

# Emergency Preparedness and Response System in Indonesia

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## Abstract

The Competent Authority (CA) on aquatic animal health in Indonesia is the Directorate Aquaculture Area Development and Fish Health of the Directorate General of Aquaculture (DGA) under the Ministry of Marine Affairs. CA is supported by national reference laboratories and professional human resources that are capable of fish disease diagnosis; as well as an established network with the farmers, trading association, and relevant stakeholders which are actively involved in national meetings, conferences, socialization of emerging diseases and policy and regulation. To control transboundary fish disease at national level, the government of Indonesia has a National Strategy on Aquatic Animal Health and Environment, which was developed by FAO under project of TCP/INS/3402: 2013-2015) collaboration with DGA, Ministry of Marine Affairs and Fisheries (MMAF). To strengthen the implementation of aquaculture in the country, the Indonesian Government issued President regulation Number 28 in 2017 which includes the implementation of fish health management as well as emergency response (Section VI, Article 60). To support the implementation of EPRS, Special Task Force Teams are formed by the Director General of Aquaculture.

Stakeholders' participation is very important in the implementation of EPRS, such as a prompt report by fish farmers and extension officer to the upper level fisheries officers at district, provincial, and national level of any observed unusual mortality that indicates disease outbreaks. EPRS activities consist of emergency response on early warning (disease information, disease preventing guideline and regulation); early detection (surveillance, appointed diagnostic laboratory); and early response (collecting information, task force formation, public awareness). Standard Operational Procedures, and detection and control were done based on published scientific information available and guidelines from World Organisation for Animal Health (OIE), Network of Aquaculture Centres in Asia-Pacific (NACA) etc. Passive and active surveillance was done on major transboundary diseases in Indonesian regions including KHV, TiLV, AHPND, WSSV, and IMNV.

## Introduction

Emergency Preparedness and Response System on aquatic animal disease is very important for Indonesia in order to protect aquaculture production since Indonesia is second top aquaculture producer in the world after China (FAO, 2016).

The objective of the emergency preparedness and response system is to prevent the transboundary or emerging aquatic animal disease entering and spread out within Indonesian territory.

Implementation of aquatic animal emergency preparedness and response system in Indonesia is regulated with the issuance of Government Regulation No. 28 /2017 concerning Aquaculture, Article 60 which states that "Emergency response thus involves such activities as (i) contingency planning; (ii) emergency response actions; and (iii) emergency response evaluation."

Contingency planning is recorded in an aquatic animal disease contingency plan which 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 disease of significant impact to aquaculture productivity and market access. Contingency plan includes four aspects namely (i) Task force organization structure; (ii) Early warning system; (iii) Early response system; and (iv) Standard operational procedures.

Emergency response actions are activities done during emergency situation, that include (i) Creation of Task force Team; (ii) Early warning; (iii) Early detection; and (iv) Early response.

Evaluation of emergency response implementation should be done for improving the upcoming emergency response implementation.

Currently, the operational regulations are being drafted by the Minister of Marine Affairs and Fisheries Regulation as a derivative regulation from Government Regulation No. 28, year 2017 concerning Aquaculture.

## Early Warning System

(1) National Competent Authority's (CA) monitoring system/mechanism on emerging/existing transboundary diseases.

Directorate General of Aquaculture (DGA) under the Ministry of Marine Affairs and Fisheries Indonesia is the government agency who has responsibility on all activities dealing with aquatic animals, such as aquaculture production, aquaculture technology, aquaculture inputs and infrastructures (seeds, feeds, pond, net cages, canals, etc.), broodstock improvement, ornamental fishes, aquatic establishments, aquaculture business and license, health management regarding fish diseases, medicines, residue, laboratory, environment aspect, Antimicrobial Use and Antimicrobial Resistance (AMU/AMR) as well as management of aquatic animal emergency disease preparedness and response system.

The organization structure scheme of Directorate General of Aquaculture is illustrated in Figure 1.

DGA has close cooperation with the other agencies such as Fish Quarantine Inspection Agency (FQIA), Research, Development and Extension Agency (RDEA) and also supported by 15 DGA Technical Implementing Units (DGA-TIU) laboratories under Ministry of Marine Affairs of Fisheries, Province/District Government and other stakeholders such as Association of shrimp/fish farmer, hatchery and processing plan, input production companies (feed, medicines, etc.) and also supported by 15 DGA Technical Implementing Units (DGA-TIU) laboratories, FQIA Technical Implementing Units (FQIA-TIU) laboratories and RDEA Technical Implementing Units (RDEA-TIU) laboratories. Location of DGA-TIU as seen in Figure 2.

