated response to a situation in a time-pressured, realistic simulation. The purpose of an FX is to test or validate the response capability of specific functions or departments in an organization. Its emphasis is on coordination, integration, and interaction of an organization's policies, procedures, roles and responsibilities before, during or after the simulated event. An FX can be used to:

- test the operational system, procedures and plans currently in place;
- identify strengths, gaps and opportunities for strengthening;
- enhance the capacity of the operational system to respond to the next emergency.

A field/full-scale exercise (FSX) simulates a real event as closely as possible. It is designed to evaluate the operational capability of emergency management systems in a highly stressful environment, simulating actual response conditions. It includes the mobilization and movement of emergency personnel, equipment and resources. Ideally, an FSX tests and evaluates most functions of the emergency management plan or operational plan. The purpose of an FSX is to test/evaluate most of the functions of an emergency plan in the most realistic manner possible. It includes coordinating the actions of multiple entities, testing numerous emergency functions, and activating the EOC/response room. An FSX can be used to:

- test the emergency response operational capacity of teams and organizations;
- test functions of the emergency management plan or operational plan;
- exercise coordination, communication and collaboration between multiple entites and stakeholders;
- identify strengths, gaps and opportunities for improvements;
- enhance the capacity of the emergency management system to respond to an emergency.

Whatever the type of exercise, a standard approach for its design and implementation consists of three phases: (i) pre-exercise planning, material development and set-up; (ii) exercise conducting; (iii) post-exercise reporting and handover phase.

Each organization should consider the applicability of the following actions to test and exercise all stakeholders who have a role in implementing the plans:

- develop a multi-year exercise programme based on escalating exercise complexity including a series of simulation exercises;
- conduct AARs to evaluate plans, equipment and training after a real emergency and the implementation of a response;
- capture observations, strengths and recommendations for areas for improvement;
- develop a report and improvement plan approved by managers in the organization.

The results of the simulation exercises should be used in the review of the emergency management system.

Prepare for emergency in peacetime: monitoring, audit and review

Beyond the 'preparedness cycle', the entire emergency management system should be monitored, audited and reviewed by the Competent Authorities and updated on a regular basis. Updates should take into account the availability of the following key elements of the system:

- applicable pre-contracts and memoranda of agreements;
- appropriate storage of defined minimum quantities of consumables (such as reagents, vaccines) with valid shelf life;
- relevant data (on animal production and health and animal health services) and capacity to mobilize it through adapted IT solutions;
- human resources and capacity to mobilize and demobilize safely, including considering stress impact on staff.

Furthermore, audits and reviews should be conducted each time circumstances justify, including:

- an evolution of the epidemiological context such as, for example, a significant increase of the risk of an animal health threat, making it a priority;
- a change in the structure of the organization of the national or local Competent Authorities that could affect the chain of command;
- a change in the access to resources such as investments, funds, human resources (for example, retirement or long-term leave);
- new technologies or change in technologies for diagnosis, tests or for controlling animal health events;
- conclusions of a post-event evaluation after an emergency.

PREVENT EMERGENCY IN PEACETIME

Preventive actions during peacetime are meant to avoid the introduction of animal pathogens or avert an endemic disease from raising above a certain threshold or spreading to unaffected areas or populations. Preventive actions should be based upon the risk of introduction or spread of the disease measured by risk analysis and possible pre-agreed identified thresholds and triggers for scaling up preventive actions.

Preventive actions should be part of the day-to-day activities of the Veterinary Services.

Each organization should consider the applicability of the following prerequisites that are needed to enable the prevention of the introduction or re-emergence and spread of specific animal health hazards:

- define priority threats and events for prevention programmes;
- maintain efficient chain of command;
- ensure needed resources (such as human resources, vaccines, disinfectant, equipment) for prevention.

In order to effectively prevent the introduction of animal health hazards, the following should be implemented and reviewed regularly:

- follow-up of official information and rumours about animal health events in neighbouring or trading partner countries;
- import policies such as pre-entry negotiated official certification, and authorization of imports only through official border inspection posts;

- border security to monitor and prevent entry of pathogenic agents through illegal means;
- post-entry quarantine, inspection and testing based on risk;
- sustained cross-border communication and collaboration.

In order to effectively prevent the re-emergence or spread of animal health hazards in the country, the following should be implemented and reviewed regularly:

- biosecurity measures (on-farm and throughout the value chain) based on risk, such as movements of animals, live animal markets, procedures at entry of new animals, procedures for animal keepers or handlers, controls on feed sources such as agroindustry or food waste, especially swill);
- animal vaccination programmes (design and implementation);
- control of the contacts of livestock with wildlife or other reservoirs of pathogenic agents;
- communication, awareness campaigns and training.

Furthermore, these measures should be reviewed using key indicators of each prevention activity (such as border control, disease control programmes or movement control), and regular internal audits should be conducted.

It is important to distinguish between specific and non-specific prevention. Non-specific prevention is based on non-specific measures such as surveillance of the territory and animal populations, border inspection and general biosecurity rules. Specific preventive measures are targeted to prevent a prioritized high-risk animal health threat; for instance, biosecurity measures that have been strengthened in several countries to limit the risk of transmission of highly pathogenic avian influenza (HPAI) from wild birds to domestic birds.

DETECT AN EMERGENCY IN PEACETIME

Detection activities during peacetime aim to find and confirm the occurrence or presence level of a pathogenic agent as quickly and as accurately as possible. These activities include observation, reporting, investigation, sampling, testing and early warning of a possible animal health event.

Detection is based on the surveillance system developed by the country. The Veterinary Services should define their strategy for epidemiological surveillance, which entails:

- defining priority threats and events for surveillance according to risk analysis;
- defining the best tools and strategies for the surveillance of priority threats and events;
- targeting animal populations (domestic or wild) for surveillance;
- selecting passive event-based or active surveillance, or both;
- developing a sampling strategy in the case of active surveillance.

The Veterinary Services should verify their capability to implement the strategy and develop and maintain an EWS, which implies:

- maintaining efficient chain of command for reporting, with a link to the field veterinary practitioners especially, to ensure a full reporting of the suspected cases;
- ensuring a veterinary network for good coverage of the territory in the field, including live animal markets and slaughterhouses, with adequate veterinary supervision and good capacity to identify a suspected case;

- ensuring an available and sustainable laboratory network with needed testing capacities, including possible agreement, as needed, with neighbouring countries, OIE reference laboratories and FAO reference centres for surge capacity or confirmation or typing of the agents; field pen-side tests may be highly relevant in situations where laboratory testing is challenging, such as remote areas or those areas with limited capacities;
- ensuring an efficient sample logistic preserving the quality of the samples;
- raising awareness of priority animal diseases and other animal health threats;
- implementing surveillance plans for priority animal diseases including clear definitions for suspicions and cases and participatory disease surveillance through networks of animal keepers and animal health workers;
- training the different actors regularly;
- encouraging prompt reporting of suspected cases to Veterinary Services (including the legal obligation of private veterinarians or professional bodies to report to the Veterinary Authority);
- conducting field event investigations including laboratory testing of all suspected animals and premises; (criminal investigations may be initiated if intentional release is suspected);
- developing and sustaining animal health information systems with key indicators for the follow-up of the above activities;

Furthermore, the Veterinary Authority should conduct a regular internal audit (using, for example, the FAO Surveillance Evaluation Tool (FAO, 2018),[16] or the framework of a PVS self-evaluation).

A surveillance programme may be designed in accordance with the chapter on surveillance in the *Terrestrial Code* (OIE, 2019c) and in the chapter on surveillance in the *Aquatic Code* (OIE, 2019a).

[16] See more details about the context and use of the tool at http://www.fao.org/ag/againfo/programmes/en/empres/news_100818.html.

Chapter 3

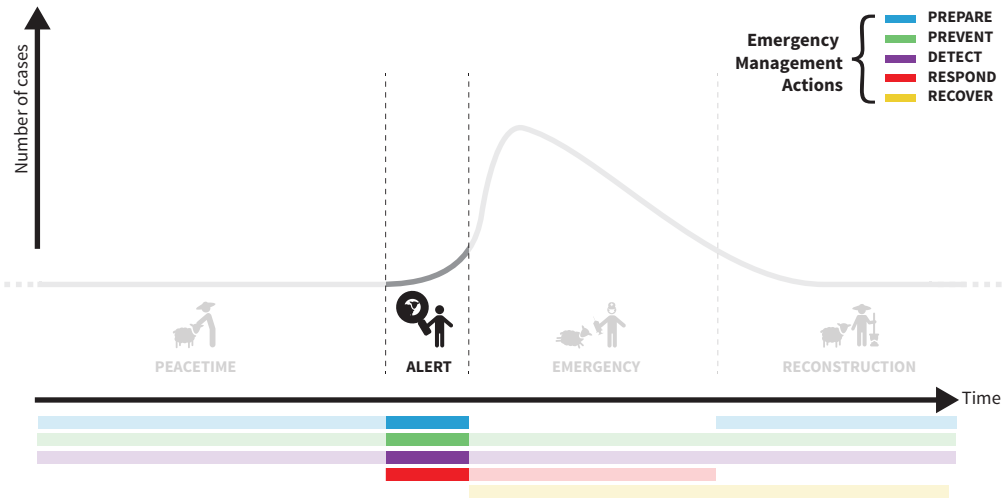
Animal health emergency management in the alert phase

The alert phase (Figure 6) is the period when the level of risk, due to a neighbouring situation or to the suspicion of an autochthonous event, requires close observation of all activities, rapid transmission and sharing of relevant information, and quick precautionary action to address an impending emergency based on early warning. Ideally, this phase should be short: the suspicion should be either denied or confirmed as quickly as possible to avoid either unnecessary restrictions if it is not a major event, or the spread of a high impact hazard if it is.

However, it can be too short, when the Veterinary Services are late in assessing the risk, or not exist at all because there may have been no detection of the preliminary signs of an event. Alert is often forgotten as a specific phase as a result of this lack of early detection, and this largely impedes the effectiveness of the response measures.

On the other hand, in a free area surrounded or put at risk by infected areas, the alert can cover an extended period of time until the risk has sufficiently decreased.

FIGURE 6
Alert phase and associated emergency management actions



Source: Authors

TABLE 3
Level of emphasis of each action during Alert

	Alert
Prepare	++
Prevent	++++
Detect	++++
Respond	+(+)
Recover	

The procedures of the actions to be implemented during the alert phase should be described in the preparedness and response plans. The most important actions during the alert phase are to detect and prevent, although preparedness should be enhanced, and first precautionary response actions can be launched (Table 3).

These prevention and detection actions include the enhancement of biosecurity measures at borders, within the country and on farms, as well as targeted surveillance and epidemiological inquiries organized in order to get and share information as quickly as possible.

PREPARE FOR EMERGENCY IN THE ALERT PHASE

During the alert phase, preparedness actions aim to achieve a heightened state of operational readiness in anticipation of a specific animal health threat.

All preparedness measures developed during the peacetime phase should be reviewed and updated, based upon a rapid risk assessment (see Annex IV). The following activities should be launched and conducted as soon as the alert has been triggered:

- convene authorities and concerned professionals to review and enhance systems, plans and procedures that address the specific risk or animal health event;
- establish regular meetings with professionals to prepare for possible response and to share data on the evolution of the situation and the updated risk analysis;
- notify emergency responders to prepare for possible activation and deployments;
- assess and secure resources, including emergency financing, that may be needed to support the alert and response to the specific animal health event;
- monitor and track the animal health event such as disease outbreaks or food contamination in other countries, especially neighbours and trading partners (including social media tracking of suspicions and rumours);
- distribute early warning materials to communicate to public and private stakeholders on the specific, known risks;
- conduct a rapid situational risk assessment and modelling of scenarios, taking into account any new data coming from risk assessment as well as the estimate of required resources and funding.

