



AQUATIC EMERGENCY PREPAREDNESS AND RESPONSE SYSTEMS FOR EFFECTIVE MANAGEMENT OF TRANSBOUNDARY DISEASE OUTBREAK IN SOUTHEAST ASIA

Aquaculture Department

Executive Summary

The most serious problems faced by the aquaculture sector are diseases spread and introduced through movements of hatchery produced stocks, new species for aquaculture, and development and enhancement of the ornamental fish trade. During the 2012 and 2013 meetings of the SEAFDEC Program Committee, member country representatives conveyed concern regarding the outbreaks of EMS/AHPND and other transboundary diseases in the region and recognized the need for concerted regional effort to address this. In response, the SEAFDEC Council, during its meeting in April 2014, suggested that aquatic animal health management, particularly the control and prevention of transboundary aquatic animal diseases, be included in the formulation of future programs of SEAFDEC and its partners in the region. Acknowledging the pressing need for sustained regional efforts to address disease problems in farmed aquatic animals, particularly on shrimps, SEAFDEC/AQD and the Department of Agriculture's Bureau of Fisheries and Aquatic Resources of the Philippines, with financial support from the Japan-ASEAN Integration Fund, convened the Regional Technical Consultation on EMS/APHND and other Transboundary Diseases for Improved Aquatic Animal Health in Southeast Asia from 22 to 24 February 2016 in Makati City, Philippines. The Consultation assessed the status of EMS/AHPND and other emerging diseases in farmed shrimps in ASEAN Member States; identified gaps, priority areas for research and development and potential collaborative arrangements; and formulated regional policy recommendations that centered on emergency preparedness and response systems (early warning, detection and response) for an effective management of aquatic animal disease outbreaks in the region.

An **ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia** was proposed by SEAFDEC/AQD and the Government of Thailand (AAHRDD, Department of Fisheries) to address the recommendations of the RTC on AHPND and other transboundary diseases. The Consultation will tackle the pressing concern of the ASEAN Member States on how to systematically approach devastating outbreaks of transboundary diseases of aquatic animals in the region following a well-defined Aquatic Emergency Preparedness and Response Systems (EPRS). For the meeting arrangements, SEAFDEC/AQD and AAHRDD, DOF will coordinate with the ASEAN Network of Aquatic Animal Health Centres (ANAAHC), the existing ASEAN body on aquatic animal health which is mainly responsible for coordination of aquatic animal health projects and activities in the region.

Progress to date:

Considering the Government of Japan's strong commitment in supporting the initiatives related to enhancing food security and safety within ASEAN Member States, this consultation on aquatic emergency preparedness and response systems for effective management of transboundary disease outbreaks in Southeast Asia was approved for support by the Government of Japan through the Japan-ASEAN Integration Fund (JAIF) in January 2018.

The ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia (ASEAN

RTC on AEPRS) was held last 20-22 August 2018 in Centara Grand at Central Plaza Ladprao in Bangkok, Thailand.

A total of 71 participants including country representatives from AMCs, resource persons, JAIF representatives, private sectors of selected countries, Thailand aquaculture farmers, and representatives from DOF-Thailand, SEAFDEC Secretariat and Aquaculture Department attended.

The ASEAN RTC on AEPRS comprised of three technical sessions: (1) Ten Country representatives presented current status of aquatic emergency preparedness and response systems concomitant to national laws, legislations, SOP's and aquatic animal health strategies, among others; (2) Six Resource persons presented the importance of aquatic emergency preparedness and response systems for effective management of transboundary disease outbreaks based on primary accounts documented at the global or regional level; and (3) Workshop to identify gaps, policy recommendations, and priority areas for R&D collaboration. Through the collaboration of all sectors and institutions present during the consultation, the expected outputs had been met. See **ANNEX 1** for full report and **ANNEX 2** for full text of Ways Forward.

Following the workshop, a Regional Technical Guidelines and Mechanism for Early Warning System for Aquatic Animal Diseases was drafted together with consultants. See **ANNEX 3** for the drafted guidelines.

To enhance the participants' awareness on aquatic emergency preparedness and response systems being practiced at the farm level, the consultation was capped with a field trip to the Nam Sai Farms Tilapia hatchery, and to the Royal Sea Farming and Aquaculture Demonstration Project in Petchaburi Province.

Power point presentations of the participants are available at SEAFDEC website
<http://www.seafdec.org.ph/2018/asean-rtc-on-aeprs/>

The publication of the proceedings for this Consultation is currently on-going. SEAFDEC/AQD, together with the partner organization, are also planning for a follow-up seminar-workshop.

Required Consideration by the Council

The Council is requested to endorse the Regional Technical Guidelines and Mechanism for Early Warning System for Aquatic Diseases for 27th Meeting of the ASEAN Sectoral Working Group on Fisheries.



ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia
 20-22 August 2018
 Centara Grand Central Ladprao
 Bangkok, Thailand

REPORT

I. Introduction

1. The ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia was conducted on 20-22 August 2018 in Centara Grand Central Ladprao in Bangkok, Thailand through the efforts of Department of Fisheries-Aquatic Animal Health Research and Development Division (DOF-AAHRDD) in Thailand together with Network of Aquaculture Centres in Asia-Pacific (NACA) and the Southeast Asian Fisheries Development Center / Aquaculture Department (SEAFDEC/AQD) with the support from the Government of Japan through Japan-ASEAN Integration Fund.
2. The Consultation was attended by country representatives from ASEAN member countries and resource persons from Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health (OIE), National Center for Genetic Engineering and Biotechnology (BIOTEC), Pacific Disaster Center (PDC) and NACA. Observers from private sectors of Indonesia, Myanmar and Viet Nam, and aquaculture farmers from Thailand were present.
3. The ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia will discuss the status of and/or need for aquatic emergency preparedness and response systems for effective management of transboundary disease outbreaks in Southeast Asia. Issues will be addressed through country reports, technical presentations and a workshop. Assessment of the current status of aquatic EPRS is currently being practiced by the different countries in the Southeast Asian region from the country reports. The workshop will review the existing laws, legislations and standard operating procedures (SOPs), among others, pertinent to aquatic EPRS of each member country, identify gaps, policy recommendations and priority areas for R&D collaboration and, enhance the cooperation among member countries, regional/international organizations and other relevant stakeholders on initiatives that support aquatic EPRS for effective management of aquatic animal disease outbreaks.