There are 47 units of aquatic animal disease laboratories under the FQIA-TIU and 3 units aquatic animal disease laboratories under RDEA-TIU. Location of FQIA-TIU laboratories and RDEA-TIU laboratories are illustrated in Figure 3.

(2) Networking mechanisms of the national competent authority with trading partners. Early warning at the national level consists of advance knowledge of transboundary, emerging and high-risk diseases which could threaten national biosecurity before pathogens enter national territory.

Early warning depends on the CA having information on current disease situation in the Indonesian region, trading partners and new

emerging aquatic animal diseases occurring on a worldwide basis. Early warning thus involves such activities as:

1. Developing good communication linkages and working relationships with the responsible authorities of primary trading partners;
2. Contributing to, and frequent checking of regional and international disease reporting systems and database;
3. Communicating with key aquatic animal health researchers in primary trading – partner countries and on a worldwide basis through such as aquatic animal health newsletters and e-mail discussion groups and attendance at regional and international meetings and workshops where new disease outbreak occurrences are reported.

DGA maintains early warning system by supporting staff to attend meetings and regional/international workshops in case of occurrence of new disease, communicate with researchers in other countries, regular checking of local/regional/international disease report databases, scientific literatures and newsletters, accessing NACA, OIE or other websites, communicate with CA of trading partners in cases serious disease or pathogen is detected from imported aquatic animals, and regular reporting of disease situations to regional and international systems.

For live aquatic animal/product movement within and between country territories, the Fish Quarantine Agency is responsible. It actively exchanges information on disease incidences with aquatic animal commodity trading partner countries through Mutual Recognition Agreement (MRA).