Based on this assessment and according to the time available, the following preparedness activities should be implemented:

- conduct specialized or refresher training on response actions to address the specific risk or animal disease;

- verify the update of the information system in relation to animal heath, animal identification and trade movements;
- ensure the capacity to follow key indicators of progress linked to the information system.

Good decision-making is based on robust information. In order to monitor the evolution of the situation in a timely manner to make conservative predictions about what is likely to happen in the next period and to ensure that resource planning is adapted to the situation and anticipated, it is important to:

- assess the epidemiological profile of the suspected animal health event, especially when occurring in a neighbouring or trading partner country, including the number of suspected cases or outbreaks, the number of animals concerned, incidence, prevalence (per animals, per epidemiological unit), geographical distribution of the suspected cases, contaminated species (including human in case of zoonotic threat);
- evaluate the risk of spread by analysing the movements and commercial trade;
- conduct targeted simulation exercises using practical scenarios based on the current threat and risk.

As a result, the authorities will be able to review and potentially modify and adapt the response plans to the situation.

PREVENT EMERGENCY IN ALERT PHASE

During the alert phase, preventive actions are meant to stop any introduction of pathogenic agents identified as a probable or imminent threat, to avert the spread of a specific disease from a suspected outbreak or to stop it from rising above a certain threshold. Actions should be based on risk assessment and may be targeted and implemented in addition to the prevention actions conducted during peacetime.

Even if the prevention actions were implemented well during peacetime, the situation of an alert phase requires that they be reviewed and updated based upon the current threat and risk. Supplementary preventive actions aimed at avoiding or stopping the introduction or spread of a hazard may be implemented in addition to the preventive actions taken during peacetime, as they can avoid an emergency, or at least limit its impact from the start. They should be based on risk and include:

- strengthening protection along the border, targeting possible passages for animals and goods, or strengthening surveillance in the high-risk area;
- reviewing and enhancing import policies at authorized border posts, including strengthening pre-export and post-entry quarantine and testing;
- enhancing cross-border communication and collaboration relative to the specific risk or animal health event;
- using adapted risk communication towards professionals and the general public, including through official or social media;
- strengthening biosecurity measures, on-farm and throughout the value chain, particularly in relation to feed, transport, markets, processing and waste management;
- strengthening segregation between domestic animals where necessary (including the possible creation and maintenance of physical barriers), and increased frequency of cleaning and disinfection;

- avoiding contact of livestock with wildlife and other potential reservoirs of the pathogenic agent.

It is also possible to implement wider mitigation measures as relevant, in relation to the current control policy and the evaluation of the risk of spread. It includes, notably:

- establishing protection zones at the boundaries with an affected country or zone;
- initiating or accompanying compartmentalization;
- initiating or strengthening the vaccination programme in the concerned area(s).

DETECT AN EMERGENCY IN THE ALERT PHASE

The other action that marks the alert phase is 'detect'. The objective of detection in the alert phase is to confirm suspicions of the introduction of a pathogenic agent (whether biological, chemical or physical), or of a sharp rise in endemic infection, or of an emerging disease, as quickly and accurately as possible. An EWS should be organized, combining pre-defined and coordinated field investigations with lines of reporting, enabling quick data collection and sharing for a rapid decision about measures to take.

An EWS[17] is a system aimed at the timely detection, reporting and communication of an incursion or the emergence of diseases, infections, infestations or intoxications in a country, zone or compartment. It can be used for any animal health hazard or event. As outlined in chapter 2 on the peacetime phase, the major elements of an EWS are:

- legal obligation for private veterinarians to report to the Veterinary Authority;
- ability to undertake effective disease investigation and reporting;
- access to laboratory capacities;
- training programmes for involved stakeholders; and,
- a national chain of command and line of information.

Detection actions during the alert phase may be targeted and complementary to the detection actions during peacetime.

All detection measures developed during the peacetime phase should be reviewed and updated based upon the current reassessed threat and risk. This implies:

- a decision to strengthen targeted surveillance (passive and active) based on risk assessment and to perform field investigations, and mobilization of resources for these targeted surveillance and field investigations;
- enhancement of awareness for all concerned actors, notably on the clinical presentation of the suspected disease or condition;
- syndromic surveillance information (such as the increase of morbidity or mortality, the decrease of laying rate or milk yield, lower weight gain) for the monitoring of the specific risk and use of the animal health information system to assess some low suspect signs, such as a causeless increase of mortality;
- active encouragement and support for the prompt reporting of suspected cases to Veterinary Services and notification of disease findings through an EWS;

[17] An EWS can be supranational, such as the Global Early Warning System (GLEWS), involving FAO, OIE (and WHO for zoonoses), which tracks and gathers information (animal health and other potential critical factors), analyses these data and issues risk assessments, trends, forecasts and alerts to partners and Veterinary Services globally.

- prompt field investigations of rumours and suspected cases, including local epidemiological investigation and tracking of animal movements;
- up and downstream field investigations, in the case of strong suspicions, including enquiring about, and testing of, contact or epidemiologically linked animals;
- assessment of diagnostic capabilities to prepare for emergency response (that is, availability of reagent and equipment, and well-trained staff) and activation of outsourcing of tests if needed;
- strengthening of laboratory testing capability for the specific pathogenic agent, including submission to national or international reference laboratories for confirmation diagnostics, if possible and if time allows.

Ideally, all these detection actions should be led by a small and stable team of epidemiologists, allowing a more uniform set of results and building up field-based firsthand detailed knowledge.

RESPOND TO AN EMERGENCY IN THE ALERT PHASE

During the alert phase, initial response actions may be needed as a precaution to avoid the spread of a pathogenic agent if it were to be confirmed. These pre-emptive actions should be immediate and specific, in order to minimize the reaction time and to enhance effectiveness of all actions taken afterward during the emergency phase.

Based upon risk, early response measures can be put into action to maximize event monitoring, tracking and information flow, and to mitigate the reaction time to a confirmed animal health event. These measures implemented before the declaration of the emergency can include:

- activation of incident coordination mechanisms to maintain situational awareness and information management (including risk communication and public information);
- advance planning of possible emergency response actions (using plausible scenarios);
- pre-position of resources (such as personnel, equipment and supplies, including vaccines);
- use of adapted risk communication tools towards relevant actors;
- implementation of precautionary pre-emptive movement restrictions ('safe movements'), partial pre-emptive culling (with compensation), disinfection of premises and vehicles, and targeted vaccination;
- initiation of specific law enforcement investigative procedures in the event of a suspected or intentional introduction of a pathogenic agent.

Any mitigation measures must be implemented in strict accordance with the emergency response plan that would be initiated by a confirmed case.

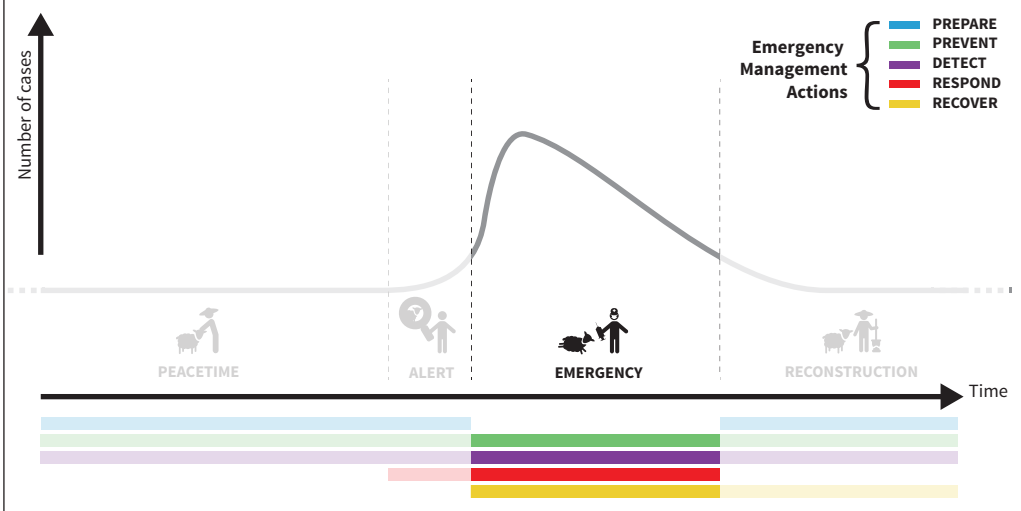
Chapter 4

Animal health emergency management in the emergency phase

The emergency phase is schematically shown on the event line as the peak of cases or outbreaks (Figure 7). It is the period calling for immediate and urgent action to avoid or mitigate direct and indirect losses caused by an animal health event. The state of emergency is decided when the animal health event creates a major disruption that cannot be addressed by normal day-to-day activities. This may be defined in advance (for example, when there is evidence of a single case of an exotic priority disease) or after a situational risk assessment (for example, demonstration of spread and impact of an emerging disease).

The most important action during the emergency phase is 'respond', and that phase does not include preparedness actions (Table 4). Once the emergency strikes, the time for methodical preparedness is over and attention and resources are directed to the combat. Indeed, it is too late to develop a fire escape plan when the house is already burning. If preparations

FIGURE 7
Emergency phase and associated emergency management actions



Source: Authors

TABLE 4
Level of emphasis of each action during the emergency phase

	Emergency
Prepare	
Prevent	+++
Detect	+++
Respond	++++
Recover	+

have not been made in advance, the capacity of response will not be optimal and control measures will be less effective, less efficient and less coordinated. It is also important to prevent the spread of the pathogenic agent and to detect where it goes and from where it comes.

Thus, managing an animal health event during the emergency phase follows three pillars that are like the legs of a tripod. If one leg is not functioning, the whole effort will collapse:

- find infection fast – detect;
- eliminate infection quickly – respond;
- stop infection spreading – prevent.

Furthermore, it is possible to initiate the first recovery actions while still in the emergency phase, subject to regular reassessment of the evolution of the event.

During the emergency phase of an animal health event, triggered by the epidemiological situation but decided by the risk managers, implementation of the plans requires a swift upsurge of staff and equipment and ongoing reassessment of the situation for real-time adaptation.

Since 'respond' is the most important action of the emergency phase, it is described first in this chapter.

RESPOND IN THE EMERGENCY PHASE

Response actions urgently address the animal health event and mitigate damage to livelihoods, human and animal health, and animal production systems in a coordinated manner, including a One Health coordination as appropriate. During the emergency phase, the objective of response is to contain and eliminate the pathogenic agent quickly. This objective can be achieved through the implementation of a specific (if pre-existing) or generic emergency response plan (or 'contingency plan') that would then need to be fine-tuned to adapt to the specific situation at hand.

The three key activities of emergency response plans are:

- rapid situational analysis;
- initiation and implementation of procedures;
- eventual deactivation of the plan and demobilization of the response teams.

Respond in the emergency phase: rapid situational analysis

The purpose of the initial rapid situational analysis is to collect and analyse data to confirm the emergency, describe the type of event, as well as assess its impact and possible evolution. The adequacy of existing response capacity and immediate additional needs should also be assessed to determine the scale of incident management operations to activate for immediate response. The size and type

of the event will help determine what control measures are the most adapted as well as the geographical extent of the control measures (for example, the implementation of wide area culling versus targeted culling).