II. Inaugural sessions

4. In behalf of DOF Director-General *Dr. Adisorn Promthep*, DOF Deputy Director-General *Mr. Bunchong Chumnongsittathum* officially welcomed the participants to the Consultation.

Words of encouragement were also given by SEAFDEC Secretary-General *Dr. Kom Silapajarn* and SEAFDEC/AQD Deputy Chief *Dr. Koh-ichiro Mori*.

5. AAHRDD Director *Miss Janejit Kongkumnerd* gave the opening remarks and officially opened the technical sessions.

III. Technical sessions

6. SEAFDEC/AQD Scientist and Training and Information Division Head *Dr. Edgar Amar* gave the overview of the Consultation.¹ Dr. Amar also served as the moderator for Technical Session 1.

a. Technical Session 1: Presentation of Country Papers on the current status of aquatic emergency preparedness and response systems concomitant to national laws, legislations, SOP's and aquatic animal health strategies, among others.

Brunei Darussalam

7. *Mrs. Dk. Siti Norhaziyah Pg Haji Abd Halim*, country representative of Brunei Darussalam, presented the current status, issues and gaps of aquatic emergency preparedness and response system practiced in Brunei Darussalam.¹
8. *Dr. Cherdsak Virapat*, NACA Director-General, asked about the channel of communication between Department of Fisheries officers and the farmers as well as the protocols in government visiting the farm during diseases outbreaks. Country representative of Brunei Darussalam said that the government is immediately notified of the outbreak through a mobile technical unit. The farmers also help in the eradication of the diseases by following the Good Aquaculture Practices (GAP) manual. A certain condition was stated that farmers are required to cooperate in times of outbreaks and that the government will have access to the infected farms.
9. *Dr. Leobert de la Peña*, SEAFDEC/AQD Scientist and Research Division Head, asked if the government gives financial assistance during eradication of diseases and on planting new crops. Country representative of Brunei Darussalam confirmed that expenses during eradication had been covered by the government and as for planting new crops, the government compensate the farmer a certain amount and not the full costs. She also mentioned that there has only been one major outbreak in the country.
10. *Dr. Eduardo Leño*, Aquatic Animal Health Programme Coordinator from NACA, mentioned that Brunei used to be free from white-spot diseases and the had experienced outbreak only recently. He then asked the source of the infection and if it is due to imported shrimp from other countries. Country representative of Brunei Darussalam said that there's no conclusion or findings on where the outbreak came from and even the feeds were tested negative. She mentioned that Brunei does not allow importation of shrimps including high-risk broodstock. For exportation, the country export live fish for human consumption only.
11. As a follow-up, *Dr. Leño* confirmed if Brunei managed to fully eradicate infected stocks and country representative from Brunei Darussalam answered in the affirmative.
12. *Mrs. Mukti Sri Hastuti*, country representative from Indonesia, asked if the Brunei Darussalam's disease-free status pertains to the entire country or a certain zone or compartment only. Country representative from Brunei Darussalam confirmed that the entire country is disease-free.

13. *Dr. Akito Sato*, SEAFDEC Deputy Secretary-General, asked if the farmers still use the GAP manual even if a disease, not covered by OIE, broke out. As a follow-up question, he asked if the existing GAP manual enough or if it needs modification. Country representative from Brunei Darussalam answered that the implementation is only for OIE-listed outbreaks and by far, the country has not suffered non-OIE listed disease. She added that farmers are advised to follow the manual since it includes details on disease prevention and treatment as well as instructions on how to tackle the problem under the action plan.
14. *Dr. Kua Beng Chu*, country representative from Malaysia, asked if Brunei does import analysis on either old or new species. Country representative from Brunei Darussalam confirmed that they are doing it on new species only.
15. Since Brunei self-declared itself free from four shrimp diseases, FAO Aquaculture Officer *Dr. Melba Reantaso* asked if those diseases are still listed on the national pathogen list. If those still are, she asked if the country wish to revise the national pathogen list based on its current disease status. The country representative from Brunei Darussalam said that the pathogens are still on the list since it is still listed as OIE disease regardless of the country's disease status. She explained that all importing countries are being notified of this in order for animal imported in country to be tested for those diseases for clearance and granting of aquatic animal health certificate.
16. *Dr. Reantaso* advised that the purpose of active surveillance is to determine the status of a particular disease in the culture species of the country. The information collected from the active surveillance should be used to update the disease list. Dr. Reantaso then commended Brunei Darussalam's approach in protecting the country from further disease incursions from the outside.

Cambodia

17. *Mr. Khan Chan Dara*, country representative of Cambodia, presented the current status, issues, and gaps on aquatic emergency preparedness and response systems practiced in Cambodia.¹
18. Regarding Cambodia's capacity on diseases reporting to OIE and NACA, Dr. Leaño mentioned that there is no need for the advanced tools for disease diagnosis. He explained that there are three levels of diagnostics. It was mentioned that Cambodia can't achieve the level 3 diagnosis and, according to Dr. Leaño, this shouldn't be a hindrance. He commended Cambodia's capacity in parasitology and bacteriology (level 2 diagnosis). Following his comment, Dr. Leaño explained the process of reporting the diseases which includes filling up the OIE and Quality Assurance Assessment Program (QAAP) forms upon disease detection. If there's certain disease listed on the form the cannot be detected, the country can just put "no information available" and make sure of the information (levels 1 and 2 diagnosis) collected from your research and surveillance for reporting.
19. *Dr. Saengchan Senapin*, Principal Researcher from Center of Excellence for Shrimp Molecular Biology and Biotechnology (Centrex Shrimp), mentioned that Centrex Shrimp recently established the Tilapia Lake Virus (TiLV) detection protocol by PCR. She offered assistance to Cambodia by sharing the detection protocol as it was given to 40 requesters from 22 countries around the world.
20. *Dr. Virapat* commented that Cambodia reported about the country's country fish monitoring system in 10 provinces and asked if they also have target farms in each of those provinces. The country representative from Cambodia said that target farms from the selected provinces are those with high aquaculture activity and then was selected as they are located around the delta and the middle of Cambodia.

