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A SURVEY OF NATIONAL EMERGENCY PREPAREDNESS AND RESPONSE (EPR) SYSTEMS
FAO PROJECT TCP/INT/3501: STRENGTHENING BIOSECURITY GOVERNANCE AND CAPACITIES FOR DEALING WITH THE SERIOUS SHRIMP INFECTIOUS MYONECROSIS VIRUS (IMNV) DISEASE

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PREPARATION OF THIS DOCUMENT

This document details the outcomes of a survey conducted as part of the *Workshop on Emergency Preparedness and Response and Contingency Planning,* held from 1-5 November 2017 in Beijing, China, under the FAO Project TCP/INT/3501: Strengthening biosecurity governance and capacities for dealing with the serious shrimp infectious myonecrosis virus disease (IMNVD).

Prior to the workshop, an aquatic animal emergency disease preparedness and response (EPR) system self-assessment questionnaire (see Appendix 1) was sent to each participating country, namely, Brazil, China, Ecuador, Indonesia, Mexico and Thailand. Draft findings of the questionnaire were presented at the above workshop and finalised following information gathered at the workshop and additional feedback from each country on the draft report.

This report analyses information provided of the status of country EPR systems in the three Asian and three South American countries and makes recommendations to be considered by countries in these regions and more broadly.

ABSTRACT

As part of the FAO project *Strengthening biosecurity governance and capacities for dealing with the serious shrimp infectious myonecrosis virus (IMNV) disease*, the FAO undertook a self-assessment questionnaire-based survey of the aquatic animal diseases emergency preparedness and response (EPR) systems of six participating countries, Brazil, Ecuador and Mexico (representing South/Central America) and China, Indonesia and Thailand (representing Asia), with a view to developing recommendations for improved performance.

Current system strengths and weaknesses were identified by comparing each country's EPR system elements against those elements needed for a comprehensive (ideal world) EPR system based on FAO and OIE publications (and the model used in Australia). The questionnaire covered three broad systems components: administration (e.g. resource allocation and legislation), operational components (including early warning, early detection and early response systems) and operational support systems (such as information management and communications systems). The questionnaire was structured into four sections: (1) general administration, (2) operational components, (3) support systems and (4) additional information. Section 1 (General Administration) contained questions aimed at generating information on the administrative structure and the scope of responsibilities of the Competent Authority on various elements (e.g. communication, risk analysis, contingency plan, personnel skills, etc.) that are essential when dealing with an aquatic emergency response. Section 2 (Aquatic EPR System Elements) contained questions on the priority system elements identified by the OIE; namely, early warning, early response and early detection systems. Section 3 (Support Systems) contained questions about broader supporting systems in relation to legislation, information management, communications and resourcing. Section 4 (Additional information) presented an opportunity for countries to provide any information or raise issues not adequately addressed in the questionnaire.

The self-assessment survey provided insight into each country's capabilities in terms of policies, procedures and institutional capabilities in place to detect the incursion of an emergency aquatic animal disease and to respond to that incursion by containing or eradicating the disease. Six key areas of need where EPR systems were not well developed included the following: stakeholder consultation, systems audit/review, simulation exercises, education/awareness building, documentation and dedicated resourcing. Analysis of the survey responses form the basis of 20 recommendations aimed at improving the administration and operation of national EPR systems with respect to early warning, early detection and early response to emergency aquatic animal disease incursions.

CONTENTS

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ABBREVIATIONS AND ACRONYMS

AHPND	Acute hepatopancreatic necrosis disease
ANQAP	Australian National Quality Assurance Program
AQUAVETPLAN	Australian Aquatic Veterinary Emergency Plan
BOF	Bureau of Fisheries (China)
CAAHRI	Coastal Aquatic Animal Health Research Institute (Thailand)
CFRDCs	Coastal Fishery Research and Development Centers (Thailand)
CNA	Brazilian Confederation of Agriculture and Livestock
CONASA	National Advisory Council on Animal Health
DINESA	Mexico's National Emergency in Aquaculture/Animal Health Device
DLD	Department of Livestock Development (Thailand)
DOF	Department of Fisheries (Thailand)
EPR	Aquatic animal emergency disease preparedness and response
FAO	Food And Agriculture Organization Of The United Nations
IAADAS	Aquatic Animal Disease Alert System (Indonesia)
IAAHRI	Inland Aquatic Animal Health Research Institute (Thailand)
IFRDCs	Fisheries Provincial Offices, Inland Fishery Research and Development Centers (Thailand)
IMNV	Infectious Myonecrosis Virus
INP	National Fisheries Institute of Ecuador
ISO	International Organization for Standardization
KHV	Koi herpesvirus
LAB-EPA	Ecuador's Laboratory of Aquatic Use Products
MAGAP	Ministry of Agriculture, Livestock, Aquaculture and Fisheries (Ecuador)
MAPA	Ministry of Agriculture, Livestock, and Supply (Brazil)
MOA	China's Ministry of Agriculture
NAAHS	National biosecurity and Aquatic animal health strategies
NACA	Network of Aquaculture Centers in Asia-Pacific
NFTEC	National Fishery Technology Extension Centre (China)
NPC	National Project Coordinator
OIE	World Organisation for Animal Health
QAAD	Quarterly aquatic animal disease
SENASICA	Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (Mexico)
SINEXE	Sophisticated integrated information management system (Mexico)
SIVE	National Epidemiological Surveillance System (Mexico)
SOP	Standard operating procedure
TCP	Technical Cooperation Programme
WSSV	White spot syndrome virus