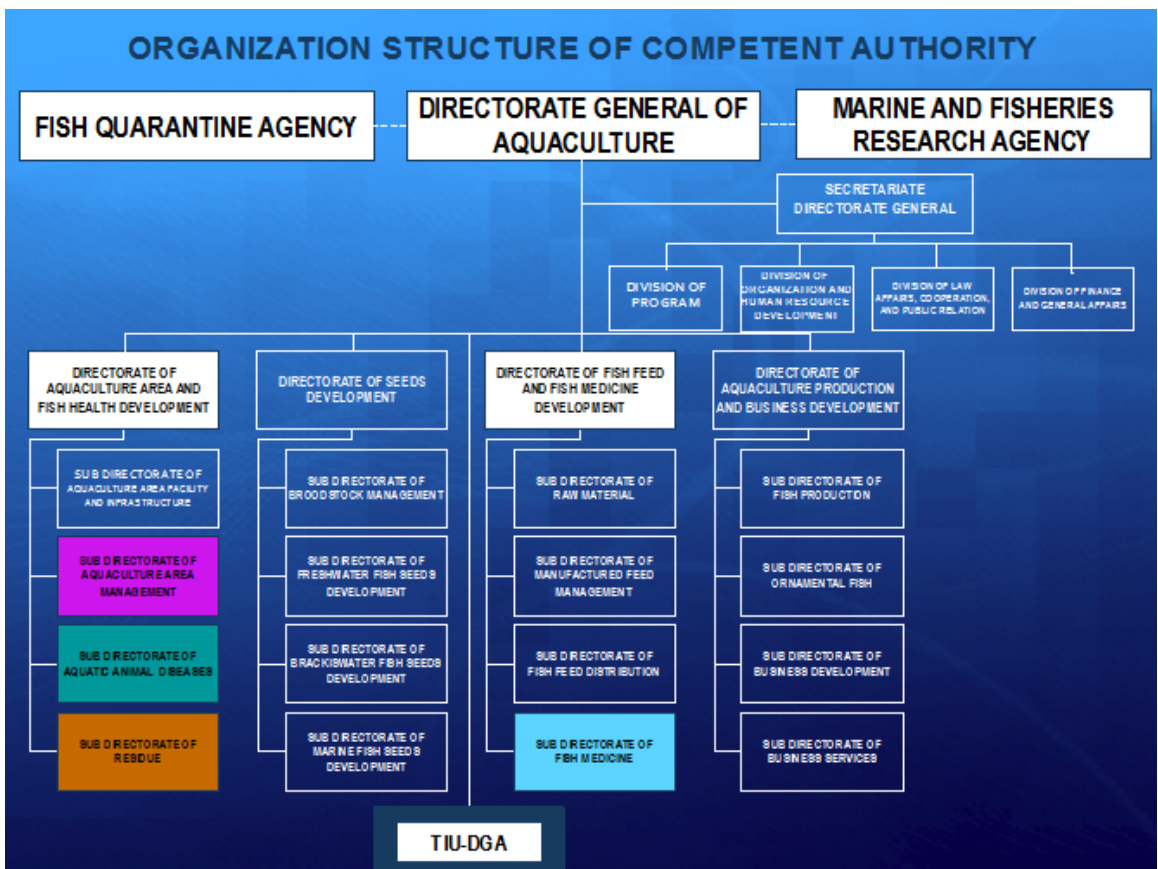
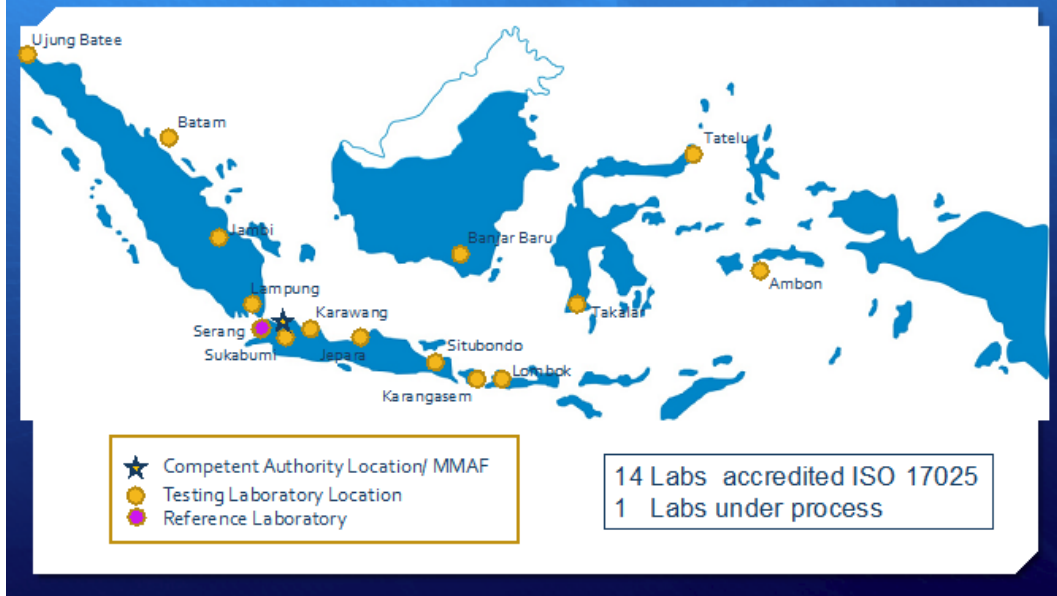