21. *Dr. Reantaso* commended the development in Cambodia especially the establishment of the fish disease-related department in agriculture. She also suggested for Cambodia to strive in attaining the highest level of diagnosis as possible. The reason why levels were created by FAO and other partners is for all countries in Asia who has varying socioeconomic levels will have an entry point in doing diseases diagnosis.
22. Mr. Sato inquired about operation and staff capacity of the Marine Aquaculture Research and Development Center (MARDeC) which was presented by Cambodia as an important part of its fish health and diseases control management. Country representative of Cambodia answered that the staff are capable of levels 1 and 2 diagnoses and the Center is not yet doing level 3. He also mentioned that the Center are receiving funds from the European Union (EU) and central government which enables the Center to assist the fish farmers in diseases diagnosis.
23. Speaking of viral nervous necrosis (VNN), *Dr. Supranee Chinabut* from Thailand asked the method of diagnosis for Cambodia if they are enable to do level 3 diagnosis. Country representative from Cambodia said that VNN diagnosis is being done through PCR.

Indonesia

24. *Mrs. Mukti Sri Hastuti*, country representative of Indonesia, presented the emergency preparedness and response system in Indonesia.¹
25. Indonesia mentioned their efforts in surveillance, monitoring, and reporting. As per *Dr. Virapat*, the details of reporting were clear. He proceeded by requesting Indonesia to clarify the difference between surveillance and monitoring and if the same set of officers do the work. Country representative from Indonesia that monitoring is passive surveillance as data is collected from the district office and its staff. As for surveillance, there is an active collection of sample involved done by the headquarters.
26. *Dr. Diana Chee Lijun*, from Aquaculture Technology Department of Agri-Food and Veterinary Authority of Singapore, mentioned about the online reporting system described in the presentation and request clarification on the following: (1) actual level of usage of the system; (2) willingness of the farmers in using the system; (3) accuracy of results; and (4) process of obtaining results from the diagnosis tests done through the system. Country representative from Indonesia mentioned that the system is being operated from the district office by an official. She explained that samples are taken for diagnosis in a quarantine lab and farmers access the website directly to view the results online.
27. As Indonesia is one of the top aquaculture producers in the world despite being challenged by Koi herpes virus, infectious myonecrosis virus (IMNV), TiLV, and other shrimp diseases as reported in local literature. *Dr. Reantaso* requested to share important lessons learned throughout the years since there's improvement in Indonesia's awareness and preparedness against the mentioned diseases. Country representative of Indonesia mentioned that early warning was one of the most important steps to do upon outbreak of diseases followed by quick response. She also mentioned the importance of consistent implementation of good aquaculture practices by the farmers.
28. Noting the commitment of Indonesian government in addressing aquatic animal health issues throughout the years, *Dr. Reantaso* asked if Indonesia placed an emergency funding mechanism. Country representative from Indonesia wasn't able to put a mechanism in place due to a change that happened in the organization that impacted its implementation.

29. *Mr. Warren Andrew Turner*, aquaculture farmer from Thailand, requested for an actual example of a successful early warning system that prevented the spread of the disease in Indonesia. Country representative from Indonesia set the efforts of the country in preventing acute hepatopancreatic necrosis disease (AHPND). She mentioned how the government quickly do public warnings and have on-the-spot communication with shrimp farmers (e.g. giving out brochures) and implemented GAP.
30. *Dr. Satoshi Miwa*, country representative from Japan, presented the fish disease control in Japan.¹
31. *Dr. Jing Wang*, Regional Representation for Asia and the Pacific of World Organization for Animal Health (OIE-RRAP), mentioned that Japan has information on unknown diseases. She inquired on what do Japan do with those unknown diseases and outbreak, how are the farmers educated, and how is it diagnosed. Country representative of Japan said that since Japan has 30-40 cases of unknown diseases and outbreaks, it would be tasking to do educational activity on each. However, he mentioned that some of it are very important since it occurs almost yearly. In such case, research about prevention of diseases and efforts in dissemination of knowledge are being done prior to educating the fish farmers.
32. *Dr. Reantaso* inquired if there are more aquatic veterinarians, who are licensed and are competent in aquatic diseases, in Japan now. Country representative from Japan said that there's not much as prefectural government usually do not hire licensed veterinarians for fisheries research laboratories. This is because the prefectural government wish to hire people who graduated fishery science as they have a general knowledge of fisheries since they are usually moved from managing issues on fish health to stock enhancement and even reproduction.
33. *Dr. Puttharat Baoprasertkul*, Head of Aquatic Animal Health Certification Research and Development Group in Department of Fisheries-Thailand, asked if National Research Institute of Aquaculture (NRIA) provide proficiency test (PT) to other international laboratories. This is due to the difficulty in getting PT for aquatic animal health laboratories at the moment. Country representative from Japan confirmed that they provide PT within Japan however, they can provide PT on Koi herpes virus and red sea bream iridovirus to international laboratories upon request.
34. Japan has a Japan Meteorological Agency (JMA) that has a tsunami warning system and for other related issues, *Dr. Virapat* asked if they are using the same model for early warning in diseases. Country representative of Japan replied in negative stating that there is no such system in Japan as of the moment.
35. *Ms. Yi Yi Cho*, Fishery Officer from Department of Fisheries in Myanmar, asked if impact assessment had been done for unknown diseases and if records on mortality is available. To which, country representative of Japan answered that conducting impact assessment in unknown diseases is impossible.
36. *Dr. Amar* asked for a general recommendation or warning if unknown disease or outbreaks occurs. Country representative of Japan stated that in their experience since unknown disease are usually from foreign countries hence it is impossible to prevent. Usually, it is caused by parasites which are benign in country of origin and when transported to a different area and hit a different species it can trigger a devastating effect. For example, parasitic disease in flounders which are benign in Atlantic Ocean caused disease outbreak in flounders as it reached Japanese waters. Occurrences of such disease is very difficult to expect since its existence is not known yet. Even for potential threats, it cannot be stopped by quarantine since it can only be made, according to OIE rule, when a parasite is well- and scientifically-established as a causative of a certain disease.

