

Regional Technical Guidelines on Early Warning System for Aquatic Animal Health Emergencies



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The drafting committee, as it appears in Appendix 1, consists of everyone who attended and contributed at the ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia that was held in Bangkok, Thailand on 20-22 August 2018.

ABSTRACT

This Regional Technical Guidelines for Early Warning System on Aquatic Animal Health Emergencies was developed to enumerate the actions to be undertaken by the AMS in case of the occurrence of known, unknown, existing, emerging or re-emerging disease(s). The guidelines identified the key players in aquatic emergency preparedness and response system including their roles and responsibilities. Actions to be undertaken during any disease emergencies were also described.

PREFACE

Aquaculture has been expanding rapidly. This expansion is accompanied by old and/or new emerging and/or re-emerging diseases whose causative agent may be known or unknown. These diseases may cause disease outbreaks resulting to 100% mortality in the cultured organism. Disease occurrence may be due to irresponsible aquaculture practices including the transfer of aquatic species, particularly farmed stocks carrying pathogens. Recognizing the impact of such diseases to the aquaculture industry, the ASEAN Regional Technical Consultation (RTC) on EMS/AHPND and Other Transboundary Diseases for Improved Aquatic Animal Health Management in Southeast Asia, funded by the Japan-ASEAN Integration Fund (JAIF), was held on 22-24 February 2016 in Makati, Philippines. One of the recommendations in the Consultative meeting is to focus on emergency preparedness and response systems (EPRS) for managing aquatic animal disease outbreaks in the region.

In response to the recommendation of the RTC on EMS/AHPND, the ASEAN Regional Technical Consultation (RTC) on Aquatic Emergency and Response System (AEPRS) organized and held on 20-22 August 2018 in Bangkok, Thailand with funding from JAIF. One of the Plans of Action identified during the RTC on Aquatic EPRS is to develop the ASEAN AEPRS guidelines. The purpose of this set of guidelines is to enumerate the actions to be undertaken by the AMS in case of the occurrence of known, unknown, existing, emerging or re-emerging disease(s).

During the RTC on Aquatic EPRS, ANAAHC Focal Points were requested to complete an EPRS Audit prepared by FAO. This Draft Guidelines is based on the analysis of the FAO Emergency Preparedness and Response Systems audit for aquatic animal diseases completed by the ANAAHC Focal Points.

SCOPE AND PURPOSE

This set of guidelines is developed to help national regulators and stakeholders in responding to and managing suspected outbreaks of emergency aquatic animal diseases; thus improve national emergency preparedness in order to maximize the efficiency of response to serious outbreaks of aquatic animal diseases.

This document aims to provide guidance to Competent Authorities (CAs) in the decision-making and in issuing regulations that can minimize the impacts of serious aquatic disease occurrence and/or outbreaks through containment or eradication or mitigation whether at the regional, national, or farm level. It is envisaged that a harmonized guideline for aquatic EPRS among AMS is developed.

The purpose of this set of guidelines is to enumerate the actions to be undertaken by the AMS in case of the occurrence of known, unknown, existing, emerging or re-emerging disease(s).

The set of guidelines is based on the analysis of the FAO Emergency Preparedness and Response Systems audit for aquatic animal diseases completed by the AMS