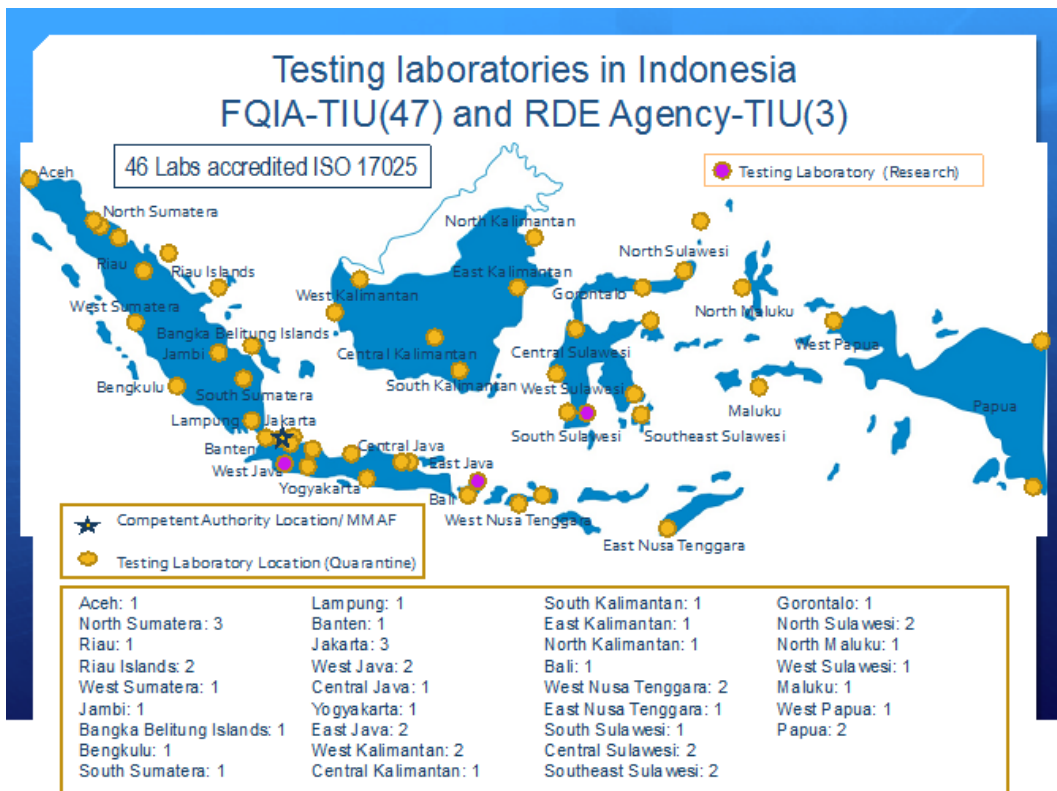
FIGURE 1. Organization Structure of Directorate General of Aquaculture as Competent Authority

## Reference and Testing laboratories (Directorate General of Aquaculture-TIU)



**FIGURE 2.** Location of DGA-TIU laboratories

## Testing laboratories in Indonesia FQIA-TIU(47) and RDE Agency-TIU(3)



**FIGURE 3.** Location of FQIA-TIU and RDEA-TIU

## Early Detection System

The objectives of an early detection is to ensure detection of the introduction of, or sudden increase in the incidence of, any disease of aquatic animal that has the potential of developing to epizootic proportions and/or causing socio-economic consequences.

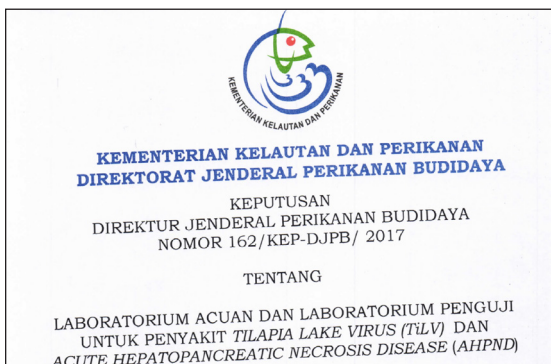
Early detection are the activities done in order to know the status of an emerging disease rapidly in the Indonesia territory within the shortest possible time frame. Some activities relating to early detection at least include:

1. Providing information about fish diseases occurrence
2. Updating laboratory testing method
3. Conducting passive/active surveillance for fish disease detection purpose
4. Preparing diagnostic capability
5. Providing list of laboratories and experts
6. Providing reporting system

Indonesia has listed Acute hepatopancreatic necrosis disease (AHPND) and Tilapia Lake Virus (TiLV) as emerging diseases. Related to this, Director General of Aquaculture was appointed reference and testing laboratories for TiLV and AHPND based on Director General of Aquaculture Decree Number: 162/KEPDJPB/2017 (Figure 4).

### Personnel competencies on recognition and reporting of a disease emergency

The front line of aquatic diseases control consisted of aquatic diseases diagnostic technician, aquaculture extension officers, researchers at various research centres and scientist at universities.



**FIGURE 4.** Director General of Aquaculture Decree Number: 162/KEPDJPB/2017

DGA actively educates farmers and all stakeholders involved in aquaculture (small-scale farmers, industries, food and aquatic medicine traders, government official and extension service officers) by means of flyers, open seminars, socialization seminars and internal meetings.