37. *Dr. Kyaw Naing Oo*, Director of Livestock Zone in Ministry of Agriculture, Livestock and Irrigation in Myanmar, asked how severe are the mentioned unknown diseases in Japan. Country representative of Japan said that when white spot syndrome diseases and red sea bream iridovirus first came to the country it was an unknown disease and it caused quite severe effects.
38. As a follow-up, *Dr. Oo* asked if there's any regulation to control the unknown diseases and how to do the country continue following the outbreak. Country representative from Japan said that research is being conducted when causes of severe diseases became apparent. As per stated in Japan's guidelines, reporting of the diseases to the Ministry of Agriculture, Forestry and Fisheries (MAFF) is required. Prior the report of the prefectural government, NRIA and MAFF already gather information about the diseases. In one case, MAFF assembled experts' committee for the disease prevention as well as provide funding to study the disease. Conference on the particular disease are being conducted to educate the people and prevent the disease from spreading.

Malaysia

39. *Dr. de la Peña* served as moderator for the second part of technical session 1.
40. *Dr. Kua Beng Chu*, country representative of Malaysia, presented the emergency preparedness and response system for aquatic animal diseases in Malaysia.¹
41. *Mr. Francis Daniel Fegan*, aquaculture farmer from Thailand, wished to know the timeline of diseases outbreak investigation process from identification of unusual happening to giving alerts to stakeholders. Country representative of Malaysia answered that it usually takes 2-3 days, if the case is quite severe, for the group would be on the ground for investigation. However, if the case is based on hearsay, it might take time to confirm the diseases depending on the available information gathered. The capability of the biosecurity division in the area can also affect the response time. Overall, it takes about 1-2 months until the response system.
42. Still on the topic of response system, *Mr. Turner* requested for an example of a disease that was able to contain before it spreads around Malaysia. Country representative of Malaysia said that most reported diseases, aside from IMNV, were contained. She referred to an IMNV case in 2014 that occurred in an isolated area where they had to do a contingency plan. At present, monitoring is still ongoing.
43. *Dr. Virapat* asked if the national focal point is the Director-General (DG) of Department of Fisheries. Country representative of Malaysia said that the DG chairs the Emergency Disease Task Force Committee. The DG chairs the meetings and make decisions based on the information gathered for the Fishery Biosecurity Division and Research and Development Division. Also depending on the situation and information gathered, he will either alert and mobilize federal committee (situation involves more than two states) and state committee (if it only involved issue within the state).
44. *Dr. Reantaso* gave a remark for Malaysia and other countries doing surveillance. She stated that surveillance is not only for the purpose of reporting since data can be used in for to generate information *e.g.* presence and absence of disease in which species, which location, and the risk factors. This information should be turned into risk management measures and forecasts. She commended Indonesia, Brunei Darussalam and Malaysia for having very good surveillance system. She advised to use it to protect uninfected areas from outbreaks. Country representative from Malaysia agreed with proper use of surveillance data in disease control measures.

Myanmar

45. *Dr. Kyaw Naing Oo*, country representative of Myanmar, presented the status of aquatic emergency preparedness and response system for effective management of transboundary diseases outbreaks in Myanmar.¹
46. *Dr. Reantaso* commented on the Myanmar's requesting assistance in developing a quarantine system. She advised that if a country is going to import live aquatic animal, risk analysis should be done and management measures that will be put at the borders (from the country of origin, pre-border, and post-boarder) will follow. The process mentioned will then conclude whether quarantine is necessary. She mentioned that direct quarantine is not the bottomline but only part of the biosecurity measure.
47. *Dr. Toe Nandar Tin*, private sector of Myanmar, shared that Myanmar, particularly in the private sector, are previously doing traditional aquaculture methods which does not need much maintenance. Starting this year onwards, methods will be modernized by transforming the aquaculture sector through the use of modern culture systems used in the other countries. She mentioned that the change was brought by the present aquaculture status of the country. This would include managing transboundary diseases (*e.g.* white spot) to avoid major production losses. She also mentioned that the reason she was interested in the Consultation is to learn about effective measure to control transboundary diseases from other countries.
48. *Dr. Leaño* mentioned that Myanmar, based on the 2016 production data, is top seven (previously 10th in 2014) in aquaculture production in the world. He also explained that introduction of modern aquaculture technology can cause challenges and Myanmar can learn from other countries *e.g.* Viet Nam and Thailand which experienced problems with diseases before. Learning from previous experiences of other countries can avoid major losses in cost and eventual collapse of the industry. He advised that private sectors, as well as the government, should work together to manage diseases especially in turning traditional farming systems into a modern one. He commended Myanmar as the country is now being seen as the next Viet Nam in terms of aquaculture production. He wished to have a more responsible and sustainable development of the aquaculture sector in the future.
49. *Dr. Reantaso* was pleased that private sector and the government is talking about working together. She explained how crucial the partnership is especially that aquaculture development and biosecurity is now being pursued and achieved together and not separately. She shared that in the past, stakeholders are reactive when it comes to biosecurity instead of being proactive. She commended Myanmar's effort in putting biosecurity in place parallel to aquaculture development which is the first in developing countries.