BACKGROUND

Aquaculture production in Southeast Asia has grown rapidly over the last two decades contributing approximately 10% of the annual world aquaculture production. However, irresponsible aquaculture practices including the transfer of aquatic species, particularly farmed stocks carrying pathogens, has brought about the emergence of infectious diseases thereby posing serious threats to the sustainability of aquaculture in the region. One of the infectious diseases that recently impacted the shrimp industry in the region was the acute hepatopancreatic necrosis disease (AHPND) or popularly known as early mortality syndrome (EMS). AHPND outbreaks in cultured penaeids in Vietnam, Thailand, Malaysia, and Philippines significantly led to low production and concomitant economic losses. The pressing situation on AHPND in cultured shrimp in the region at that time spurred the organization of a consultative meeting, i.e. ASEAN Regional Technical Consultation (RTC) on EMS/AHPND and Other Transboundary Diseases for Improved Aquatic Animal Health Management in Southeast Asia, funded by the Japan-ASEAN Integration Fund (JAIF), on 22-24 February 2016 in Makati, Philippines. The RTC was not only instrumental in assessing the current status of EMS/AHPND and other emerging diseases in farmed shrimps in ASEAN Member States (AMSs) but also facilitated the identification of gaps and priority areas for research and development collaboration. Notably, the consultation was pivotal in the formulation of Regional Policy Recommendations, which among others, focused on emergency preparedness and response systems (EPRS) for managing aquatic animal disease outbreaks in the region. This prompted the organization of the ASEAN Regional Technical Consultation (RTC) on Aquatic Emergency and Response System (AEPRS) which was held on 20-22 August 2018 in Bangkok, Thailand. One of the Plans of Action identified during the RTC on Aquatic EPRS funded by JAIF, is to develop the ASEAN AEPRS guidelines.

EPRS are comprised of contingency planning arrangements that can minimize the impacts of serious aquatic animal disease. Establishing a harmonized aquatic EPRS among AMSs would certainly warrant a solid platform for an effective and prompt decision-making with clearly defined responsibilities and authority.

Emergency preparedness is the ability to respond effectively and in a timely fashion to disease emergencies (e.g. disease outbreaks, mass mortalities). The capability to deal with emergency disease situations requires a great deal of planning and coordination (including establishing operational, financial and legislative mechanisms) and making available required resources (i.e. skilled personnel and essential equipment). As long as there is importation of live aquatic animals, the possibility of serious disease outbreaks due to exotic pathogens will exist. Even under the best of circumstances, pathogens will occasionally escape detection, breach national barriers, become established, spread and cause major losses. The extent to which losses occur often depends on the quickness of detection (which depends on the effectiveness of disease surveillance, diagnostics and reporting programs) and the rapidity and effectiveness with which governments recognize and react to the first reports of serious disease. As quick and effective reaction (containment and/or eradication) is largely dependent upon contingency planning, all countries need to develop such plans for key cultured species and diseases.

ACRONYMS AND ABBREVIATIONS

ANAAHC	ASEAN Network of Aquatic Animal Health Centres
AMS	ASEAN Member State
ASEAN	Association of Southeast Asian Nations
CA	Competent Authorities
EPRS	Emergency Preparedness and Response System
FAO	Food and Agriculture Organization of the United Nations
FHO	Fish Health Officer
MC	Member Country
NACA	Network of Aquaculture Centers in Asia-Pacific
OIE	World Organization for Animal Health

TERMS AND DEFINITIONS

Aquaculture - Science, art and business of cultivating aquatic organism under controlled condition.

Aquaculture site- Hatchery, nursery or grow-out area, including land-based, flowthrough and open-water based systems.

Aquaculturist- A person who engages in the aquaculture.

Aquaculturist Community- A group of persons engaged in aquaculture

Aquatic animals – All life stages (including eggs and gametes) of fish, molluscs and crustaceans originating from aquaculture establishments or removed from the wild, for farming purposes, for release into the aquatic environment or for human consumption (modified from OIE, 2005).

Biosecurity – The sum total of a country’s activities and measures taken to protect its natural aquatic resources, capture fisheries, aquaculture and biodiversity and the people who depend on them from the possible negative impacts resulting from the introduction and spread of serious transboundary aquatic animal diseases (TAADs).

Competent authority – The National Veterinary Services, or other Authority of an OIE Member Country, having the responsibility and competence for ensuring or supervising the implementation of the aquatic animal health measures recommended in the World Organisation for Animal Health’s (OIE) Aquatic animal health code (modified from OIE, 2005).

Containment- Action of keeping the disease and pathogen within specified zones with controls in place around infected zones to prevent spread to uninfected populations within the country or straddling neighboring borders.