INTRODUCTION

The self-assessment questionnaire was designed to understand each country's capacity to mount an effective response in the event of an emergency aquatic disease outbreak. The questionnaire delved into the systems elements needed for a comprehensive (ideal world) aquatic animal diseases emergency preparedness and response (EPR) systems based on relevant publications of the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE) and the model used in Australia, i.e. .FAO and OIE publications, and the Australian Aquatic Veterinary Emergency Plan (AQUAVETPLAN), with a view to identifying areas for potential country level improvements.

The questionnaire was structured into four sections: (1) general administration, (2) operational components, (3) support systems and (4) additional information. Section 1 (General Administration) contained questions aimed at generating information on the administrative structure and the scope of responsibilities of the Competent Authority on various elements (e.g. communication, risk analysis, contingency plan, personnel skills, etc.) that are essential when dealing with an aquatic emergency response. Section 2 (Aquatic EPR System Elements) contained questions on the priority system elements identified by the OIE; namely, early warning, early response and early detection systems. Section 3 (Support Systems) contained questions about broader supporting systems in relation to legislation, information management, communications and resourcing. Section 4 (Additional information) presented an opportunity for countries to provide any information or raise issues not adequately addressed in the questionnaire.

A national aquatic animal emergency disease preparedness and response (EPR) system comprises the policies, procedures and institutional capacities and capabilities in place to detect the incursion of an emergency disease into a country and to respond to that incursion by containing or eradicating the disease.

FAO encourages Member Countries to develop and formalize national biosecurity and aquatic animal health strategies (NAAHS) and health management procedures (FAO 2007). A NAAHS, a broad yet comprehensive strategy to build and enhance capacity for the management of national aquatic biosecurity and aquatic animal health, contains the national action plans at the short-, medium- and long-term using phased implementation based on national needs and priorities.

The technical elements that may be considered in the strategic framework will vary depending on an individual country's situation, and thus may not include all the programme elements listed below (alternatively, additional programmes may be identified as having national and/or regional importance and thus need to be included):

i. Policy, Legislation and Enforcement
ii. Risk Analysis
iii. Pathogen List
iv. Border Inspection and Quarantine
v. Disease Diagnostics
vi. Farm-level Biosecurity and Health Management
vii. Use of Veterinary Drugs and Avoidance of Antimicrobial Resistance (AMR)

viii. Surveillance, Monitoring and Reporting
ix. Communication and Information Systems
x. Zoning and Compartmentalization
xi. Emergency Preparedness and Contingency Planning
xii. Research and Development
xiii. Institutional Structure (including Infrastructure)
xiv. Human Resources and Institutional Capacity and
xv. Regional and International Cooperation.

As shown in Figure 1 below, an EPR system is one of a range of systems elements that can go to make up a country's aquatic animal health management and biosecurity system.