Fish farmers in Indonesia have long experienced dealing with disease-related problems and are highly aware of the vulnerability of the industry to diseases. For example, shrimp farmers are well aware of the significance of early disease detection and control to mitigate the impact on the industry. Nowadays, farmers recognize many aquatic transboundary diseases and report unusual mortality or morbidity during production to competent authority by: (1) directly, through short text message and using online application and (2) indirectly, through extension service and nearest laboratory by national fish diseases information system.

Fish farmers in Indonesia exist at the lowest level (fish farmer group, in district/village level) to national level (fish farmer associations) that enables two-way communication between government and farmers. In addition, provincial and district aquaculture production ventures have their own officers and laboratories (usually Level I and II laboratories) for aquaculture disease diagnostics and control; and act as liaison between farmers and competent authority at higher level.

Fish diseases diagnostic laboratories in Indonesia work in cascading fashion according to its level. Level III laboratories are national reference laboratories and directly supervised by DGA. These laboratories are situated in Java Island where most of big aquaculture activities are situated. Laboratories at the provincial and district levels are usually categorized as Levels I and II laboratories. Export-oriented shrimp farms developed their own laboratories and trained shrimp disease specialist.

The educational background skill and knowledge of staff in each laboratory are varied and mostly have bachelors degree, with a few staff with post graduate degree in fish diseases, biotechnology and veterinary. There are 15 fish health and environment laboratories under the DGA, 47 laboratories under the Quarantine Agency, three laboratories under Research, Development and Extension Agency and 75 laboratories under the Local Government (mostly Level 1 focused on



water quality monitoring). In general, the national reference and provincial laboratories have aquatic animal health professionals and veterinarians as well as competent staff to meet the accurate and rapid detection requirement.

### Standard Operating Procedures

Disease awareness of farmers and officers involved in aquatic diseases control is one of the top priorities of DGA. In addition to the methods mentioned above, fish disease awareness at farmers' level is achieved by personal approach according to the local social condition. Usually, when a disease outbreak is suspected, farmers will report to extension officers and laboratory personnel at district level. However, a pilot project for diseases reporting using internet-based system was introduced recently. Through this mechanism, farmers can directly report to CA through SMS gateway, phone and website. This system gave positive results but needs improvement. The standard operating procedures for national diseases reporting and response is presented in Figure 5 below.

### Surveillance System

National fish diseases surveillance and monitoring was established, supported by (i) annual planning for aquatic animal diseases surveillance and

monitoring; (ii) online reporting for regular reporting through Monitoring Fish Disease System Software (SSMPI) and fast tracked through Indonesian Aquatic Animal Diseases Alert System (IAADAS); (iii) appointed diagnostic laboratory based on DGA Decree (2017). In order to support laboratory capacity, some activities are done such as (i) regular training; (ii) twinning program with OIE Reference Laboratory, (iii) proficiency test towards several types of fish disease (IMNV, WSSV, VER, EHNV) collaboration with Australian Centre for International Agricultural Research (ACIAR) and NACA.

Surveillance, monitoring and reporting of aquatic animal diseases is regularly done starting from annual aquatic animal surveillance and monitoring plan, set up of aquatic animal diseases concern, commodities and target location, appointed reference and testing laboratories and reporting. The steps in the surveillance, monitoring and reporting of aquatic animal diseases are illustrated in Figure 6.

### Disease Reporting System

Results of aquatic animal disease surveillance and monitoring are reported through on line Software System Monitoring Penyakit Ikan (SSMPI). The system is illustrated in Figure 7.