Contingency plan – A documented work plan designed to ensure that all needed actions, requirements and resources are provided in order to eradicate or bring under control outbreaks of specified diseases of aquatic animals (modified from OIE, 2005).

Disease- An abnormal occurrence displayed by living organisms through a common characteristics (signs), or sets of characteristics.

Eradication- Initial destruction of disease with eventual total elimination of the pathogen from an affected population, including sub-clinical infections if they occur. This is the highest level of response but may not always be possible, especially where the disease was well-established prior to the initial detection (i.e. where early detection has essentially failed), intermediate or carrier hosts are unknown, or the source of the infection is unknown.

Fish Health Officer- A person legally qualified or sufficient to perform an act that will diagnose cause of disease.

Introduction – The human-assisted movement of an aquatic animal to an area outside its natural range.

Mitigation- Reduction of the impacts of the pathogen by implementing control measures at the farm, or affected population, level that reduce the occurrence and severity of disease. These measures focus on stocks within the infected zone, and concentrate on long-term circumvention of disease losses, either through development of treatments or husbandry techniques. These measures are based on failed eradication attempts or epidemiological risk assessments indicating that eradication efforts are unfeasible or impractical.

Monitoring – Collection and analysis of information necessary to detect changes in prevalence or intensity of infection.

Movement – Human-mediated movement of aquatic animals within or across political borders (international, state/provincial or regional boundaries) or between differing geographic areas (e.g. between drainage basins) or zones of differing disease status.

Occurrence- An event especially something that is not expected to happen.

Outbreak- A sudden increase in occurrences of a disease in a particular time and place.

Pathogen- A biological agent that causes disease or illness to its host.

Risk – The likelihood of the occurrence and the likely magnitude of the consequences of an adverse event to public, aquatic animal or terrestrial animal health in the importing country during a specified time period (modified from OIE, 2005).

Risk analysis – The complete process composed of hazard identification, risk assessment, risk management and risk communication (modified from OIE, 2005).

Risk assessment – The evaluation of the likelihood and the biological and economic consequences of entry, establishment or spread of a hazard within the territory of an importing country (modified from OIE, 2005).

Surveillance – A systematic series of investigations of a given population of aquatic animals to detect the occurrence of disease for control purposes, which may involve testing samples of a population (modified from OIE 2005).

Transfer – The movement of an aquatic animal to an area within the established or historical range of the species.

Zone – A portion of one or more countries comprising (a) an entire water catchment from the source of a waterway to the estuary or lake, or (b) more than one water catchment, or (c) part of a water catchment from the source of a waterway to a barrier that prevents the introduction of a specific disease or diseases, or (d) part of a coastal area with a precise geographical delimitation, or (e) an estuary with a precise geographical delimitation, that consists of a contiguous hydrological system with a distinct health status with respect to a specific disease or diseases for which required surveillance and control measures are applied and basic biosecurity conditions are met for the purpose of international trade. All areas of the zone must have the same health status. The zones must be clearly documented (e.g. by a map or other precise locators such as Geographical Positioning System [GPS] coordinated by the competent authority [ies]) (modified from OIE, 2005)

GUIDING PRINCIPLES (FAO/NACA 2000)

These set of Guiding Principles, developed to guide in the implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals (FAO/NACA, 2000), are relevant to the implementation of the Regional Technical Guidelines for Early Warning System for Aquatic Animal Health Emergencies.

1. Movement of living aquatic animals within and across national boundaries is a necessity for economic, social and development purposes.
2. Such movements may lead to the introduction of new and emerging pathogens and to disease establishment and, therefore, may pose risks to the importing country's animal, plant and human health status
3. The role of health management is to reduce the risks arising from the entry, establishment or spread of pathogens to a manageable level with the view to protecting animal, plant and human life. Health management should also protect living aquatic resources, the natural aquatic environment and aquatic biodiversity, as well as support the movement of aquatic animals and protect trade.
4. The health management process is defined, in the broad sense, as aquatic animal health management encompassing pre-border (exporter), border and post-border (importer) activities, as well as relevant national and regional capacity-building requirements (infrastructure and specialised expertise) for addressing health management activities, and development and implementation of effective national and regional policies and regulatory frameworks required to reduce the risk of disease spread through movement (intra- and international) of live aquatic animals.