Philippines

50. *Dr. Sonia Somga*, country representative of Philippines, presented the aquatic emergency preparedness and response systems for effective management of transboundary diseases in the Philippines.¹
51. *Dr. Reantaso* commended the advancement in reporting through registrations and other established systems that were presented. However, she suggested that the data collected and reported should be used to form early warning systems. She suggested, addressed to all countries doing disease outbreak investigation, to do post-mortem activities (*e.g.* to sit down and examine what have been done during outbreaks and discuss gaps and lapses) shortly after every outbreak that had occurred. *Dr. Reantaso* then assured the participants that the Consultation is the perfect venue to discuss how to move forward in countering emerging diseases.

52. Mr. Turner, as an aquaculture farmer, shares his experience in disease outbreaks especially in TiLV. He mentioned that in Israel, the disease already exists for 10 years and probably more in the other parts of the world however it was only recently identified by using PCRs. He expressed that the process is too long because when the solution was finally found, damages in farms were already done. Subsequently, he noted that biosecurity measures *e.g.* foot and tire bath can only do so much since there's no solution for flying insects, amphibians and reptiles which are also vectors in spreading diseases. He then suggested that the government sectors to create laws and regulations based on the real experiences of farmers.
53. Dr. Reantaso, in support of the concerns expressed by Mr. Turner, expressed that authorities should be more creative in assisting the stakeholders through active producer engagement. Each country may have different ways to do things but she is hopeful that assistance could be given to producers.
54. Country representative from the Philippines noted Mr. Turner's concerns and shared that in the Philippines when farmers asked for assistance during outbreaks and by the time officers arrived the stocks are already fully-infected especially in shrimp diseases *e.g.* WSSV and AHPND that spread quite fast. What regulatory officers do following the incident is promoting the prevention of diseases and putting up biosecurity measures in the farms to control significant pathogens. She also noted that early detection is very important.
55. Dr. Leaño expressed that aquatic diseases cannot be solved alone and he then encouraged collaboration of all sectors including academe, research institution, private and the government. He cited Indonesia's operational public-private partnership that prevented the entry of APHND and TiLV.

Singapore

56. *Dr. Teo Xuan Hui*, country representative of Singapore, presented the status of aquatic emergency preparedness and response system in Singapore.¹
57. Dr. Wang suggested for Singapore to report emerging diseases to OIE-WAHIS (World Animal Health Information System) as per Aquatic Animal Code chapter 1.1, article 1.1.4. She encouraged all member countries to notify for emergent diseases because important diseases like TiLV is still not OIE-listed disease.
58. Dr. Senapin asked if Singapore has a detection method for viral disease. She mentioned that Singapore has qPCR which detected diseases in seabass, a potential economic species in the region including Thailand, hence the method could help the country for early detection of the virus. Country representative of Singapore answered in the affirmative.
59. Dr. Virapat wished to elaborate on the early warning system, particularly information dissemination, for export of ornamental fish. Country representative from Singapore explained that all exports consignments should have export permits and undergo health inspection to prove that it is free of clinical signs. Requirements of imported countries should also be completed and secured. He cited it as an early warning system for other countries (country of destination) because once detection happened during health inspection or pre-export testing prior export, it serves as a warning for them.
60. Dr. Virapat asked who receives the information (*e.g.* national focal point) on the other end and country representative of Singapore said that in the case of exportation, the country has counterparts (in-charge of export/import) in receiving countries and not the national aquatic focal point.

Thailand

61. *Miss Jaree Polchana*, country representative of Thailand, presented the aquatic emergency preparedness and response system in Thailand.¹

Viet Nam

62. *Ms. Bui Viet Hang*, country representative of Viet Nam, presented the aquatic emergency preparedness and response system in Viet Nam.¹

63. Dr. Virapat asked if the farmer is willing to provide information when diseases was detected on his farm. Country representative of Viet Nam responded that local authorities are being notified when there's diseases outbreaks. Local authorities then take samples for reporting to the province.

64. Dr. Virapat asked if farmers have positive attitude in providing information of disease outbreaks. Country representative of Viet Nam answered that farmers are not happy to share information before however, there's been a change recently upon realization that agencies and authorities are willing to help them solve the problem.

b. Technical Session 2: Plenary Presentation. Importance of aquatic emergency preparedness and response systems for effective management of transboundary disease outbreaks based on primary accounts documented at the global or regional level

65. Dr. Baoprasertkul served as moderator for technical session 2.

66. *Dr. Chris Chiesa*, Deputy Executive Director of Pacific Disaster Center, presented the "Component of Implementation Strategies for Effective Hazard Monitoring and Early Warning."¹

67. Mr. Fegan asked how to use epidemiology to assess and assign risks and other activities that will follow. Dr. Chiesa explained that in the system for hazard monitoring, factors such as hazard occurrences patterns, demographics, structures (land-area, foundation of buildings) and other categories are being considered. He explained that the same process can be applied to create early warning systems for disease outbreaks. Factors will be alternated with exposed population (*e.g.* aquatic animals), vulnerability (*e.g.* cultured species are much susceptible to diseases than the wild), among others. Monitoring activities can be create following the identification of risk factors.

68. Noting that PDC worked with the Myanmar government, Dr. Toe asked which industry was involved and if the system can be used in fish farms. Dr. Chiesa mentioned that PDC had been working with Myanmar's Relief and Resettlement Department (RRD) with the Department of Meteorology and Hydrology (DMH) as their department focal points. He also expressed his interest in working with the private aquaculture sector of Myanmar to share information.

69. Dr. Virapat asked if it is possible to develop a system, like the one developed by PDC for natural disasters, that could help in disease outbreaks, surveillance and monitoring. For example, a software that could tell history of outbreaks and mapping of existing diseases which can be updated in real-time since NACA and SEAFDEC has many member countries and information should be disseminated quickly. Dr. Chiesa believed that the system can be adopted in the described scenario. He explained that historical data and archiving are possible and that body of knowledge can be accessed by member countries in a few clicks. As for real-time monitoring, since outbreaks are being reported in a different speed as natural disaster, it

can still be reported but at a different pace. However, if standard operating procedures of member countries improved, the system can be enhanced. He also expressed his willingness to do a workshop in converting the existing software into a helpful device to monitor disease outbreaks.