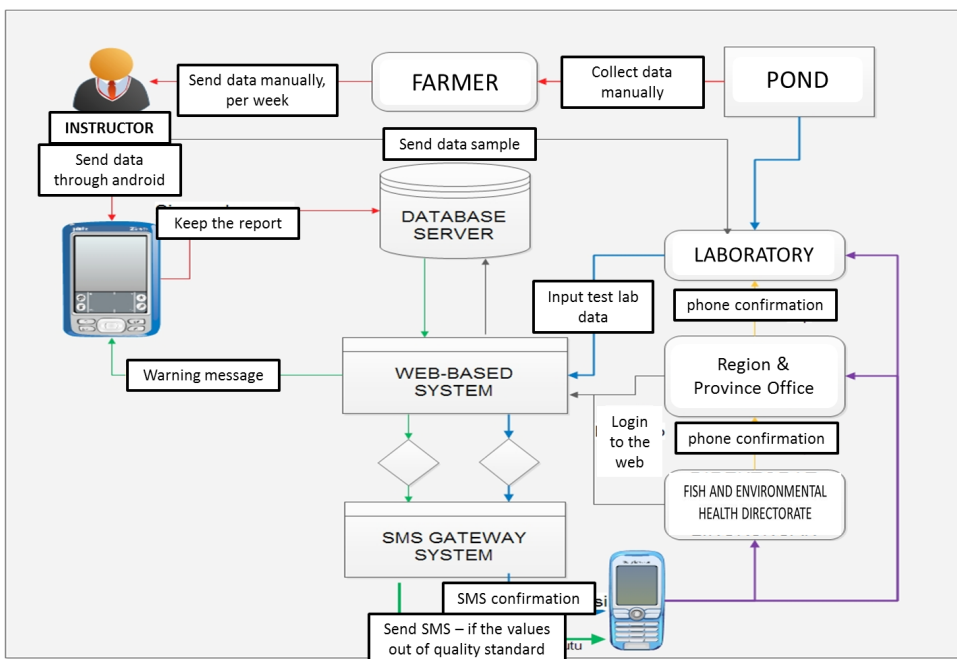


FIGURE 5. The flow of fish disease fast track report system through SMS Gateway

# Surveillance, Monitoring and Reporting

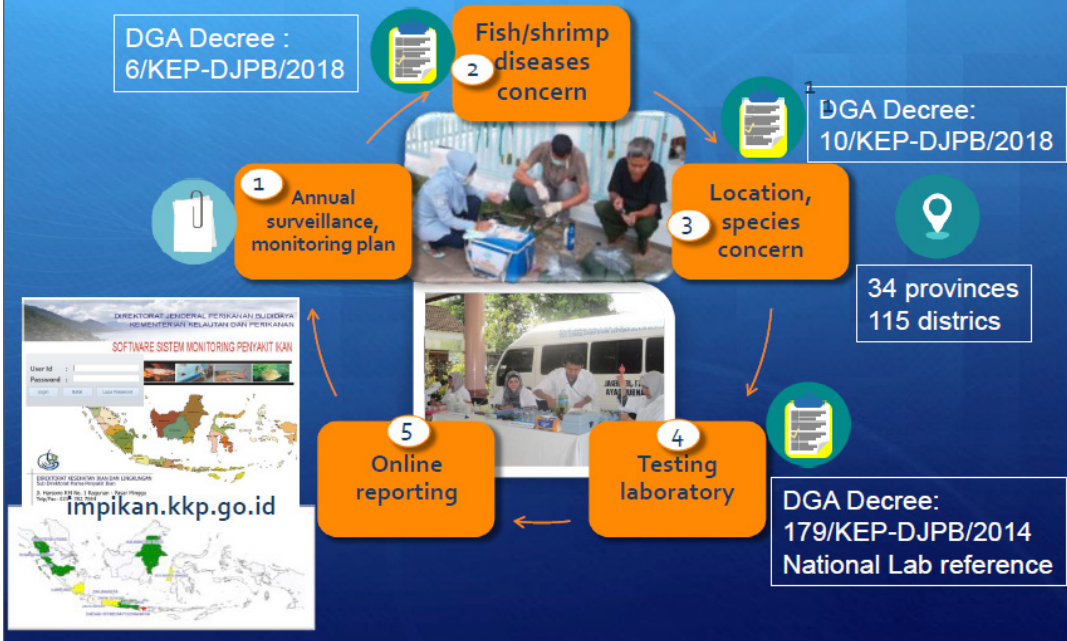


FIGURE 6. Surveillance, monitoring and reporting routes of aquatic diseases in Indonesia