5. Health management measures should be practical, cost-effective and easy to implement by utilising readily available facilities. Individual countries may need to adopt, modify or vary these Technical Guidelines to suit their own particular situations and resources.
6. The varying capacity of developing countries to implement programmes on health management should be acknowledged by relevant international organizations and financial institutions. These organizations should give full recognition to the special circumstances and requirements of many developing countries.
7. Health management measures shall be based on an assessment of the risk to animal, plant and human life or health. In assessing the risk, prevalence of specific pathogens in both the region of origin and the region of destination shall be a crucial issue. The likelihood of new or emerging pathogens becoming established in the region of destination is a major consideration.
8. All movements of aquatic animals should be conducted within the provisions given in existing relevant international agreements and instruments. Health management measures should not be applied in a manner which would constitute a disguised restriction on trade. Health management measures should be applied only to the extent necessary to protect animal, plant or human life or health, and must be based on scientific principles and not be maintained without sufficient scientific evidence.
9. In determining the appropriate level (stringency) of health management measures to be applied, relevant economic and ecological factors have to be taken into account. These are, inter alia: potential damage due to loss of production or value, and the cost of control or eradication. A conservative approach should be adopted in cases where insufficient knowledge exists in relation to disease risks posed by a particular import; a higher stringency of health management procedures should be adopted where inadequate knowledge exists.
10. The first movement (introduction) of a new species into a new area will require special health management considerations in light of the need to evaluate scientific evidence regarding the risk of introducing pathogens to new areas.
11. Different regions should attempt to harmonise health management procedures to facilitate safe movement of aquatic animals within and between regions.
12. Considering the free movement of aquatic species in trans-boundary waterways, division of regions into manageable sub-regional units based on factors such as geography, hydrography, ecosystems, epizootiological surveillance and effectiveness of control is necessary for the effective implementation of health management procedures. The basis for the establishment of such units should be uniform, clear and unambiguous.
13. Honest, conscientious and transparent reporting is essential for health management to be effective.

14. Technical co-operation among regional experts is essential to promote exchange of information and expertise.

15. Collaboration among the governments, public institutions, and the private sector, including all stakeholders, is important to achieve the full purpose of implementing effective health management. Opportunities for sharing the benefits of health management among all stakeholders should be explored.

Aquatic EPRS Technical Guidelines

Section 1: General Administration

AMS's should identify the national government agency (national authority) with primary responsibility for managing the country's EPRS. The identified national authority should have clear lines of responsibilities (administrative and technical), clear organigram including relationships with national and international emergency response arrangements.

1.1. ROLES AND RESPONSIBILITIES

1.1.1. Competent Authority (CA)

The list of CAs is in Appendix 2. The CA should be responsible for the following:

- a) Technical, diagnostic capacity and capability relevant to aquatic health in the country.
- b) Coordinate with other relevant agencies within the country.
- c) Approval and/or registration of aquaculture premises.
- d) Approval and/or registration of third party aquatic health diagnostic laboratory.
- e) Create awareness among aquaculturists through extension and awareness programs.
- f) Communicate with other AMS.
- g) Monitoring and surveillance for OIE listed and other significant and emerging aquatic animal diseases in the country.
- h) Implement enforcement activities for non-compliance to national practice and/or legislations.

1.1.2. Fish Health Officer (FHO)

The FHO should be responsible for the following:

- a) Recognize a suspected disease emergency.
- b) Carry out diagnostic procedures.
- c) Report findings to the appropriate provincial or national authority responsible for declaring a disease emergency and declaring a response.