This analysis can be conducted by a dedicated team considering the following questions: (i) Is there an emergency or not? (ii) What is the main animal health threat? (iii) What decisions need to be made (that is, confirm or define response objectives)? (iv) What information is needed to make these decisions? (v) What is the existing response capacity (identify resource requirements)?

The main steps of the rapid analysis are: (i) set the assessment priorities; (ii) collect available data; (iii) analyse and interpret them; (iv) present the results and conclusions with response options. Following these steps, the plan and orders can be disseminated, executed (and evaluated and revised afterward). Assessment needs to be regularly updated according to new confirmed cases or outbreaks.

Respond in the emergency phase: implementation of the emergency response plan

To implement the emergency response plan, declaration of a state of emergency is needed. Precautionary measures may be introduced immediately at the beginning of the implementation of the plan.

As described in chapter 3, alert could be triggered, for example, by a priority disease normally absent from the country being confirmed in a bordering country, or by the suspicion of the first case of a priority disease which is normally absent from the country. An emergency would be then triggered by the confirmation of the first case of a priority disease normally absent from the country. Passing from alert to emergency phase, could also be triggered by a significant increase (to pre-decided thresholds) or abnormal evolution (in terms of hosts or areas) of, for example, the incidence or virulence of a priority disease present in the country; or by high and concomitant frequency of decreased animal performance with no known cause in many epidemiological units (to pre-decided thresholds).

There are many possible examples of an emergency in terms of nature and scale. The differences can be geographical but also thematic, especially if an intentional act is suspected to be the cause of the event. In any case, the implementation of the emergency response plan requires a robust legal framework, established in peacetime. The correct activation and implementation of the emergency response plan relies on the structures built during peacetime.

Implementation of the emergency response plan: the process of action

All along the emergency phase, the activities should be supervised and conducted by structures with different roles and responsibilities, ideally through an AH-EOC as described in chapter 2.

The coordination structure is an off-site (central and local) structure that provides resources and strategic guidance, authorization and specific decision-making support to the incident command structure. It declares the emergency and disseminates information to the public. It designates the government officials with authority and activates and deploys incident coordination mechanisms at the central level to maintain situational

awareness and information management, including risk and crisis communication according to approved procedures and the communication plan. The coordination of emergency response operations also implies (i) acquisition, allocation and tracking of resources, (ii) global supervision of response staff, (iii) response monitoring and evaluation and (v) continuous modelling and assessment. Typically, the coordination structure comes from the Veterinary Authority and other relevant central Competent Authorities.

The command structures are local site level structures that implement on-scene responses for direct management of the emergency. Command structures imply, in particular, the activation and deployment of incident command mechanisms at the local level to effectively and efficiently manage the response activities in the field according to plans. These could include vaccination, culling, restriction of movement, decontamination, tracking and tracing the spread of the pathogen and zoning. Command structures will be in charge of the actual implementation of the emergency response activities, which includes the setting of incident objectives and priorities (what to achieve), response strategies (approach to accomplish the objectives) and response tactics (methods to achieve the objectives). Implementation also implies the mobilization and management of the resources needed to reach the objectives and the organization of operations necessary for the selected strategy and tactics. The command structures are in charge of the overall support organization, including logistical, planning, financial and administrative functions. Typically, the command structure is comprised of the local Veterinary Services and representatives of other relevant local Competent Authorities, agencies and stakeholders.

It is important to repeat here that the good implementation of response activities requires prior planning:

- the adoption and implementation of needed local regulatory texts for the response implies pre-established templates;
- the rapid modelling and assessment of impact of the event and resource needs implies specialized capacities and data management;
- the release and deployment of resources such as emergency funding, emergency response personnel, contractors, equipment and supplies including sampling material and PPE, as well as just-in-time training in case of need, implies thorough preparedness planning;
- the protection of the health and safety of personnel implies a health and safety plan to prevent responder injury or illness (including due to mental stress);
- the respect of animal welfare and protection of the environment implies targeted awareness actions in peacetime;
- the implementation of laboratory emergency procedures implies the prior setting of specific rules and training.

Implementation of the emergency response plan: contain the spread

The modes of transmission of a pathogenic agent can include direct contact, fomites, arthropod vectors and wind-borne spread, or a combination of those factors. Depending on these factors, the pathogenic agent may spread only between animals in close contact in the same herd or flock, or over long distances, especially if infected animals are moved. Even for hazards carried by the wind, control of other modes of transmission may reduce risks.

Movement restrictions

Spread due to the movement of live animals and animal products can be controlled by movement restrictions that are adequately enforced. Such movement restrictions need to be supported by legislation and their conditions should be prepared in advance. It is best if the owners of the animals or animal products understand the need for restrictions and that complying with the requirements will be in their own interests. Good communication before and when applying movement restrictions is, therefore, essential. Moreover, movement restrictions will be most effective when they have minimal impact on the animal owners. Restrictions that are temporary or of short duration are likely to receive more popular support. An assessment of the relative risks will allow some low-risk animal products to move, such as pasteurized and other treated products.

Biosecurity

Spread can also be contained by specific biosecurity measures in the affected and neighbouring zones, to be added to the basic or general biosecurity measures used for prevention. The locations at highest risk of infection are those close to those where active infection is ongoing. Even from infected farms to neighbouring farms, most disease spread occurs through indirect fomite-mediated routes rather than through direct animal-to-animal contact across farm boundaries. Improved biosecurity can dramatically reduce this risk. Biosecurity is relatively inexpensive and cost-effective in the short and long term. Thus, expenditure on helping livestock keepers improve their biosecurity during outbreaks is a sensible investment.

Vaccination and treatment

The benefits obtained by reducing clinical signs and losses due to the pathogenic agents often make vaccination or treatment an attractive option. Emergency vaccination (or treatment in some cases) may also stop the spread of the event. However, in the face of an outbreak this option is difficult, resource-intensive and expensive. It requires previous planning to identify potential sources of vaccine or medicines and to plan the possible strategies for application. When there is a high level of infection such that 'stamping-out' alone is not feasible, vaccination can be used to reduce the circulation of the infection until levels are low enough for targeted culling. Specific guidelines on emergency vaccination are described in the *Terrestrial Code* chapter on vaccination (OIE, 2019c).

Implementation of the emergency response plan: eliminate the agent

To eliminate a transmissible pathogenic agent, the most effective solution is to destroy it at the source through a 'stamping-out' process, which comprises three phases.

Depopulation

Killing of animals that are either proven infected or potentially infected because of direct or indirect contact, is a way to eliminate the agent. Those animals are the greatest source of the agent and are the most dangerous direct source of infection. Killing should be carried out in an humane manner. The actual method used varies from situation to situation. Culling of animals or groups of animals should be limited to those that are found to be

actively infected and, in some situations, those at locations that a risk assessment has found to be at high risk of infection. Animals not at risk but which are pre-emptively culled may be slaughtered for human consumption. Methods of killing for animal health purposes are described in the animal welfare sections of the *Terrestrial Code* (OIE, 2019c) and *Aquatic Code* (OIE, 2019a) and on the OIE website portal of animal welfare,[18] as well as in the FAO *Manual on procedures for disease eradication by stamping out* (Geering, Penrith and Nyakahuma, 2001).

Disposal

Carcasses of dead animals resulting from disease or killing may remain contaminated for a period after death and can contaminate the environment or scavengers. Methods for disposal of dead animals and their products are described in the chapters on disposal in the *Terrestrial Code* (OIE, 2019c) and the *Aquatic Code* (OIE, 2019a), in the FAO *Manual on procedures for disease eradication by stamping out* (Geering, Penrith and Nyakahuma, 2001) and in the FAO *Carcass management guidelines* (Miller, Miknis and Flory, 2020).

Disinfection

It is essential to clean and disinfect the premises and fomites as indirect transmission can occur through the movement of the pathogenic agent present on inanimate objects (that is, fomites), including on vehicles, clothing and, particularly, people's footwear. Guidelines on disinfection are described in the chapters on disinfection in the *Terrestrial Code* (OIE, 2019c) and the *Aquatic Code* (OIE, 2019a), and in FAO's *Manual on procedures for disease eradication by stamping out* (Geering, Penrith and Nyakahuma, 2001) and *Carcass management guidelines* (Miller, Miknis and Flory, 2020).

A.2.4. Implementation of the emergency response plan: compensate

Fear of losing their animals is an incentive for owners to move them away from an outbreak. This reaction enhances the risk of spread of the agent and can be reduced if culling strategies are only applied to the extent necessary and if compensation is adequate and rapidly delivered. Effort must be taken to reassure owners that their animals will only be culled when there are no valid alternatives and that they will be compensated.

Compensation policies should be developed and funded during peacetime. They should be implemented as soon as possible after the control measures, even during the emergency phase, and are then considered a recovery action. However, complete compensation can often be implemented only during the reconstruction phase. Further guidance can be found in the LEGS Manual.

Implementation of the emergency response plan: demobilize

Demobilization is the release and return of resources that are no longer required. It may occur at any time during the event. Some resources can be demobilized as soon as the emergency phase has ended, while others will be kept until the very end of the event.

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[18] See at https://www.oie.int/en/animal-welfare/animal-welfare-at-a-glance/.

Demobilization should be conducted in an efficient and safe manner and not interfere with ongoing incident operations. A formal demobilization plan and process should be developed for complex incidents, identifying responsibilities of different directories, release priorities, release procedures and demobilization processes.

Managers should plan and prepare for the demobilization process at the same time that they begin the resource mobilization process.

Respond in the emergency phase: the key indicators of progress

All along the emergency phase, the animal health information system should be used to establish the key indicators to follow the evolution of the event and the level and speed of the implementation of control measures and their effectiveness. This also will enable continuous situational risk assessment in order to determine the actions needed to update the emergency response.

The effectiveness of the response and of the control measures should be continuously evaluated to correct and adapt them through the analysis of key progress indicators. Adaptation can include the revision of case definition and actions to be undertaken for suspected and confirmed cases, or even the review and possible modification of response goals.

Good decision-making has its foundation in a step-wise process, based on information:

- decisions about control policies must be knowledge-based;
- knowledge is built from reliable information;
- information comes from the analysis of data.

The progress of the response may be assessed through the following indicators:

- ratio of positive to negative reports;
- incidence rates globally or in specific locations: numbers of cases during a given period compared with the number of cases in the previous period;
- routes of spread between infected sites;
- surveillance methods that are detecting most cases;
- days from the onset of first signs to the day of reporting;
- days from report received to the end of culling;
- days from the end of culling to the end of disposal;
- days from the end of disposal to the end of cleaning and disinfection.

Although usually done after the emergency phase (see Chapter 5), some targeted AARs can be conducted during the emergency phase. This approach allows for a focused review of a particular activity, a group of activities, a part of the response or a period of time. Review offers opportunities for multiple cycles of improvement during the response, especially for extended emergencies. While reviews may be difficult to conduct during an emergency, the benefits will exceed the effort.

Respond in the emergency phase: adaptation to specific situations

Countries may find it difficult to develop most of the control measures during the emergency phase in some areas because of geographical constraints, movements of the population (nomadism, transhumance or refugee status) or civil unrest.