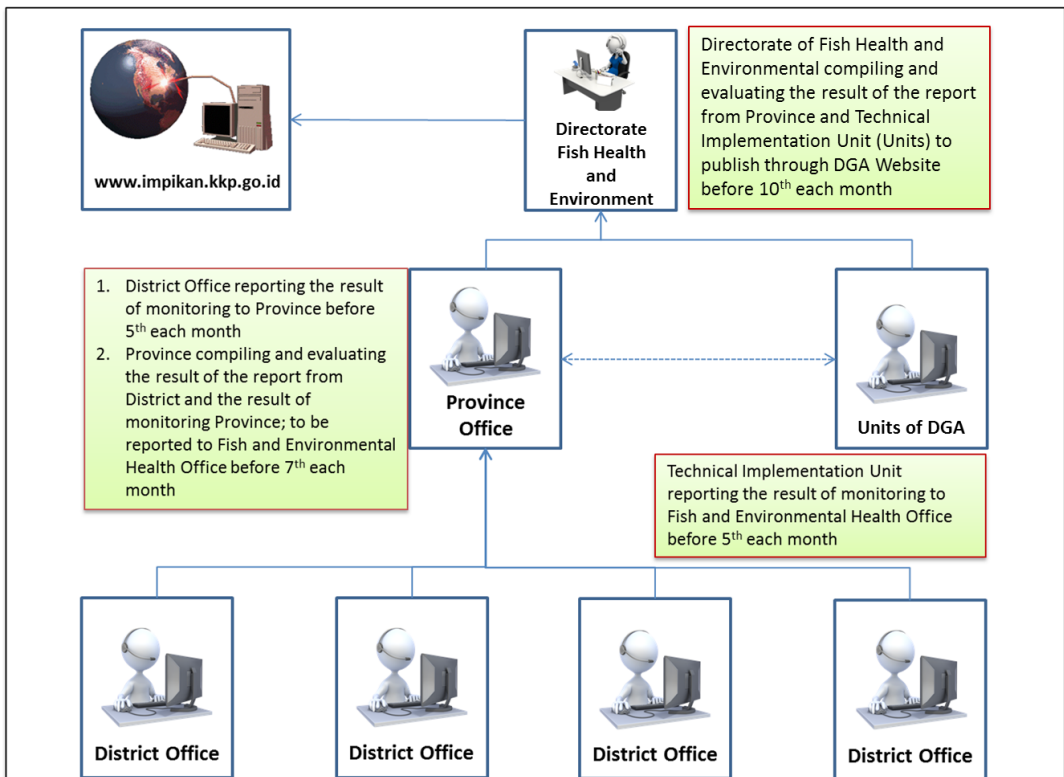


FIGURE 7. The flow of reporting the result of Surveillance and Monitoring Fish Disease through SSMPI ONLINE

## Early Response System

### Task Force Team

In order to support emergency response implementation, DGA establish Task Force Team following work flow as seen in Figure 8.

In case of emergency response for the emerging diseases such as KHV in 2002, EMS in 2013 and AHPND and TilV in 2017, DGA had established the Task Force. In 2017 establish Task Force on Tilapia Lake Virus (TiLV) and Acute Hepatopancreatic Necrosis Disease (AHPND) based on Director General of Aquaculture Decree No. 165/KEP-DJPB/2017 as seen in Figure 9.

DGA plays a central role in gathering all aquaculture stakeholders and formulating the emergency response. Member of Task Force Team consist of:

- Quarantine Agency
- Research, Development and Extension Agency
- University
- Association (shrimp farmer, hatchery, shrimp feed, processing plant, medicine and other input production)
- Expert

## Public awareness

Public awareness of fish disease outbreaks is very important for farmers and stakeholders. They must be able to understand how to prevent outbreaks, treat it, and eradicate diseases so that they can by themselves minimize mortalities, economic losses and spread of disease to other ponds or farms. Improvement of public awareness has been carried out through national seminars / workshops, public counseling, and dissemination of brochures and leaflets in central aquaculture production in the Indonesian region.

A Workshop on EMS was conducted in 2013 in 12 provinces namely: West Kalimantan, Lampung, North Kalimantan, North Sumatera, West Java, Banten, Central Java, DI Yogyakarta, East Java, Bali, South Sulawesi and West Nusa Tenggara.. The workshop was conducted to update on the the status of the emerging disease EMS, understand why outbreaks occur in other countries, and how to prevent tEMS occurrence through the proper implementation of biosecurity measures at national, local and farm levels.