70. Regarding reporting time-scale as diagnosis takes longer than identification of natural hazards, Dr. Amar asked on how can reporting be enhanced to suit PDC's system. Dr. Chiesa suggested have a level of severity, as for natural disaster the levels include informational, confirmed, etc., and it could be similar for reporting severity of diseases. All data can be mapped and patterned like how droughts is being monitored.
71. Dr. Reantaso asked whether the aspect of doing a retrospective analysis of disease reports that started 18 years ago. The reports are rich in data that could help in understanding the pattern and the trends of disease outbreaks. She mentioned that while the data is rich, the analysis of data is what was lacking in the region. Dr. Chiesa believes that the data in reports can be a good starting point in analyzing outbreak trends. It could be used to created time-series data and report incidence to map the patterns (*e.g.* season-related outbreaks) and immediately clue the causes.
72. Mr. Turner pointed the limitations of using the software as farmers tends to be afraid of reporting outbreaks especially if their farms are the disease's ground zero. He also mentioned that there's no incentive (*e.g.* funding support or in form of assistance) in reporting the outbreak which also makes farmers uncooperative. Dr. Chiesa suggested to make the software a closed system which is exclusive to farmers, decision makers, science community and other key players.
73. *Dr. Eduardo Leaño*, Aquatic Animal Health Programme Coordinator from NACA, presented "Transboundary Aquatic Animal Diseases: History and Impacts in ASEAN Aquaculture."¹
74. Mr. Turner commented that TiLV started in 2008 (Dr. Leaño chimed in saying that it was only called '*summer mortality disease of tilapia*') but was only identified in 2017. He noted that initial identification takes a long time which makes immediate response impossible. Subsequently, he suggested to find a cure, if not to stop the disease entirely, at least slow down the spreading of the virus. Dr. Leaño answered that what Mr. Turner mentioned is part of the biosecurity programs planned for ASEAN countries. He then suggested for farms to be proactive rather than reactive. He subsequently requested for farms to be more cooperative in reporting outbreaks, as some of these outbreak reports doesn't reach the right authority.
75. Mr. Fegan shared that in the early years of white spot outbreaks, the risk factors had been observed in the farm level by application of epidemiology principles before it was even identified as a virus. He suggested to give more emphasis on the application of epidemiology principle in the early stages of the disease outbreaks to hasten the response and control. Dr. Leaño agreed with the suggested.
76. Since it was established that live feed is a factor in disease transmission in the region, Mr. Fegan asked on how the exportation and trade of live feeds monitored and if it can be quarantined. Dr. Leaño said that live feeds are not being quarantined when exported to other countries. He also mentioned that live feeds are now being produced within the country such as polychaetes. However, he also mentioned that trading of polychaetes is very popular in the region without proper quarantine system. It now being speculated that AHPND was caused by trading bacteria-infested polychaetes. It is still a big discussion that needs to be addressed.
77. *Dr. Jing Wang*, OIE-RRAP in Tokyo, presented "Aquatic Animal Diseases: Trade Implication."¹

78. Mr. Fegan asked what actions can OIE take to encourage countries in fulfilling their obligation in reporting information. He also noted that there are instances where countries may not report disease outbreaks and also some instances that other institutions, aside from the government, are not allowed to report. Dr. Wang answered that OIE is not only doing passive surveillance (awaiting reports from countries) but is also doing active surveillance (scientific journals and papers from scientists). Even reports coming straight from the farmers are being scanned, confirmed through focal points in each member countries, and included in the WAHIS interface. She also mentioned that there's miscommunication between OIE focal points and the ministry or departments which is also being addressed by creating a platform (e.g. meetings) between focal points and officials to discuss OIE matters, among others.
79. Dr. Toe expressed that Myanmar was banned in exporting carps to Saudi Arabia based on OIE reports despite the diseases is non-existent in the country. Dr. Wang said that it might be a bilateral issue and she reiterated that OIE Standard only provides the guidelines in trade. In the case of Myanmar, the two countries should create a communication mechanism and bilateral meeting. She suggested that the OIE general meeting is a perfect venue for country delegates to sit together and discuss lifting the ban.
80. *Dr. Seangchan Senapin*, Deputy Director of Centex Shrimp, presented "Emergency response to emerging diseases: TiLV in Tilapia."¹
81. Dr. Miwa commended Dr. Senapin's presentation and inquired about the outbreak that occurred in 2012 with unidentified virus. He asked if this is due to the nature of the virus or the cause of mortality. Dr. Senapin that there was a significant mortality during the outbreak but there were no signs of bacterial infection.
82. Mr. Turner reiterated that the discovery or identification of new diseases in the region should be improved to hasten the aid when outbreaks once again occur in the region.
83. *Mr. Amorn Luengnaruemitchai*, aquaculture farmer from Thailand, addressed that TiLV might not be an emerging disease but was only discovered and identified once a suitable equipment became available – as gathered in the technical sessions. He also mentioned that susceptibility to diseases cannot be generalized in all species of tilapia since in his experience in production, the red tilapia is more susceptible to TiLV. In his observation, this is due to red tilapia's overproduction.
84. *Dr. Desrina Haryadi*, from the Fisheries Department of Diponegoro University in Indonesia, commended the presentation and asked it is possible for the virus to exist and not cause any mortality meaning the pathogen is not the cause of mortality but external factors did e.g. temperature, water quality, among others. Dr. Senapin answered in the affirmative. She further explained that this is what they called asymptomatic infection wherein fish appeared to be healthy but is infected with the pathogen. Mortality could be caused by genotype and poor farm management. As for TiLV, Dr. Senapin believed that a lot needs to be done in terms of research.
85. Dr. Chinabut shared that it used to be hard to find diseases in tilapia until the industry boomed. Diseases e.g. *Streptococcus* first came and was followed by other pathogens. She suggested to focus on the ways forward on how to prevent tilapia diseases. Efforts should include collaboration with both public and private sectors together with research community.
86. *Dr. Kallaya Sritunyaluksana*, researcher from BIOTEC, presented "Emergency response to emerging disease: AHPND in shrimp."¹
87. Dr. Reantaso commended the effort of Dr. Kallaya's team in establishing a network of researchers and research institutions. She suggested for the network to think on how the

scientific findings can be applied in the farm level as it adds value to the collected data. Dr. Sritunyalucksana noted of the suggestion and said that the group also realized on how to make the findings useful to the stakeholders. In fact, the group is already working with the local farmers on the device to detect white spot and AHPND through optimization process however, it was only newly introduced. There is also a schedule for some of the members to go and present the findings to the farmers. She expressed how laymanizing the findings can be difficult however it is always interesting to learn on how explain the information to them and apply the findings to their farms. Findings are also published in local (in Thai language) magazines to reach local readers.