A specific approach will be needed for these areas with specific means (for example, air transport of staff or equipment, or mobile equipment). In addition, specialist staff or

locally hired personnel with a good knowledge of the local communities and the ability to gain their confidence will be needed. The emergency management system should identify these barely accessible areas and determine during peacetime what specific measures are required, as far as possible. Sometimes, resorting to NGOs may be helpful because of their extensive experience of working with these isolated or unsecure communities. NGOs and their staff should be regarded as a valuable resource for assistance in implementing animal health programmes in difficult areas, including epidemic livestock disease-control campaigns. Negotiations should, therefore, be carried out with appropriate NGOs to obtain their collaboration in this domain. An important part of preparedness in peacetime is to pre-identify such potential partners. The necessary training and resources should then be supplied to their staff.

Respond in the emergency phase: emergency communication

It is important that a regular timetable of communication between command levels is established and laid out in the emergency response plan. This should include information flows from lower to higher levels and instructions from higher to lower levels. Communication must be two-way to work. It is also important to avoid duplication of communications. One way to achieve this is to have standardized distribution lists for reports and instructions previously defined so that the information goes to the required point but is also copied to the other interested parties. A 'battle rhythm' of meetings within command levels and communication between them needs to be established to ensure that all relevant areas are regularly reported on and that progress is reviewed. This process should be organized and supervised by the coordination structure.

Basic principles of emergency risk communication may be summarized as follows (OIE and WHO, 2015):

- trust is the goal: each delivered information or message either builds or erodes trust;
- transparency is the tool: telling all the facts to stakeholders, proactively and voluntarily, will build trust;
- controlled messaging frequency, with an early start, frequent updates and no blanks reinforces trust and adherence: even with incomplete information, occupying the stage helps to control rumours and establishes leadership.
- communication adapted to public concerns is essential: listening and responding establishes a dialogue that enables confidence and ownership; being ready to answer concerns that could seem unreasonable to a specialist, allows for a better understanding of the social reaction to the emergency and to the response activities;
- planning is the key: an animal health emergency will trigger extreme demands in terms of communication, so communication planning is key and may prevent an emergency from becoming a crisis.

Depending on the situation, communications technologies, like call centres and social media, may be efficient in reaching professionals and the general public but they should be used cautiously as messages can be biased.

DETECT IN THE EMERGENCY PHASE

Detection actions during an emergency are primarily meant to locate and quickly confirm the presence of the specific animal pathogen or other hazard, and of animals affected or at risk, in order to implement response measures most efficiently. Detection actions in the emergency phase are usually part of the emergency response plan.

It is vitally important to establish the geographical spread and number of affected locations as early as possible in the event. Surveillance over a wide area is required at the outset. Usually, the index case (that is, the first case reported that indicates a hazard is present) is not actually the primary, or first-occurring, case. There have been many examples where the two are widely separated, either in space, time or both. Locating the primary case will give a good indication of the expected severity of the event and the necessary measures to control it. The primary case is also crucial to locate if a malevolent act is suspected, as this will be an essential element of the possible criminal investigations.

Implementation of surveillance facilitates evaluation of the effectiveness and the impact of control measures. There needs to be risk-based targeted active surveillance in both non-affected and affected areas after the implementation of control measures. This surveillance will also allow the establishment of free zones to maintain or re-establish trade, for example.

Necessary detection actions in the emergency phase include the following:

- mobilize resources for targeted surveillance, communication and awareness;
- review and strengthen ongoing specific surveillance activities such as (i) prompt reporting of suspected cases by veterinarian and diagnosticians, (ii) enhancement of capabilities of key stakeholders to recognize and report the event, (iii) public awareness of the clinical presentation of the cases, and (iv) active surveillance plans to target risks in the various zones (such as infected, containment, protection, surveillance or free zones);
- conduct systematic field investigations, including sample collection at each outbreak;
- trace the other affected or linked animals, to understand the epidemiological evolution of the event and identify the source of the event – (this is a specialist activity that requires trained staff and involves the use of standardized data collection forms to ensure a uniform set of results and detailed, first-hand, field-based data);
- review and maintain or strengthen diagnostic capacities including reassessing laboratory needs for an upsurge of personnel, equipment, supplies and potential use of foreign laboratories;
- refine case definition (including suspicions) based on the findings and epidemiological situation;
- target surveillance in support of the response, based on epidemiological assessments and investigations, in the affected and non-affected areas;
- use the animal health information system to supervise the level of detection.

Veterinary Authorities should notify outbreaks of TADs and other high impact animal health events using OIE's World Animal Health Information System (WAHIS) and FAO's global animal disease information system, EMPRES-i. They also should follow any regional protocol for notification. Early international reporting will enable early access to international assistance and the regional or global coordination of a response.

PREVENT IN THE EMERGENCY PHASE

Prevention actions during the emergency are aimed both at stopping additional pathogenic agents from entering the country and inhibiting the spread of the pathogenic agent outside the affected area or country. These actions involve a heightening of pre-existing measures and targeted actions that address the specific nature of the animal health event based on the assessed risk. Actions aimed at prevention in the emergency phase are usually part of the emergency response plan.

Continual review, strengthening and strict implementation of preventive measures that were launched during the alert phase (or, if it was not possible, which were in place during peacetime) are required, including the need to:

- strengthen protection at the border and surveillance in high-risk areas;
- review and enhance import policies and import security to prevent entry of the specific pathogenic agent;
- strengthen pre-export and post-entry quarantine and testing;
- enhance cross-border communication and collaboration relative to the specific animal health event;
- strengthen biosecurity measures (on-farm and throughout the value chain) relating to feed, transport, market, processing and waste management;
- implement, if possible, specific measures related to vector protection (such as disinfection, screens, repulsive treatments, period of transport);
- strengthen segregation of subpopulations (creation and maintenance of barriers to limit the spread of the animal health event), cleaning and disinfection even in non-affected areas;
- avoid contact of livestock with wildlife and other potential reservoirs of the pathogenic agent;
- initiate zoning based on rapid risk assessment and the evolution of the epidemiological situation;
- initiate or strengthen the vaccination programme in concerned areas, if relevant, in relation to the current control policy and the evaluation of the spread risk.

Prevention also implies the mobilization of necessary resources, which should have been estimated beforehand but may be re-evaluated.

RECOVER IN THE EMERGENCY PHASE

Although recovery is related primarily to the reconstruction phase, recovery actions during the emergency phase are meant to begin to restore and rehabilitate those areas that are no longer infected, or are under control. Some recovery actions in the emergency phase may be part of the emergency response plan.

Effective recovery implies a coordinated analysis of the situation to determine when first actions can occur that are consistent with actions of the exit strategy. These include the need to:

- mobilize resources for adapted surveillance and the establishment of free zones;
- transfer emergency response personnel;
- run damage assessments to define recovery strategy and assess the needed resources;
- lift movement restrictions and controls as dictated to control risk;

- initiate compensation or, when authorized, restock animals that are free of the disease;
- conduct evaluation and improvement planning of the response;
- publish after action reports and improvement plans approved by leadership;
- conduct risk analysis to demonstrate the impact and effectiveness of actions and control measures applied during the epidemic;
- assess the health and psychological status of operational staff.

The criteria for the initiation of recovery (for example, pre-agreed thresholds) should be established in peacetime or at the beginning of the emergency, and verified during and towards the end of the emergency.

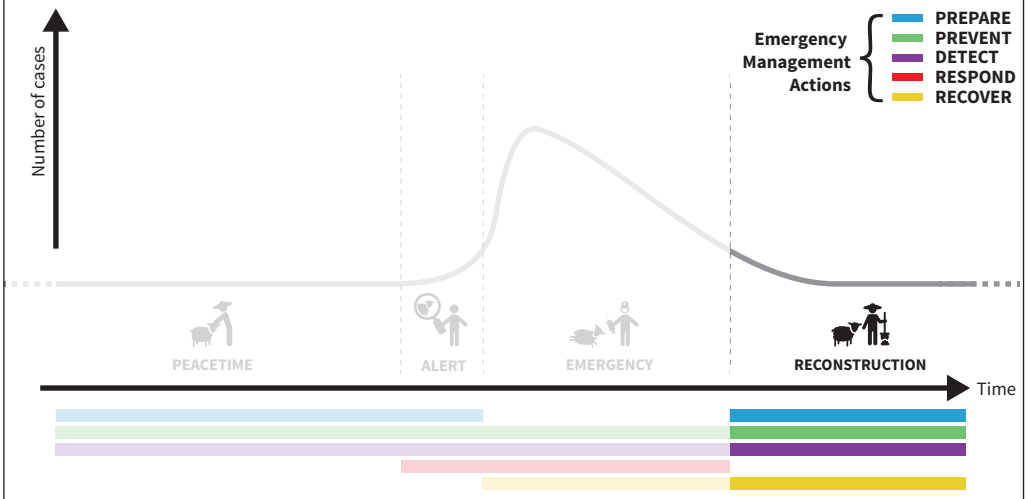
Chapter 5

Animal health emergency management in the reconstruction phase

Like the alert phase, the reconstruction phase (Figure 8) is often neglected in emergency management. The reconstruction phase follows the emergency phase and focuses on the re-establishment of the situation which existed before the event. Reconstruction involves the re-establishment of animal populations, recovery of pre-emergency human and animal health levels, relaunching of animal production systems, restoration of livelihoods, value chains and trade as well as support to other socio-economic aspects impacted by the event. In this phase the most important action is 'recover' (Table 5).

When an emergency event has been well managed, the situation after the event can actually result in improvements in terms of health status or preparedness levels, although the control strategy in relation to the hazard might also have changed. In the case of an animal health event of an infectious nature, there may be a complete recovery to a free

FIGURE 8
Reconstruction phase and associated emergency management actions



Source: Authors

TABLE 5
Level of emphasis of each action during reconstruction

	Reconstruction
Prepare	+++
Prevent	++
Detect	++
Respond	
Recover	++++

status or an evolution to an endemic but stable situation that is manageable by normal day-to-day activities. Whatever the animal health status or the epidemiological situation, it should be demonstrated, assessed and maintained. That is why the actions 'prevent' and 'detect' are also important in the reconstruction phase.

The reconstruction phase begins when the level of the emergency has reached a point where the exit strategy may be engaged. Initiation of this phase may occur after a series of verifications have been carried out through risk assessment, investigation and surveillance. These actions assist in the evaluation of the effectiveness and efficiency of the response actions and help to shape future adaptations to preparedness and response plans. In regard to potential future events, the 'prepare' action is essential.

RECOVER FROM AN EMERGENCY IN THE RECONSTRUCTION PHASE

Recovery actions during reconstruction aim to continue the process of rehabilitation to the former state before the emergency, or aspire to build back better in those areas that are no longer infected. Recovery actions are consistent with the pre-determined exit strategy. The LEGS handbook, published by FAO in combination with other organizations and designed originally for natural disasters such as floods or droughts, provides helpful decision-support tools as part of the recovery process.

Recover from an emergency: strategy

Damage assessments should be conducted to refine the strategy to relaunch the animal productions affected by the event.

All relevant Competent Authorities should coordinate to make a decision on the recovery strategy, based on pre-established plans, addressing:

- prioritization of restoring trade flows (that is, domestic supply and export);
- exit from emergency zone by zone or for the entire country;
- strategy for restocking (including priority farms, sourcing of animals, types and health status of animals or herds);
- accompanying measures (such as compensation or subsidies and types of payments, technical support, supply of breeders or genetic material, supply of feed).

Competent Authorities should ensure the implementation of the regulatory texts for recovery that were prepared in peacetime, and should adopt any needed supplementary texts. All emergency response personnel should be demobilized and should return to their day-to-day activities.

Resources needed for the recovery strategy should have been estimated during peacetime, but needs should be reassessed through damage assessment, and resources should be secured from both public and private sources. Resources include:

- funds in cash;
- animals (including funds for purchase, transport and possible testing);
- human resources from public and private sectors.