1.1.3. Aquaculturist

The Aquaculturist should be able to:

- a) Recognize a suspected disease emergency at farm level.
- b) Report disease occurrence and/ or outbreak to appropriate authorities.
- c) Prevent the spread of suspected diseases from their own farms to other farms
- d) Perform treatments to reduce potential virulence
- e) Document any information related to clinical signs, mortality, etc.

1.2. COMMUNICATIONS

- a) Aquaculturist inform FHO or extension worker about disease occurrence/outbreak in the pond.
- b) FHO or extension worker inform CA about disease occurrence/ outbreak in the pond.
- c) CA reports disease occurrence/outbreak to NACA and OIE.
- d) Semi-annual consultation with aquatic animal health professionals and relevant agencies, academe, researchers, industry representatives is carried out.
- e) There is direct line of communication from the regional counterparts to the national authority for reporting suspected disease agents of concern.
- f) The aquaculturist and the aquaculturist community inform FHO or extension worker about any abnormal occurrences in the fish farm.
- g) FHO or extension worker inform competent authority (CA) about all abnormal occurrences in the fish farm and the presumptive diagnostic results.
- h) CA analyzes the report from FHO whether it is necessary to perform confirmatory examination or not. If it necessary, CA performs confirmatory examination and make the final report.

Section 2: Aquatic EPR System Elements

A planned approach for the prevention, preparation and response to an emergency situation should be identified. The approach should include the elements of EPRS: early warning, early detection, and early response. The role of each player should be clearly defined.

2.1. Early Warning System

- a) CA monitors aquatic animal disease occurrence/outbreak in other countries (such as via the International Biosecurity Intelligence System (IBIS) [<http://biointel.org/>], through the internet, scientific literatures, aquatic animal health newsletters, e-mail discussion groups, conference attendance) and relay

the information to all relevant stakeholders, including but not limited to aquaculturists, fish health professionals, etc.

- b) CA checks and reports disease occurrence/outbreak to Network of Aquaculture Centers In Asia Pacific (NACA) or World Organization for Animal Health (OIE).

2.2. Early Detection System

- a) Immediate recognition of signs of disease, or an emerging disease situation, or unexplained mortality, in aquatic animals at farm level by the aquaculturist.
- b) Aquaculturist immediately communicates the event to the FHO or CA.
- c) FHO or CA conducts diagnostic investigation with minimal delay. FHO or CA should have access to laboratories with the expertise and facilities required to diagnose and differentiate listed and emerging diseases from endemic or benign infections.
- d) Immediate recognition of signs of disease, or an emerging disease, or unexplained mortality, in aquatic animals at farm level by the aquaculturist/aquaculturist community.
- e) FHO/CA inspects, collects, and documents all information including samples related to abnormal occurrences and chorological occurrences
- f) FHO informs CA about abnormal occurrence outbreak in the fish farm and also report the presumptive results.
- g) CA analyzes the report from FHO whether it is necessary to do confirmatory examination or not. If it is necessary, confirmatory examination can be started. The final report should consist of conclusion that the abnormal occurrence could differentiate the listed or emerging disease.

2.2.1. Risk analysis

- a) CA conducts risk analysis to identify high priority aquatic disease threats.
- b) CA identifies farm level risk factors.
- c) CA conducts epidemiological studies.

2.2.2. Disease surveillance

- a) CA conducts passive surveillance for targeted and non-targeted diseases.
- b) CA conducts active surveillance for targeted diseases.