88. Dr. Amar agreed that the practical side of the research should be disseminated to the farmers e.g. proper use of probiotics in shrimp farms. He expressed that before he thought that plasmid is only present in *Vibrio harveyi* and now was reported to exist in *Micrococcus* which means there's no guarantee that it won't transfer to other bacteria e.g. probions. Dr. Kallaya agreed with the statement.
89. Mr. Fegan expressed the need for farmers to be properly educated on what is the right probiotic to be used in different farm conditions. Dr. Kallaya agreed that it would be a good program to start.
90. Dr. Melba Reantaso, Aquaculture Officer from FAO's Fisheries and Aquaculture Department, presented two topics (1) "Risk analysis in aquaculture" and (2) "**Emergency preparedness and response and contingency plans as a component of an Aquatic Animal Health Management and Biosecurity Strategy.**"¹
91. Dr. Leñaño expressed that financial inadequacy might be the main reason why risk assessment was not conducted with this he asked if how expensive or cheap it is to do such task. Dr. Reantaso estimated the costs to USD 60,000. She suggested for countries to have basic knowledge on risk analysis even if they've hired consultants. Dr. Leñaño said that risk assessment is an investment since it costs cheaper and is easier than control the problem when it already existed.
92. Dr. Reantaso suggested for APEC member countries to approach APEC to provide support in capacity building for risk analysis.
93. For TiLV, Dr. Kua asked if which is more appropriate import risk analysis or impact risk analysis. Dr. Reantaso answered that both are important, noting that impact risk analysis is done when the risk is already there.
94. Dr. Virapat commended Dr. Reantaso for presenting useful tools for risk analysis. He requested Dr. Reantaso for advice in dealing with small-scale farmers on how to deal with risk analysis since they might lack the knowledge of the guidelines. With this, Dr. Reantaso suggested to train more extension officers as they are the link between government, science community and the fish farmers. She cited the United States of America's good training and utilization of their extension officers. She also mentioned that farmers also inherit knowledge that the government and the science community don't know yet still they should learn the basic of risk analysis since diseases constantly changes.
 - c. **Technical Session 3.** Workshop to identify gaps, policy recommendations, and priority areas for R&D collaboration to address these gaps
95. The participants were divided into three groups for discussions. The workshop was facilitated by Dr. Reantaso, co-facilitated by Dr. Leñaño and assisted by Dr. Amar. Leaders of each group presented the findings during discussions.¹

96. Dr. Reantaso then summarized the findings as part of the way forward.

IV. Closing sessions

97. Mr. Sato delivered the closing remarks and officially closed the Consultation.

¹ Presentations are available on <https://www.seafdec.org.ph/2018/asean-rtc-on-aeprs/>

WAY FORWARD

Dr. Melba Reantaso

The overall objective of this technical consultation is to bring together the representatives of ASEAN Member States and technical experts to examine the status of aquatic emergency preparedness and response systems currently being practiced in the region in order to identify gaps and other initiatives for regional cooperation. In general sense, Dr. Reantaso commented that the RTC is successful in achieving the general objective.

As for the specific objectives, (a) to assess existing laws, legislations and standard operating procedures (SOPs), among others had been partially achieved. This is because the consultation didn't assess but was only informed (through the reports of country representatives) of the current situation ASEAN member countries. The way forward of this is to complete the EPRS audit questionnaire as basis of the more systematic assessment. The second objective is (b) to assess the need for a regional aquatic EPRS in the ASEAN, the participant voted in the affirmative. The way forward of this is to create an ASEAN guidelines including the mechanics. The third objective is to (c) enhance cooperation among Member States, regional/international organizations and other relevant stakeholders on initiatives that support aquatic EPRS for effective management of aquatic animal disease outbreaks. This objective has been achieved. The way forward for this is to get the same people for a planned and proposed consultation II for continuity and for emphasis on more private sector and academe representation.

During the two full days of consultation, the following information were gathered:

1. Common issues presented are on communication, funding, stakeholder consultation, risks analysis, and lack of information, planning and system. Dr. Reantaso mentioned that these should be captured in the report of the consultation and in the proposed ASEAN guidelines on EPRS as part of the situational analysis and guiding principles.
2. Regular meetings, more funding, and trust between government and private sectors in disclosing information are the top recommendations in establishing a functional and effective engagement on EPRS between government, producers and academic sectors.

Plan of action

1. To complete the EPRS audit questionnaires as basis for a systematic assessment which will be done by SEAFDEC/AQD and member countries.
2. To develop the ASEAN EPRS guidelines including the mechanics which will be led by SEAFDEC/AQD, supported by ANAAHC and Consultation partners. The process of the developing the guidelines are the following:
 - a. Use the analysis as a reference point
 - b. Form a working group that will develop the scope and content. The zero draft will be circulated to participants including external experts (peer review)
 - c. Information, analysis and synthesis in the working group matrix will be captured in the guideline either in the situational analysis or guiding principle or actual guidelines.
 - d. Organize a writeshop to popularize and refine the guidelines including country-level implementation and monitoring
3. To organize a part two of the consultation to present the guidelines for refinement and consensus. It is also recommended that the consultation II will not be limited as a workshop but will be an actual capacity building on preliminary guidelines implementation. The following themes are suggested:
 - a. Simulation exercise;

- b. Database registry analysis of surveillance data, experts, laboratories, preparation of contingency plans for high-profile disease, aquatic epidemiology, risk analysis pathology, etc. including private sector leads;
 - c. This is will be taken to ASEAN process for endorsement and approval
- 4. To get the same people for a planned and proposed consultation II for continuity and for emphasis on more private sector and academe representation. It was suggested to keep the AEPRS network including member countries, producers, academe and institutional partners. ANAAHC and the member countries will be responsible of this.
- 5. In order to accomplish the aforementioned plans, the consultation should develop a concept note or proposal to member countries, donors and explore new ways for resource generation and mobilization to support all activities. This will the responsibility of member countries and Consultation I partners.