Recover from emergency: animal health

When infection appears to have been eliminated, a series of verification programmes involving statistically based sample surveys and active clinical surveillance should be carried out to verify freedom from the pathogenic agent. These programmes will allow countries to lift quarantine and movement controls progressively and systematically, to reopen live animal markets and animal product markets with higher biosecurity, and to restore normal internal trade conditions for livestock and animal products. This verification will also provide objective proof to other countries that the country (or zone, depending on the strategy) has regained freedom from the disease or other animal or public health hazards, thereby restoring normal trade conditions.

If emergency vaccination was practised, it should be paused and a decision should be made, based on risk, about whether to stop vaccination completely or to implement a systematic vaccination programme. The use of vaccination during an outbreak can complicate the move from the emergency to the reconstruction phases because of difficulties demonstrating the absence of the agent. The issue of an exit strategy from vaccination should be considered before it is initiated, as mentioned in the advice for preparedness planning. Standards and procedures for claiming freedom from infection or infestation in countries or zones are found in the *Terrestrial Code* (OIE, 2019c) and the *Aquatic Code* (OIE, 2019a). Specific OIE standards apply to obtain official recognition of free status for several diseases.[19]

Recover from an emergency: rehabilitation of affected communities

The road to recovery and rehabilitation of severely damaged livelihoods and, in many cases, spirits, is long and sometimes difficult. Public assistance is needed to help the affected populations towards recovery, rehabilitation, development and a capacity to satisfy future needs. Psychological support might be needed. In developing and developed countries alike, experience has shown that life after a serious animal epidemic or disaster may be accompanied by flashbacks, distress, feelings of bereavement and sometimes a fear of a new disaster. These mental conditions also affect the personnel in charge of operations. Trust in public authorities may often be damaged unless the emergency has been well-managed; hence, the need for the intervention of reliable informal and formal support networks. Adapted and prepared communication is key for the recovery of affected communities.

[19] See the list and procedures on the OIE website at http://www.oie.int/en/animal-health-in-the-world/official-disease-status/.

For the recovery of animal production, the following should be applied or taken into consideration:

- damage assessments should be conducted to refine the strategy to relaunch the animal productions affected by the event;
- all quarantine and movement controls should be progressively and systematically lifted when possible;
- live animal markets and animal product markets should be reopened with higher biosecurity and support as trade becomes safe.

Restocking is a complex activity. The LEGS handbook provides helpful decision-support tools for the provision of livestock as part of the recovery process. In general, and where possible, it is better to provide financial compensation for culled animals (and other items which may have been destroyed) rather than live animals. This allows the livestock keepers to choose the type and numbers of livestock they wish to buy and to control the timing of their purchase, which is also important. However, restocking with live animals avoids the possibility that money might be wasted, either through diversion or embezzlement.

Before any restocking can take place, the premises must be free of the pathogenic agent. This can be achieved by thorough cleansing and disinfection, often carried out twice. For some resilient or vector-borne infectious diseases, susceptible sentinels may be required for a given period (calculated as a number of incubation periods) before restocking to make sure there is no residual infection. Another approach, when possible, is that the replacement animals are vaccinated and immune prior to their introduction.

Livestock for restocking should, if possible, be bought locally or in neighbouring areas. These animals are adapted to local conditions, the risk of transmitting disease is minimized and they are usually those that farmers know best. The purchase of large numbers of livestock from other areas to replace whole herds may bring diseases that are unfamiliar or even unknown. This risk is particularly true for diseases with few prominent clinical signs or long incubation periods, which cannot be easily recognized without specific tests that may not always be readily available.

It is difficult to be sure that livestock are infection-free, but the risks and consequences of introducing disease can be minimized with careful planning. It is important that livestock keepers be advised of the issue of disease introduction and, where necessary, that controls are imposed to limit the risk posed by this large-scale movement of animals. Buying livestock from several sources will inevitably mean that animals will be of different health and immune statuses, and mixing them under stress can lead to cross-infection. Restocking, therefore, presents many issues and challenges that need to be discussed with stakeholders, particularly livestock holders and potential traders. Accompanying measures should be implemented without delay (such as compensation, subsidies, technical support such as fodder support schemes, and management and veterinary advice).

Negotiation with trade partners should be conducted to re-open international markets, with new or updated agreements and health requirements based on risk and in accordance with the OIE standards.

Key indicators should be monitored; in particular, trade flows, market prices, animal population growth and the evolution of the number of breeders.

PREVENT EMERGENCY IN THE RECONSTRUCTION PHASE

Prevention actions during reconstruction aim to restore necessary protections based on risk. They are designed to stop pathogenic agents or other hazards from entering the country, or to avert an endemic disease from raising above a certain threshold or spreading to free areas or populations. Prevention is also needed to ensure a population free of the pathogenic agent (or with no risk of spread) to allow for a safe restocking.

Competent Authorities should revise the prevention policy according to the new epidemiological situation and an updated risk analysis, adjusting the resources needed for prevention according to the updated prevention policy.

Specific preventive measures include:

- strengthened border controls and other internal preventive measures against future disease incursions, such as:
  - import policies that prevent entry of disease through authorized imports;
  - sufficient border security to monitor and prevent entry or the spread of diseases from the area or country through unauthorized means;
  - post-entry quarantine and testing;
  - normative cross-border communication and collaboration;
- revised biosecurity measures, on-farm (such as pre-entry isolations, movement controls, feed sourcing and storage) and throughout the value chain;
- development or updating of the disease control programme according to the new situation (for example, vaccination before eradication strategy);
- limitation of contact of livestock with wildlife and other reservoirs.

As stated in the recovery actions, restocking of animals should be sourced from a population free of the disease (or with no risk of spread).

Public awareness, and extension and education programmes that were ongoing during peacetime should resume and be strengthened.

Specific surveillance should support verification of the effectiveness of prevention and the animal health information system should allow monitoring of the prevention measures.

DETECT AN EMERGENCY IN THE RECONSTRUCTION PHASE

Detection actions during reconstruction aim to locate and confirm possible presence of the specific pathogenic agent to verify the disease status of animal populations, especially those that were at risk and those that were used for restocking. Detection strategies should be adapted to the anticipated health status of the animal population. Decision-making on the animal health status to be recovered should take into account the updated risk analysis and the socio-economic interest of this status, which, in turn, will affect the post-emergency surveillance strategy and resources needed as outlined in the updated surveillance policy.

The design of the surveys and the sample size estimates should be undertaken by an experienced epidemiologist who understands the local conditions. International standards for animal health surveillance are found in the *Terrestrial Code* and the *Aquatic Code* and in the *Guide to terrestrial animal health surveillance*.

Vaccination may make the demonstration of absence of infection difficult to achieve by masking the infection. A strategy differentiating infected from vaccinated animals can be considered when relevant, with the understanding that it requires substantial resources.

An alternative might be the use of unvaccinated sentinel animals to detect the infection in vaccinated groups.

During the reconstruction phase, the Competent Authorities should determine how disease surveillance and other early warning procedures can be improved, and on which geographical areas to concentrate efforts. They should:

- review the surveillance strategy with the involvement of different partners (stakeholders, other authorities) to target surveillance on the most susceptible populations (including possible sentinel animals) to raise the sensitivity of the surveillance and enable early warning;
- focus on previously affected areas to detect any possible resurgence or reintroduction of the pathogenic agent;
- strengthen and adapt surveillance to demonstrate the status of animal populations, to include freedom of infection or infestation with the specific pathogenic agent;
- apply surveillance to certify the free status of the animals used for restocking.

The animal health information system should be used to monitor the results of the surveillance programme.

PREPARE FOR FUTURE EMERGENCIES IN THE RECONSTRUCTION PHASE

The reconstruction phase should not be dedicated only to recovering a better situation, but can also be an occasion to develop a higher level of readiness for future animal health events. Things never go as planned as emergencies confirm, but these experiences can help to improve planning.

Preparedness actions during reconstruction aim to reflect on lessons learned, and incorporate changes and best practices to enhance the state of operational readiness. The best time to solicit preparedness funding is just after an event has occurred given that attention on the event will be optimal.

An impact assessment should also be conducted to demonstrate the impact and effectiveness of actions and control measures applied during the emergency.

Prepare for future emergencies in the reconstruction phase: after-action review

The reconstruction phase should be used to gather feedback on experiences and lessons learned, with a thorough AAR of the response activities while the events are still fresh in people's minds. This information can be used to update the preparedness and response plans, especially in relation to:

- governance (legislation, organization, roles and responsibilities, coordination and partnerships);
- sourcing (including investment) and mobilization (including pre-contracting) of resources (human resources, equipment and consumables);
- training programmes.

An AAR[20] is a critical review of actions taken to respond to an emergency. It strives to identify best practices, gaps and lessons learned, and is a space for collective learning.

[20] FAO develops and publishes guidelines for AARs.

It brings together relevant individuals or stakeholders to analyse or assess decisions and actions taken during the response, critically and systematically. The objective of an AAR is learning. That can occur at a personal, collective or institutional level and can include:

- learning about the role of individuals within the management of an emergency;
- learning within a team, for better team dynamics and understanding within the emergency management process;
- learning about improvement to overall emergency management, such as through better preparedness and response plans or mechanisms of coordination.

AARs also provide an opportunity to:

- consolidate key information about an emergency;
- explore issues that arise during the response and identify potential solutions for future emergencies;
- identify areas of the response that worked well;
- represent practices that should be sustained in the future.

An AAR can be formal or informal. It can be undertaken by the Competent Authority, the Veterinary Services or an independent team that was not necessarily involved in the response.

An AAR may be conducted over a period of time and may use multiple approaches to gather quantitative and qualitative data.

Conducting an AAR after the animal health emergency has concluded may allow for a holistic review of all activities. While this review may occur when resources are more available, it is essential to gather responses from all critical participants before they are unavailable or focused on other activities. Thus, the sooner the AAR is conducted after the event, the better.

Conclusion

«*SI VIS PACEM, PARA BELLUM*»[21]

Preparation during peacetime is the key factor for a successful and efficient animal health emergency management system.

Some prerequisites are needed for the efficient management of an animal health emergency including Veterinary Services with robust capacities, an enabling legal framework, a reliable chain of command with good coordination with other agencies, and surveillance and diagnostic capacities. Only once secure in their day-to-day missions, can Veterinary Services develop a good emergency management system.

Prioritization of the animal health events that could represent a potential emergency is also a preliminary step to focus the efforts and resources on major threats. However, the prioritization should be regularly revised in accordance with an updated risk analysis. It is important to agree on thresholds and triggers to activate different steps of the preparedness plan and relevant emergency management actions.

Peacetime is the best period to develop and test the emergency preparedness plan and the emergency response plans for specific animal health threats. If these are left to be performed later, it will be more difficult to mobilize the needed resources and to train the staff who are managing the response. The development of the emergency management system should be coordinated with the national disaster plan, to optimize the potential synergies (including mobilization of resources and engagement of other authorities). There is no good preparation without some verification through audit and simulation exercises. By definition, an animal health emergency is a rare event and it is not possible to base the development of the emergency management system on just the learning curve of the experience.

In most cases, the alert phase should be as short as possible. In particular, if the emergency management system is prepared well, the time should be very short between an alert about a suspicion of case and the confirmation or refutation of the suspected animal health threat. In some situations, however, the alert can be maintained in an area close to a zone where an emergency is ongoing, even without a suspicion of case.