2.3. Early Response System

2.3.1. At pond/farm level

- a) Aquaculturist, FHO, fisheries extension officers introduce measures to contain or control disease prior to disease diagnosis

- b) Aquaculturist provides FHO or CA with information on disease signs, as well as any movement of live animals prior to disease occurrence/outbreak.
- c) FHO or CA recommends actions that would rapidly and effectively contain, and then possibly eliminate an emergency disease outbreak, and mitigate its effect or prevent it from spreading and becoming an uncontrollable epizootic.
- d) FHO, fishery extension officer, CA assists and ensures the implementation of recommended control measures to prevent disease spread, both prior to and after disease diagnosis
- e) FHO or CA coordinates control measures between farmers, both affected and non-affected.
- f) Aquaculturist provides FHO/CA with information on abnormal occurrence/disease signs, as well as any movements of live animal prior to disease
- g) Aquaculturist community do prevention the spread of the suspected disease at their farm to another location
- h) Aquaculturist/aquaculturist community do any possible treatment to reduce of potential damage
- i) Aquaculturist/aquaculturist community do documentation of any information related to clinical sign, mortality rate, etc.

2.3.2. At national level

- a) CA confirm the disease diagnosis with the reference laboratory
- b) CA identifies risks factors based on reported disease scenario
- c) CA defines disease zones based on data from reporting laboratories
- d) CA initiates information, education and communication (IEC) campaign
- e) CA recommends Contingency Plans

Section 3: Implementation of the Technical Guidelines

Countries adopting these Technical Guidelines should agree to implement them in line with their national circumstances and capacity. These guidelines are recommended to be integrated into existing national strategies on aquatic animal health management or aquaculture biosecurity strategies, aquaculture development plans and other emergency preparedness mechanisms. Implementation is done in a phased manner, based on existing priorities and capacities.

A detailed implementation plan is essential. The implementation plan will cover important aspects pertaining to the following:

3.1. Capacity building

3.1.1 Response management manuals

FHO should follow a documented procedure on collection, packaging, transporting and sending samples to the laboratory.

3.1.2 Diagnostic resources

- a) Regional laboratories and specialized centers with responsibilities for providing emergency diagnostic services should be available.
- b) Technical expertise in aquatic disease controls should be available.
- c) New staff/veterinarians should be recruited and trained, in case the diagnostic team is lacking to cater to the needs of the aquaculture industry.
- d) Continuous staff development should be implemented.

3.1.3 Training resources/ field personnel

- a) FHOs and CAs prior to designation should undergo training on fish health management.
- b) Resource persons are invited to conduct on-site workshops/forum/trainings
- c) Formal non-degree training programs and regional institutions are available to provide short training course on fish health management given to designated government and industry personnel.

3.2. Contingency plans

3.2.1. Summary document

The CA should prepare a summary document presenting an overview of the national approach for contingency planning for serious aquatic animal diseases. The information should be concisely and clearly presented, such that it can be easily understood by all stakeholders.

A sample flow diagram summarizing the different actions to be undertaken during any disease emergencies is in Appendix 3.

3.2.2. Support plans

- a) Legislation
Countries should have legislation that support actions in responding to disease emergencies, e.g. access to farm premises, collection of samples, movement controls, mandatory stock disposal, compensation, etc.
- b) Financial
 - i. Necessary budget allocation for the emergency response should included in the annual budget.
 - ii. The national authority should provide resources for preparedness and response activities.
 - iii. There should be a system to compensate or assist farmers on losses due to mandatory destruction.

- c) Resource
 - i. Resource plans and access to personnel/equipment/analysis from other laboratories should be arranged, in advance; to avoid wasting time seeking approvals or negotiating conditions when an emergency is underway.
 - ii. Technical expertise in aquatic disease controls should be available.
- d) Other agencies
 - i. A collaboration between different governmental departments and agencies, key private-sector organizations, and regional or international assistance and expertise should be available in case major outbreak of a rapidly spreading, highly pathogenic disease may require collaborative efforts.
 - ii. Awareness building and advocacy including public-private sector partnership should be implemented.

3.2.4 Awareness and education

FHOs, Aquaculturists, the Aquaculturist Community should attend trainings on aquatic animal health provided by other agencies or organizations such as Food and Agriculture Organization (FAO), Southeast Asian Fisheries Development Center (SEAFDEC), Network of Aquaculture Centres in Asia-Pacific (NACA), World Organization for Animal Health (OIE), European Union (EU), Japan International Cooperation Agency (JICA), Australian Centre for International Agricultural Research (ACIAR), International Development Research Centre (IDRC) and other Association of Southeast Asian Nations (ASEAN) initiatives. Attendance to training promotes awareness of emerging diseases and ways to prevent their entry, or actions to be taken such as detection and control, in case they have entered the culture system.