In 2014, public awareness on White Faeces Disease (WFD) was carried out in 7 provinces, namely: Central Java, North Sumatera, West

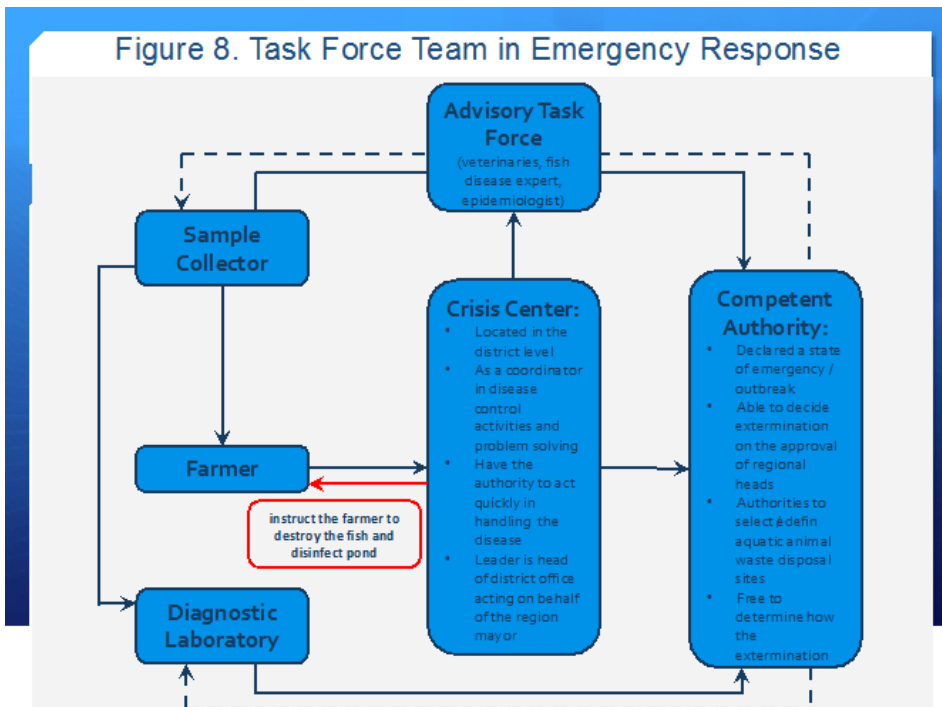


FIGURE 8. Task Force Team in emergency response



Java, DI Yogyakarta, South Sulawesi, East Java, and Lampung to update on the status of WFD in Indonesia and how to well manage WFD outbreak to reduce economic losses, eradication actions in case of outbreak in ponds as well as proper implementation of biosecurity measures.

In 2017 a public awareness seminar on Tilapia Lake Virus (TiLV) held in Jakarta was attended by 100 participants from 7 provinces: Jambi, South Kalimantan, West Java, Central Java, DI Yogyakarta, Banten and East Java. The seminar aimed to update on the status of TiLV outbreaks

in different countries, to understand the hazards and risks of TiLV, and how to prevent TiLV disease from occurring in ponds and tilapia farms.

The workshop and seminar were a collaboration between the government and the private sector; the budget came from government funds with contributions from the private sectors. During the national workshops/seminars, aside from sharing information and discussions, leaflets and brochures were also distributed that provided information on diseases such as shown in one of the pictures in Figure 10.



**FIGURE 9.** Director General of Aquaculture Decree No. 165/KEP-DJPB/ 2017 concerning Task Force Team on TiLV and AHPND



**FIGURE 10.** Workshop and seminar as public awareness on AHPND, WFS and TiLV

## **Standard Operating Procedures (SOP)**

For the early detection and proper response to an emerging disease outbreak, an updated, accurate and simple SOP is very essential. This SOP is prepared by experts, government officers and stakeholders by adopting existing SOP's, up-to-date technology and regional/international recommendations. SOP's are prepared in a format that is easily understood and implemented by all relevant personnel.

An example of a Standard Operating Procedure provided in support of the implementation of emergency response is presented below:

- Farm investigation
- Collecting, preserving and transporting samples
- Disease diagnostic
- Disease prevention and control
- Disease treatment
- Eradication
- Rehabilitation

## **Reference**

FAO, 2017 Guidelines for emergency preparedness and contingency plan on shrimp diseases in Indonesia, 53 p.

FAO, 2017 Aquatic Animal Health Information System on Infectious Myo Necrosis Virus (IMNV), 21 p.

Indonesian Government Regulation Number 28/2017 concerning Aquaculture.