The efficiency of the response in the emergency phase will depend on the level of preparation which will determine:

- the capacity to mobilize the needed resources in time;
- the capacity to make the right decisions in time to adapt the control measures (as defined in the emergency response plan) to the real situation;
- the capacity to implement these decisions on time with good coordination between all involved actors, including the private sector.

[21] "If you want peace, prepare for war."

The strategy for the reconstruction phase can be adapted when the animal health event is under control; however, two points should be defined during the preparation of the emergency response plan:

- the conditions to lift the restriction measures that will ensure the absence of risk of new flare-ups of the animal health event;
- the conditions of restocking to ensure no risk of reintroduction of the pathogenic agent of concern, or of new ones.

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Annexes

Annex I

OIE PVS evaluation and emergency management

		Importance for emergency management	Comments
HUMAN, PHYSICAL AND FINANCIAL RESOURCES			
I-1A	Professional and technical staffing of the Veterinary Services A. Veterinary and other professionals (university qualified)	++	Emergency management is not possible if the human resources are not sufficient for the basic missions of the Veterinary Services, and if the initial training is not adequate.
I-1B	Professional and technical staffing of the Veterinary Services B. Veterinary paraprofessionals	++	
I-2A	Competency and education of veterinarians and veterinary paraprofessionals A. Veterinary and other professionals (university qualified)	++	
I-2B	Competency and education of veterinarians and veterinary paraprofessionals B. Veterinary paraprofessionals	++	
I-3	Continuing education	+++	Continuing education is needed to maintain the capacity for emergency management.
I-4	Technical independence	++++	If decisions during emergency shall be science or evidence-based and not under political or particular interest pressure.
I-5	Planning, sustainability and management of policies and programmes	+	
I-6A	Coordination capability of the Veterinary Services. A. Internal coordination (chain of command)	++++	If the normal chain of command is not well established, the incident command will not work. The incident command shall be recognized by the normal chain of command.
I-6B	Coordination capability of the Veterinary Services. B. External coordination (including the One Health approach)	++++	If it is a zoonosis or a disease involving wildlife, coordination with other authorities will be needed.
I-7	Physical resources and capital investment	++	It is not realistic or efficient to consider emergency funding if the basics are not ensured for operational funding and for physical resources.
I-8	Operational funding	++	
I-9	Emergency funding	++++	Emergency funding is needed to finance all expenses during the emergency (such as testing, culling, disposal of dead animals, disinfection, vaccines and overtime expenses).

(Cont.)

		Importance for emergency management	Comments
TECHNICAL AUTHORITY AND CAPABILITY			
II-1A	Veterinary laboratory diagnosis A. Access to veterinary laboratory diagnosis	++++	The country needs to have access to the relevant tests, and permanently to be able to confirm the emergency whatever the circumstances (no shortage of needed reagent, presence of qualified staff).
II-1B	Veterinary laboratory diagnosis B. Suitability of the national laboratory system	++++	
II-2	Risk analysis and epidemiology	++++	A minimum of risk analysis is needed to prioritize the threats/diseases for which a response plan should be defined. This is also important to assess the emergency and to adapt decisions made during the emergency.
II-3	Quarantine and border security	++	Border security is part of the prevention of emergencies.
II-4A	Surveillance and early detection A. Passive surveillance, early detection and epidemiological outbreak investigation	++++	Without surveillance, there is no identified emergency, or the emergency is identified only when it is a disaster.
II-4B	Surveillance and early detection B. Active surveillance and monitoring	++++	
II-5	Emergency preparedness and response	++++	This is the core CC for emergency management.
II-6	Disease prevention, control and eradication	++	Indirectly, disease control programmes can facilitate the maintenance of the field veterinary network, and the data (identification of epidemiological units and animals) needed for emergency management.
II-7A	Animal production food safety A. Regulation, inspection (including audits), authorization and supervision of establishments for production and processing of food of animal origin	+++	If it is a food safety emergency, the identification of and the capacity to inspect food premises is important.
II-7B	Animal production food safety. B. Ante- and post-mortem inspection at slaughter facilities and associated premises	++	Ante and post-mortem inspections are tools for surveillance. In cases of the slaughtering of suspected animals, it can be interesting to follow observed pathological lesions in slaughterhouses.
II-8	Veterinary medicines and biologicals	++++	The capacity to control and to authorize the needed vaccines or drugs quickly can be important for the efficient control of the emergency event.
II-9	Antimicrobial resistance and antimicrobial use	+	Only if there is use of antibiotics during the emergency.
II-10	Residue testing, monitoring and management		
II-11	Animal feed safety	+++	If it is a feed safety emergency, the identification and the capacity to inspect feed plants are important.
II-12A	Identification, traceability and movement control A. Premises, herd, batch and animal identification, tracing and movement control	+++	This is important to track and trace back suspected animals and to control movements.
II-12B	Identification, traceability and movement control A. Premises, herd, batch and animal identification, tracing and movement control	+++	This is important to track and trace back contaminated products and organize withdrawal from the market.
II-13	Animal welfare	++	It can be sensitive in cases of culling animals or lockdown or standstill for biosecurity reasons.

(Cont.)

		Importance for emergency management	Comments
INTERACTION WITH STAKEHOLDERS			
III-1	Communication	++++	Communication is crucial during the crisis to inform the public, to encourage good practices and to avoid over-reaction and panic.
III-2	Consultation with stakeholders	++++	Consultation is essential before (preparation) and during the emergency to coordinate the action of public Veterinary Services and private operators.
III-3	Official representation and international collaboration	+	International standards provide guidance to manage the emergency, and participation in international meetings can be important to update the response plan.
III-4	Accreditation/authorization/delegation	+++	It can be important to select private partners (mobilization of laboratories for testing, involvement of private veterinarians).
III-5	Regulation of the profession by the Veterinary Statutory Body	+	
III-6	Participation of producers and other stakeholders in joint programmes	++++	The cost-sharing and the involvement of a private sector (especially the commercial livestock sector) is a joint programme to be ready in case of emergency. Common simulation exercises can be organized.
III-7	Veterinary Clinical Services		
ACCESS TO MARKETS			
IV-1A	Legislation and regulations. A. Integrity and coverage of legislation and regulations	++++	The Veterinary Services shall have the needed regulations to allow their actions in case of emergency so that they can quickly apply the needed actions (such as culling or vaccination).
IV-1B	Legislation and regulations. B. Implementation of and compliance with legislation and regulations	+++	The Veterinary Services shall have the capacity for quick enforcement of their decisions (such as culling or control of movement).
IV-2	International harmonization	+	International standards provide advice on managing emergencies and can guide the update of the response plan.
IV-3	International certification	+	It will be needed during the reconstruction phase to open international markets.
IV-4	Equivalence and other types of sanitary agreements	+	It will be needed during the reconstruction phase to open international markets with new negotiation of trade agreements.
IV-5	Transparency	+	Transparency is needed to allow the credibility of the country during an emergency and to facilitate the restoration of the trade flow after the emergency.
IV-6	Zoning	++	It can be a tool to maintain some markets from a certified disease-free zone.
IV-7	Compartmentalization	++	It can be a tool to maintain some markets open to those products or animals originating from a certified disease-free compartment.

Annex II

Five steps to good advocacy for investment in emergency management

EXPLORING ADVOCACY

Influencing public policy change can be complex, and it may not be easy to get the results you want. Nevertheless, creating an effective and clear pitch for the policy change you envision will bring you one step closer to success.

Advocacy plays an essential role in emergency management. It represents an important step in preparing for an animal health emergency, reflecting the good practice of acting now to save later. It is also useful to ensure the best coordination possible during, as well as after, an emergency in the reconstruction phase.

Investing in preparedness will drastically reduce the damage that may potentially be caused during an emergency. The success of a country's response to an animal health emergency depends on the commitment of key decision-makers to: mobilize needed resources, make rapid decisions, coordinate mobilized national capacities, and communicate adequately with the public, the professionals concerned and country partners. What is more, it is crucial to involve those players during the peacetime phase of emergency management, specifically through advocacy.

Animal health advocacy plays a key role in supporting and building animal health policies by facilitating timely decision-making. Advocacy is essential for a consistent and optimal approach to animal health. Involving legislators, government agencies, members of the media and other stakeholders in animal health policies will drive results.

In terms of animal health emergency management, advocacy is a continuous process by which preparedness techniques can be introduced and implemented on many levels. A vital component to the preparedness phase of emergency management is having a finely-tuned advocacy strategy in place.

The following proposed process to develop an advocacy policy and outreach is just an example. However, the methodology involving all relevant actors is as important as the development of the rationale.

KNOW YOUR AUDIENCE

When it comes to advocacy, communication is key. However, for your message to be clearly understood and efficiently conveyed, it is important to know your audience. Policy-makers are those to whom you will be advocating, as any positive changes to policy or mobilization of resources will be done by these actors. Messaging must, therefore, be adapted to them – the policy-makers – with consistent use of positive language and clearly presented ideas.

The following is a non-exhaustive list of policy-makers to whom you will need to advocate for good preparedness.

Political leaders and advisers

The resources needed to develop and implement an emergency preparedness plan, such as human resources, funds, support from various organizations, are generally mobilized by political leaders and advisers. Involving those actors from the beginning and securing their commitment during peacetime will facilitate decision-making during the alert and emergency phases. Remember, advocacy is about relationship building and trust. Forming and strengthening ties now will have a positive impact later on when it comes to such actions as stopping exports, closing borders, and limiting or controlling population movements. Oftentimes decisions that are made during emergencies involve top-level decision-makers such as presidents, prime ministers, parliament, ministries (agriculture, public health, finance, transport, foreign affairs), and members of the board or heads of affected public agencies (public health, agriculture, food industry).

Leaders representing stakeholders

Leaders representing relevant stakeholders must also be involved in the decision-making and preparation phases. In this case, the leaders to involve in the process are usually representing animal industry associations, farmer associations and the main operators of the animal value chain.

Regional economic communities

Regional economic communities (RECs) should also be involved in the drafting of an emergency preparedness plan. In the event of an animal health emergency of regional concern, RECs will have to facilitate and coordinate sharing of information and the transboundary activities needed to contain the event. RECs can contribute to this preparation by coordinating decision-making by the country members, supporting preparation in each country and encouraging cross-boundary simulation exercises.

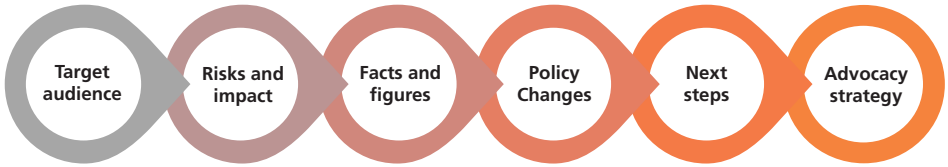
International organizations

Organizations such as FAO, WHO and OIE can develop their advocacy scope to demonstrate to countries and key actors the importance of investing in preparation. They can also provide support to countries looking to develop their emergency management systems, particularly through the EMC-AH.

DEVELOP AN ADVOCACY STRATEGY

This section provides guidelines that can be adapted to the context and the culture of each country. Now that you have a firm grasp of advocacy and have identified your audience, you need to build your advocacy strategy. Figure 9 outlines some key points to keep in mind when developing the strategy. We also lay out the potential impacts of a delayed or non-existent response, which should form the crux of arguments for changes in policy.

FIGURE 9
Development of an advocacy strategy



Source: Authors

When drafting your strategy remember the following four rules.