ASEAN Regional Technical Consultation on Aquatic Emergency Preparedness and Response Systems for Effective Management of Transboundary Disease Outbreaks in Southeast Asia

20-22 August 2018

Centara Grand Central Ladprao

Bangkok, Thailand

**Draft Regional Technical Guidelines for Early Warning System
for Aquatic Animal Health Emergencies**

1. BACKGROUND AND INTRODUCTION

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.

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.

2. AIM 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 guidelines 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 guidelines was based on the analysis of the FAO Emergency Preparedness and Response Systems audit for aquatic animal diseases completed by the AMS.

3. TERMS AND DEFINITIONS

Aquaculture

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

Aquaculturist

A person who engages in the aquaculture.

Competent Authority (CA)

A body or organisation legally qualified or sufficient to perform an act such as regulation, organisation, certification, and etc.

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 neighbouring borders.

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 (FHO)

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

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.

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.

4. ROLES AND RESPONSIBILITIES

4.1. Competent Authority (CA)

The CA is 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.

4.2. Fish Health Officer (FHO)

The FHO is 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.

4.3. 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.

5. 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) Consultation done semi-annual meetings with aquatic animal health professionals and relevant agencies, academe, researchers, industry representatives.
- e) There is direct line of communication from the regional counterparts to the national authority for reporting suspected disease agents of concern.

6. OPERATIONAL COMPONENTS

6.1. Early Warning System

- a) CA monitors aquatic animal disease occurrence/outbreak in other countries (such as through the internet, scientific literatures, aquatic animal health newsletters, e-mail discussion groups, conference attendance) and relay the information to local aquaculturists.
- b) CA checks and reports disease occurrence/outbreak to Network of Aquaculture Centers In Asia Pacific (NACA) or World Organization for Animal Health (OIE).

6.2. 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.

6.2.1. Risk analysis

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

6.2.2. Disease surveillance

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

6.3. Early Response System

- a) At pond/farm level
 - i. Aquaculturist, FHO, fisheries extension officers introduce measures to contain or control disease prior to disease diagnosis
 - ii. Aquaculturist provides FHO or CA with information on disease signs, as well as any movement of live animals prior to disease occurrence/outbreak.
 - iii. 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.
 - iv. 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
 - v. FHO or CA coordinates control measures between farmers, both affected and non-affected.
- b) At national level
 - vi. CA confirm the disease diagnosis with the reference laboratory
 - vii. CA identifies risks factors based on reported disease scenario
 - viii. CA defines disease zones based on data from reporting laboratories
 - ix. CA initiates information, education and communication (IEC) campaign
 - x. CA recommends Contingency Plans

7. COMPONENTS OF CONTINGENCY PLANS

A contingency plan is 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 infectious diseases of significance to aquatic animal productivity and/or market access. Contingency plans are refined on a regular basis through simulation exercises and personnel are trained in their individual roles and responsibilities.

7.1 Summary document

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

7.2. Support plans

7.2.1. Financial

- a) Necessary budget allocation for the emergency response is included in the annual budget.
- b) The national authority provides resources for preparedness and response activities.
- c) There is no system to compensate farmers on losses due to mandatory destruction.

7.2.2. Resource

- a) Resource plans and access to personnel/equipment/analysis from other laboratories are arranged, in advance; to avoid wasting time seeking approvals or negotiating conditions when an emergency is underway.
- b) Technical expertise in aquatic disease controls are available, but limited. Included as part of staff function.

7.2.3. Legislation

Applicable laws, regulations, guidelines and standards that concerns control measures during emergencies are available.

7.2.4. Other agencies

A major outbreak of a rapidly spreading, highly pathogenic disease may require the collaboration between different governmental departments and agencies, key private-sector organizations, and regional or international assistance and expertise.

7.3. Operational capability

7.3.1 Response management manuals

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

7.3.2 Diagnostic resources

- a) Technical expertise in aquatic disease controls are available, but limited. Included as part of staff function.
- b) There are new staff/veterinarians hired that still needs to be trained since they lack knowledge in aquaculture and aquatic animal health.
- c) Continuous staff development is in the program.

7.3.3 Training resources/ field personnel

- a) FHOs prior to designation are required to 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.

7.3.4 Awareness and education

FHOs 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.

7.3.5 Simulated response exercises

SOP's are being followed by the Fish Health Officers and Quarantine Officers in performing their tasks.

7.4 Technical plans

The CA prepares 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 must include the private-sector for a cohesive coordination of effort.

7.4.1 Control Centers Management Manual

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

7.4.3 Destruction manual

The Destruction manual 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.

7.4.4 Disposal manual

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

7.4.5 Disease strategy manuals

Disease strategy manuals are a series of manuals that provide specific information needed for the recognition and control of individual diseases.

7.4.6 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.
- b) Alternates are designated and should be 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 are incorporated into the normal job description of key individuals.
- d) Personnel involved are authorized through Fisheries Office Order issued by the bureau Director.

8. Recovery from an emergency disease

8.1 Verification and international acceptance of disease freedom

- a) Prove that the affected population has regained freedom from the disease agent.

- b) Demonstrate that the country has a capable aquatic animal health service and relevant disease surveillance programs.
- c) Implement targeted surveillance using scientifically proven laboratory tests for both clinical and subclinical infections.
- d) Provide surveillance data as evidence of an effective surveillance program and diagnostic testing.

8.2 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.