3.2.5 Simulated response exercises

Desk-top and field simulation exercises should be done on SOP's being followed by the FHO's and other players in the performance of their tasks to enhance their skills and confidence in performing their duties.

3.3 Technical plans/ EPRS Toolkit

The CA, CA staff and FHO should prepare the technical plans which are sets of instructions or manuals, required to support the contingency plans. Some manuals are “generic” and can be applied to all/most disease emergencies; whereas others will need to be disease specific, taking into account the need for specialized expertise, partnerships or international coordination. The technical plans must include the private-sector for a cohesive coordination of effort.

3.3.1 Control Centers Management Manual

The Control Centers Management Manual which outlines the organizational response during the investigation, alert, operational and stand-down phases of an aquatic animal disease emergency should be prepared.

3.3.2 Destruction manual

The Destruction Manual which is an operational procedures manual to be used in instances where preventing the spread of a serious disease necessitates the efficient and humane killing of stock should be prepared.

3.3.4 Disposal manual

The Disposal Manual which is an operational procedures manual that provides guidance on best practice for safe transport and disposal of carcasses, animal products and wastes should be prepared.

3.3.5 Disease strategy manuals

Disease Strategy Manuals which are a series of manuals that provide specific information needed for the recognition and control of individual diseases should be prepared.

3.3.6 Job descriptions

- a) Job cards summarizing tasks (roles and responsibilities) of key personnel involved in EPRS for a rapid and effective response to a disease emergency should be available.
- b) Alternates should be designated and alerted and ready when a contingency plan is put into effect, whether for training or for a real-time exercise, in case key personnel cannot participate for reasons beyond their control.
- c) Contingency plan responsibilities should be incorporated into the normal job description of key individuals.
- d) Personnel involved should be authorized through Fisheries Office Order issued by the Bureau Director.

3.4. Recovery from an emergency disease

3.4.1 Verification and international acceptance of disease freedom

- a) It should be proven that the affected population has regained freedom from the disease agent.
- b) It should be demonstrated that the country has a capable aquatic animal health service and relevant disease surveillance programs.
- c) Targeted surveillance should be implemented using scientifically proven laboratory tests for both clinical and subclinical infections.

- d) Surveillance data should be provided as evidence of an effective surveillance program and diagnostic testing.

3.4.2 Rehabilitation of aquaculture facility

- a) The aquaculture facility should be rehabilitated to rebuild socio-economic losses and re-establish lost markets.
- b) Affected area should be repopulated with disease-free animals, usually an alternative species is used.

3.5. Monitoring and evaluation

AMS's should establish a network among CA's to document, collate, summarize and analyze compliance with the guidelines among the AMS's. EPRS Audit and review should also be implemented.

3.6. Regional cooperation

Not all MC's implement biosecurity measures and best management practices thus disease outbreaks are experienced. AMS's should conduct regular meetings to share information, technology and best practices that can improve the ability of each MC's in preventing or responding to aquatic emergency situations. Another consultation to present the guidelines for refinement and consensus, and for capacity building on its implementation is essential. Regional consultative meetings should be organized to prepare technical plans or EPRS toolkits (i.e. disease strategy manuals, fish disease outbreak/fish kill investigations, contingency plans, strategy manuals, simulation exercises, proper documentation, epidemiology and surveillance).

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Appendix 2. Competent Authorities in ASEAN Member States Responsible for Aquatic Animal Health Emergencies.

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Japan	Animal Products Safety Division, Food Safety and Consumer Affairs Bureau Ministry of Agriculture, Forestry and Fisheries
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Appendix 3. Flow diagram summarizing the different actions to be undertaken during any disease emergencies.