- Be clear: keep it simple, be concise, use easy-to-follow points and positive language. The goal is to educate your audience to provide them with the data they need to take positive action.
- Present the problem (for example, 'lack of preparedness now will have a much bigger impact later'), the solution (for example, 'invest in preparedness to be ready to respond'), and the benefits (for example, 'minimize the impact of an emergency').
- Use evidence and examples to support your arguments. Facts carry weight!
- Use budget-based arguments as they will speak clearly to certain audiences. Do your research and use figures to get your point across.

RECOGNIZE THE IMPORTANCE OF INVESTING IN PREPAREDNESS

As mentioned above, preventing, detecting and responding quickly to animal health events lowers their impact (morbidity, mortality and economic impact). Investing in readiness for events decreases the need for additional resources over longer time periods by shortening the response phase and reducing the reconstruction phase. It is important when advocating for good preparedness practices to outline the risks that justify the need for action.

A rational advocacy strategy should be developed using an impact analysis adapted to the national context. Such an analysis will be effective in gathering reliable data to be used to support your arguments. Leading with the most prominent risks can help to highlight the importance of prioritizing emergency preparedness.

OUTLINE THE RISKS

Impact on the national budget

A badly managed emergency will create tremendous losses. The support needed to manage an emergency comes from various sources, such as agriculture, finance, trade and public health, which can complicate the mobilization of funds and delay the response. It is essential to solidify a pre-approved funding process before access to the budget is required. Overall, national spending will be far higher if a clear plan is not introduced in advance of an emergency.

Socio-economic impact

Animal diseases or other animal health events create a loss of income for farmers through mortality and a dip in production. This reduction in animal production can trigger an increase in the price of animal products.

Animal diseases also affect trade and the income of value chain operators. Borders may need to be closed and an increase in inspections and tests at the border will slow down exports.

An outbreak can also have an indirect impact on other activities; for example, the feed industry can be negatively affected due to a reduced animal sector; there can be a decrease in crop production due to a loss of animal-generated power during drought; and the tourism industry can suffer.

An animal health emergency can jeopardize consumer trust, causing a negative impact on primary producers' prices.

All these consequences can badly affect employment in the primary production and supply chain sectors.

Control measures can also affect the economy through their direct cost (for example, depopulation, vaccination) in addition to having an indirect impact on trade (for example, the controlled movement of animals).

Public health impact

In the case of diseases transmittable to humans, or zoonoses, a delayed response can increase the number of contaminated humans.

Other zoonoses can affect food safety through the risk of transmission to humans through food. Similarly, food can also be contaminated by toxins, pathogens or medicinal products, which can affect food security and disrupt the food chain.

Contagious diseases can impact food security directly through losses (such as a drop in milk production, increased death and abortions), but also through dips in crop production when animals are affected during a drought. A delayed response will add to these risks, potentially leading to longer-term demands on the national budget.

Societal and environmental impact

An animal health event can directly affect animal welfare whether in the form of an animal's painful symptoms before death or inhumane culling methods. Proper equipment and resources are needed to ensure humane culling where depopulation is needed, and the funds for that equipment must be allocated prior to an emergency.

Control measures can also have an environmental impact when it comes to the disposal of dead animals and the use of insecticides against vectors.

Certain control measures (such as stamping out) may not be widely accepted by the public if they are not correctly justified and implemented. It is important to have a clear policy on control and depopulation methods to prevent backlash from the public.

When animal health events affect limited populations such as endangered breeds and protected wild animals, there can be a knock-on effect in terms of biodiversity and genetic resources. These effects can occur directly through animal death, or indirectly because of control measures.

Political and reputational risks

The consequences of the previously mentioned impacts can create social unrest, such as demonstrations, riots and strikes.

A badly managed emergency can develop into a crisis, which is even more difficult to manage in political terms. In addition, a delayed response will create doubt within the general population, which can be detrimental to efforts to control the emergency. The support of the public is necessary to ensure the efficient introduction of a response plan. Public support is an important step in the preparedness process as without it the emergency management mechanism will be overstretched leading to more resources being spent on rebuilding the trust of the population.

Conflict with neighbouring countries can be triggered when herds are moved to avoid control measures such as stamping out, or when the inability to control the spread places neighbouring countries at risk.

At the international level, a country's reputation can be damaged for years following a mismanaged emergency that puts the rest of the world at risk.

Annex III
Progressive pathway for animal health emergency preparedness

The progressive pathway for emergency preparedness (PPEP) is a country-led and participatory process that enables animal health officials and corresponding stakeholders to self-assess the animal health emergency readiness of the country and to facilitate the identification of areas for improvement and animal health emergency management capability needs. It establishes a monitoring framework, which enables a benchmark of progress and provides a progressive, phased approach, based on the country's available resources and level of commitment. The PPEP is designed to enhance and harmonize animal health emergency preparedness globally, providing a common platform for international multi-agency capacity-building efforts.

The PPEP's overall expected result is to facilitate national policy and technical document development and improvement; to facilitate resource mobilization for personnel, equipment and supplies; and to identify training and simulation exercises that contribute to building and strengthening the capacity of national Veterinary Services through adoption of FAO GEMP principles. Its overall design provides for practical and subsequent technical progression steps in policy development and technical implementation (including resources), which are not exclusive or linear. These steps are translated into a self-assessment questionnaire (that is, an assessment tool) to facilitate identification and prioritization of related Veterinary Services capacity needs, and jointly agreed regional or international technical assistance[22] to meet these needs.

The PPEP is based on the GEMP guide. It complements other international progressive pathway initiatives, notably the OIE PVS Pathway, as well as FAO/OIE progressive pathways for control of foot-and-mouth disease and African swine fever, and for eradication of peste des petits ruminants. It both uses and provides data from and to other tools, including the FAO Surveillance Evaluation Tool (SET) and Lab Mapping Tool (LMT).

The PPEP provides a roadmap for national Veterinary Services to strengthen their animal health emergency preparedness capacities and capabilities and achieve compliance with the relevant requirements of the OIE PVS Pathway. The ultimate goal is for countries to achieve self-sustainable state of emergency preparedness in line with OIE international standards (that is, the *Terrestrial* and *Aquatic Codes*, and the *Manual for laboratory diagnostics*) through policy and technical implementation, and regular monitoring and evaluation. This compliance is related to strengthening effective and efficient policy and technical management of animal health emergencies in cooperation with a range of internal and external stakeholders, which involves regular monitoring and evaluation, and impact assessment, in the 'One Health' approach promoted by FAO, OIE and WHO.

[22] FAO offers various capacity-building programmes to answer those identified needs.

Annex IV

Risk analysis in animal health emergency management

INTRODUCTION

Risk analysis is a procedure that we all do intuitively in our everyday lives and in the workplace. It has developed into a more formal discipline which is being used increasingly in many fields of endeavour. In animal health it has been most widely used for decision-making related to the most appropriate health conditions for imported animals and animal products, and strategies for quarantine operations. Guidelines for import risk analyses have been included in the *Terrestrial Code*.

Risk analysis is also an effective tool for animal health emergency preparedness planning. In fact, risk analysis provides an excellent foundation for decision-making, and should be undertaken in an early stage of the development of emergency response plans.

APPLICATIONS OF RISK ANALYSIS

Risk analysis can be applied at each stage of animal health emergency preparedness. This includes:

- priority ranking of serious animal health threats for the country, indicating what level of resources should be devoted to preparing for each of the high-priority diseases or other threats;
- determining import quarantine policy and how to strengthen quarantine and other prevention procedures;
- planning well-focused training courses for veterinary staff and farmer awareness and publicity campaigns;
- determining how and where animal health surveillance and other epidemiological systems need to be strengthened;
- determining how to strengthen laboratory diagnostic capabilities;
- planning response strategies, including comparative evaluation of different control options.

WHO CONDUCTS THE RISK ANALYSES?

The risk analysis component is best conducted by the epidemiological unit in the national veterinary headquarters as part of the national EWS for TADs and other emergency animal health events. Risk management and risk communication are tasks for everyone, but the CVO should coordinate these.

It should be remembered that risks do not stay static. They will change with such factors as the evolution and spread of epidemic animal diseases internationally, the emergence of new diseases, changing international trading patterns for the country, and new scientific

knowledge and technology. Risk analysis should, therefore, not be seen as a 'one off' activity. The process should be repeated and updated regularly.

QUANTITATIVE VERSUS QUALITATIVE RISK ASSESSMENT

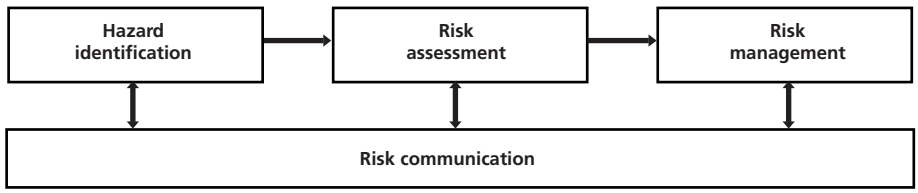
The assessment of risks can be done in a quantified, semi-quantified or qualitative way. The advantages and disadvantages of each approach are discussed in greater detail in Annex V. Quantitative analysis is widely used in physical fields, such as engineering, and sophisticated computer programmes are available to facilitate this. However, it is inherently very difficult to quantify (or ascribe probability numbers to) risks in many biological systems because of the lack of historical precedents and serious gaps in the available biological data. Risks should be quantified as far as is practicable, but if this cannot be done, it is recommended that qualitative risk analyses be used for emergency animal health events. The risks can be described as 'high', 'medium', 'low' or 'negligible', or preferably by a simple scoring system (for example 1–5 for the level of risk and 1–5 for the level of potential consequences). Not all risk factors are of equal gravity. Therefore, consideration should be given to modifying risk scores by a weighting system, although this can sometimes produce unexpected outcomes and should be fully understood before it is used. This ranking process will provide an agreed transparent mechanism for prioritizing the identified risks and a solid platform for emergency response planning.

PRINCIPLES OF RISK ANALYSIS

Risk analysis comprises four components (Figure 10). These are:

- hazard identification, in which the main threats are identified and described;
- risk assessment, in which the risks of an event occurring and developing in particular ways are first identified and described. The likelihood of those risks occurring is then estimated. The potential consequences of the risks if they occur are also evaluated and are used to complete the assessment of the risk;
- risk management, which involves identifying, documenting and implementing measures to reduce identified risks and their consequences. Risks never can be eliminated completely. The aim is to adopt procedures that will reduce the level of risk to what is deemed to be an acceptable level;
- risk communication, which is the process of exchanging information and opinions on risk between risk analysts and stakeholders.

FIGURE 10
The four components of risk analysis



Source: Good Emergency Management Practices: The Essentials (FAO, 2011)

RISK ANALYSIS PROCESSES IN ANIMAL HEALTH EMERGENCY PLANNING

Hazard identification

Hazard identification should be done by constantly monitoring the international status and evolution of outbreaks of transboundary and emerging animal diseases. The latest scientific literature should also be monitored. This monitoring should be a routine function of the epidemiological unit of the national Veterinary Services. Apart from the scientific literature, a valuable source of information is available from OIE (through its regular international disease reports, publications on import risk analysis and WAHIS) and from the various reports and publications of the emergency prevention system for transboundary animal and plant pests and diseases (EMPRES) programme at FAO. Information on zoonoses is available from WHO. ProMed, an internet server and mailing service, currently provides a useful forum for very rapid dissemination of unofficial information on animal, plant and human disease occurrences around the world. The Global Public Health Intelligence Network is a secure, internet-based 'early warning' system that gathers preliminary reports of public health significance in seven languages in real time.

Risk assessment: entry and exposure

Having identified and described the main animal health threats, the next step is to assess how likely the entry of each of them is and the routes and mechanisms by which they may enter and spread. Questions to ask include:

- What is their current geographical distribution and incidence around the world?
- Is the distribution fairly static or has there been a recent history of spread to new countries, regions or continents?
- Have any new antigenic subtypes emerged which may threaten countries that routinely vaccinate against the disease?
- How close is the disease? What is the status of neighbouring countries, not only with respect to the known presence of the disease, but also in terms of the level of confidence in their Veterinary Services to be able to detect and control disease outbreaks?
- If the disease is present in neighbouring countries, where are the outbreaks nearest to shared borders?
- Are there any feral or wild animal populations in the country which are susceptible to the disease and which may introduce the pathogenic agent (for example, through natural migrations) and/or act as a reservoir?
- Is there a past history of introduction or occurrence of the disease in the country? Is it possible that it is still present in undetected, endemic pockets of domestic, feral or wild animals or birds?
- How is the disease likely to be spread in the country? What would be the relative roles of live animals and their movements, fomites, meat or other animal products, insect vectors, wind-borne spread, etc. in transmission of the aetiological agent?
- Are there significant imports of potential risk animal species, meat products or other materials? Do they come from endemic regions? Do quarantine import protocols conform to OIE standards? How secure are import quarantine procedures?
- How secure are barrier and border import controls/quarantine procedures to prevent unlawful entry of animals or risk materials? Is there smuggling, unofficial livestock

movement, transhumance or other practices which would constitute a risk for entry of the pathogenic agent? Is there political instability/civil unrest in neighbouring countries that might result in major movements of people and movement or abandonment of livestock?
- Where are infected animals likely to cross the border and where are the main livestock trading routes from these areas?
- Are there adequate biosecurity measures in-country to lessen the chance that exposure to susceptible animals will occur if a pathogen is introduced?

Risk assessment: consequences

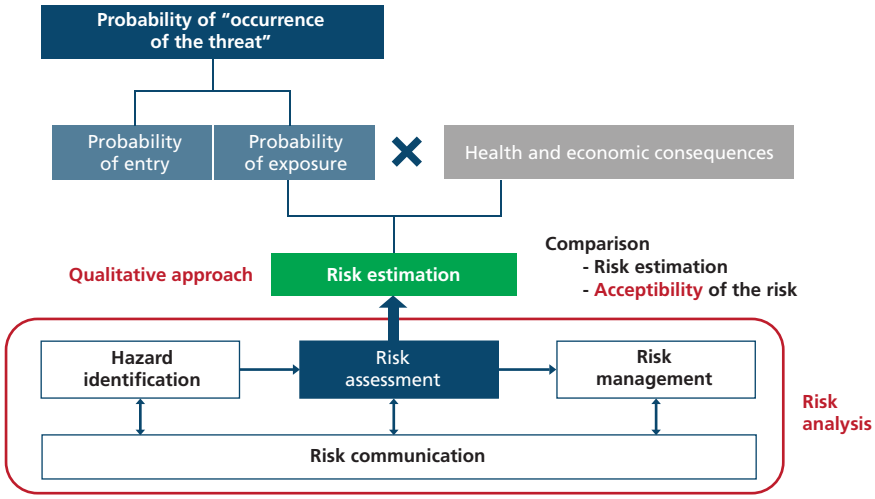
The next step is to evaluate how serious the socio-economic consequences might be if there is an incursion of the disease. Factors that may be taken into consideration include:

- Is the disease likely to become established in the country? Are there susceptible livestock host populations, and, in the case of arthropod-borne diseases, are there competent insect or tick vector species?
- Is the disease likely to become established in feral animals or wildlife populations?
- Will it be difficult to recognize the disease quickly in different parts of the country?
- How large are the populations of susceptible livestock or poultry in the country? What are the livestock management and trading systems? How important are those livestock industries to the national economy? What is their importance in satisfying nutritional (food security) and other needs of communities?
- How are these livestock industries structured within the country? Are there large commercial and/or intensive production industries or do they consist of smallholder/village production or extensive pastoral systems? Is production concentrated in just a few areas of the country?
- How serious will the production losses be from the event? Will food security be threatened? What will be the socio-economic consequences?
- Is there an actual or potential export trade in livestock or livestock products? If so, how important is this export trade for the national economy? What would be the likely reaction of importing countries if the disease was found in the country? What would the socio-economic consequences be, both at a local and national level, of the loss of export trade for an extended period?
- What are the likely consequences on internal trade in livestock and livestock products?
- Are there susceptible animal populations which are poorly controlled and allowed to roam freely, and which may constitute difficult-to-control reservoirs of infection?
- How difficult and costly will the pathogenic agent be to control and eliminate? Is it capable of eradication? All resources and both direct and indirect costs should be considered.
- Are there likely to be adequately trained manpower and physical and financial resources available to mount an effective response against an incursion of the disease?

Risk assessment: prioritization and categorization

By addressing these questions and issues it will be possible to build a risk profile for each high-impact animal health event. Weaknesses can be identified and judgements made on the magnitude of the risk presented, in qualitative, if not quantitative, terms (Figure 11).

FIGURE 11
Risk analysis: a process for qualitative risk assessment



Source: Authors

Most importantly, it will be possible to categorize each disease or animal health event. In this context, a disease that had a high risk of entry to a country, but only a low risk of establishment if it entered or presented trivial potential socio-economic consequences, would get a low overall score in a risk assessment. Conversely, a disease assessed as having a low risk of introduction, but serious consequences if introduced, would be rated more highly.

On the basis of risk assessment and profiling, it should be possible to prioritize the risk associated with each of the diseases or other threats, and to determine what level of resources should be devoted to preparedness planning for each. It is also possible to get some idea of the most likely sources and methods of entry of the pathogenic agent and how it may spread in the country. The geographical pressure points for entry, establishment and spread also may be assessed.

On the basis of this analysis, it will become clear how and where animal health prevention and surveillance strategies and programmes need to be strengthened. Finally, the process should reveal how Veterinary Services and emergency response planning might need to be strengthened for the highest priority threats.

Risk management

In a very real sense, the GEMP is devoted to risk minimization and management strategies for animal health emergencies. Identification of critical control points through the risk assessment process will prioritize the steps included in the GEMP, which are needed to manage the risks.

Risk communication

This is the process of exchanging information and opinions on risk between risk analysts and stakeholders. Stakeholders in this context would include all those who could be affected by the consequences of the risks (that is, everyone from farmers to politicians). It is important that risk assessment and risk management strategies are fully discussed with stakeholders so that they feel comfortable that no unnecessary risks are being taken and that the risk management costs are a worthwhile 'insurance policy.'

To ensure ownership of decisions, risk analysts and decision-makers should consult with stakeholders throughout the risk analysis process so that risk management strategies address stakeholder concerns and resulting control measures are well-understood and broadly supported.

INCORPORATING RISK ANALYSIS INTO THE EMERGENCY RESPONSE PLAN

The results of the risk analysis for a priority disease or threat should be incorporated into the specific emergency response plan. With its discussion of risks and consequences, the risk analysis should prove to be a powerful weapon in persuading government decision-makers to approve the emergency response plan.

Annex V

Emergency response plans (contingency plans) – their nature and structure

INTRODUCTION

Emergency response plans, also called emergency intervention plans or contingency plans, are the cornerstone of any effective response to an animal health emergency. They are sets of well-structured and clearly-stated documents that describe policies, strategies and procedures for an effective control response to high-impact animal health events. They may be generated by using international guidelines or be adapted from the emergency response plans of other countries. Emergency response plans are usually prepared for specific high-impact diseases (for example, a foot-and-mouth disease contingency plan or an avian influenza contingency plan). They should be prepared for each of the animal health emergencies which risk analysis identifies as constituting the highest threats for the country. The plans need not be voluminous documents. They should be written in simple, straightforward language, so that all stakeholders will understand:

- the overall control strategies;
- how programmes will be implemented and coordinated; and
- their own roles and responsibilities.

Emergency response plans should not be too rigid because it is impossible to predict exactly how emergency animal health events will present themselves and how they will evolve. Where appropriate, plans may include different options and offer suggestions about what options might be preferred given particular epidemiological and socio-economic circumstances. It is extremely important that these plans be considered by all major stakeholders, including the political, financial, legislative and bureaucratic arms of government and the private sector, particularly livestock organizations. All stakeholders should have the opportunity to contribute to the plans either during their formulation or by consultation before they are finalized. Finally, emergency response plans should be approved at the highest level of government. This process should ensure that there will be acceptance of their implementation in an emergency situation. After they have been prepared, key staff should be trained so that they can properly carry out their expected duties within the plan.

When developing good emergency management practices, it is helpful to consider if all needs have been addressed. Annex III describes a way to assess the level of readiness in all aspects of an emergency management system covered in *GEMP: the essentials*. It is important to highlight strengths and weaknesses of an emergency management system and to assess the need for possible support, to progress along a PPEP approach.

STRUCTURE AND FORMAT OF EMERGENCY RESPONSE PLANS

There is no ideal 'one size fits all' format for an emergency response plan and no master list of what it should contain. Undoubtedly, there is no list that will suit all situations or all countries.

Every country has its own unique set of circumstances and the contents of the plan need to be tailored to best meet those individual requirements. The emergency response plan is only produced to be of use to those who develop it. But there are certain elements that need to be present in the plan if it is to have the required effect of enabling rapid control of an outbreak. The following extensive list attempts to show what elements could be covered and some elements that may be useful. Since the plan should be concise, achievable and readily understood, only some of these elements might be applicable.

An emergency response plan can have the following chapter headings:

1. Legislation
2. Finance
3. Command and control
4. Roles and actions
5. Nature of the disease or animal health event
6. Size, structure and movements, and trading patterns of relevant animal populations
7. Wildlife involvement
8. Policy options: scenarios including hazard maps
9. Resource plans
10. Laboratories
11. Vaccination and treatment
12. Public awareness and communication
13. Recovery, including animal health status
14. Other possible chapters

An emergency response plan should include the following:

- resource plans, including resource inventory
- operational manuals
- series of SOPs
- compensation policy, including funding details.

When drafting, and before implementing, an emergency response plan, the following activities should be considered:

- ensure the availability of a known stock of resources such as people, materials and finance;
- ensure that the series of SOPs are covering the whole field of needs for emergency response;
- establish a working group composed of Competent Authorities and private stakeholders, including relevant NGOs;
- schedule recurring meetings (with a defined and adaptable frequency).

Nothing will replace experience. Countries are invited to refer to existing examples of emergency response plans such as those provided on the OIE webpage (for both aquatic and terrestrial animals).[23]

[23] See at https://www.oie.int/en/solidarity/emergency-management/planning-for-emergencies/.

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Animal health emergencies are evolving, but they remain among the most challenging situations a country can confront. Infectious diseases and other threats have increasing potential to spread rapidly within a country or around the world due to growing populations, concentration of animal populations and market intensification, human and animal movement, and global trade.

This international GEMP Essentials guide is meant to support the advancement of key components of emergency management as countries continue efforts to work and prepare together. It sets out in a systematic way the elements required to achieve an appropriate level of preparedness and proposes an approach to animal health emergency management inclusive of all types of events, be they caused by natural phenomenon, including not infectious events, or by accidental or deliberate human action. The guide also includes the One Health approach.

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