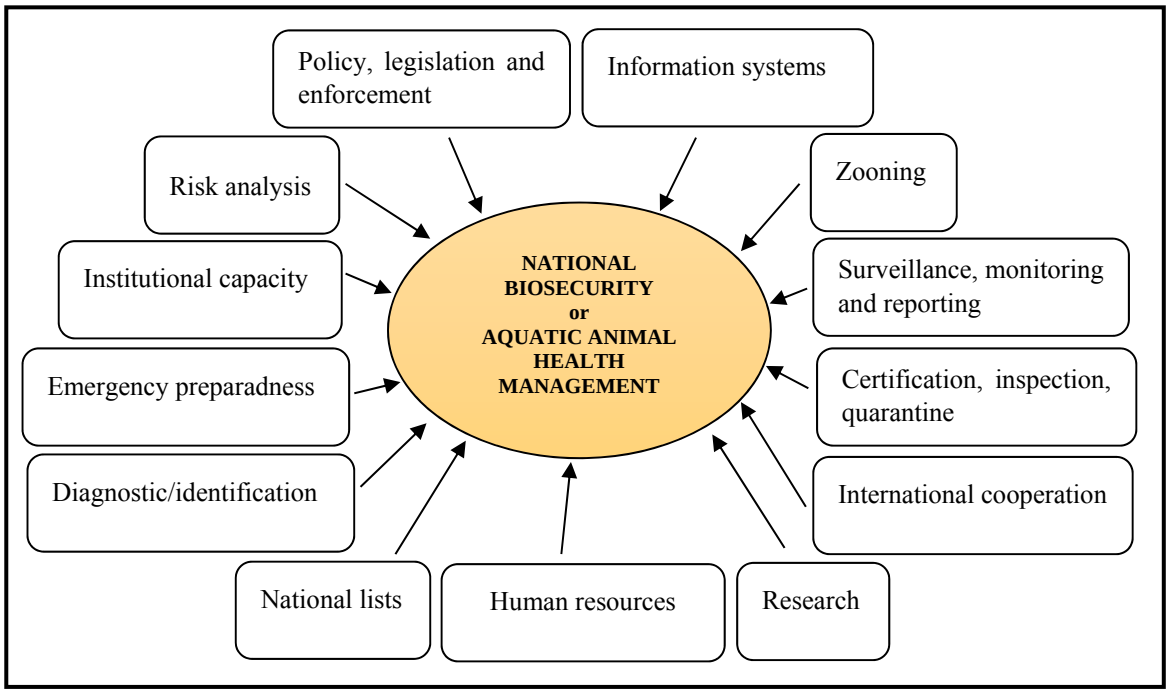

Figure 1. Elements of a national biosecurity and aquatic animal health management system, highlighting the role of emergency disease preparedness and response

As part of the FAO TCP/INT/3501 project: *Strengthening Biosecurity Governance and Capacities for Dealing with the Serious Shrimp Infectious Myonecrosis Virus (IMNV) Disease*, a survey of national emergency aquatic disease preparedness and response systems was conducted for Brazil, Ecuador and Mexico (representing South/Central America) and China, Indonesia and Thailand (representing Asia).

PROCESS

The self-assessment questionnaire used to undertake the survey was designed to understand each country's capacity to mount an effective response in the event of an emergency aquatic disease outbreak. The questionnaire delved into all the systems elements needed for a comprehensive (ideal world) EPR system based on FAO[1] and OIE publications[2], and Australia's AQUAVETPLAN[3]. The survey findings help in identifying areas for potential improvements in each country.

The questionnaire was structured into four sections: (1) general administration, (2) operational components, (3) support systems and (4) additional information. Section 1 (General Administration) contained questions aimed at generating information on the administrative structure and the scope of responsibilities of the Competent Authority on various elements (e.g. communication, risk analysis, contingency plan, personnel skills, etc.) that are essential when dealing with an aquatic emergency response. Section 2 (Aquatic EPR System Elements) contained questions on the priority system elements identified by the OIE; namely, early warning, early response and early detection systems. Section 3 (Support Systems) contained questions about broader supporting systems in relation to legislation, information management, communications and resourcing. Section 4 (Additional information) presented an opportunity for countries to provide any other information or raise any other issues that they felt had not been adequately covered. The questionnaire included detailed guidance on how it should be conducted.

As would be expected of a survey of this type, there were some inherent limitations. These included the long and complex nature of the questionnaire (with open questions) resulting from the need to capture all elements of EPR systems including national, state/local government and industry components. This open-ended nature of the questionnaire became relevant in the context of the limited time (and resources) available to complete the questionnaire. The questionnaire was completed in English, thus a small degree of error through mistranslation and misinterpretation may also be expected.

The full questionnaire is attached as Appendix 1.

[1] Arthur, J.R.; Baldock, F.C.; Subasinghe, R.P.; McGladdery, S.E. Preparedness and response to aquatic animal health emergencies in Asia: guidelines. *FAO Fisheries Technical Paper*. No. 486. Rome, FAO. 2005. 40 p.

[2] OIE. 2018. Manual of Diagnostic Tests for Aquatic Animals (the Aquatic Manual). Available online at: http://www.oie.int/index.php?id=2439&L=0&htmfile=sommaire.htm

OIE. 2018. OIE Aquatic Animal Health Code (the Aquatic Code). Available online at: http://www.oie.int/en/standard-setting/aquatic-code/access-online/

[3] http://www.agriculture.gov.au/animal/aquatic/aquavetplan

SURVEY RESPONSE ANALYSIS

SECTION 1. General administration

Sound leadership, governance, administration and coordination is an essential prerequisite to an effective EPR system. All surveyed countries have nominated high level EPR system leadership overseeing the EPR system, indicating a high degree of importance being attached to EPR, at least in intent. Jurisdictional responsibility for EPR in each country sits with animal health (veterinary) services, as in the case of Mexico, Ecuador and Brazil, or with fisheries/aquaculture agencies as seen in China, Indonesia and Thailand; perhaps an indication of the relatively long history and scale of aquaculture in the Asia, compared to the Americas. All countries have high level leadership of overall EPR system planning, with Mexico's steering committee having a dedicated EPR system planning-coordination officer. Technical input to EPR system planning and development is through subordinate level staff with specialised expertise, e.g. epidemiology. Indonesia's aquatic animal emergency disease response system is currently focused on acute hepatopancreatic necrosis disease (AHPND), with single officer given coordination responsibility by decree (No. 95A/KEP-DJPB/2013) – there is an expectation that this role will be expanded in the future to cover the range of other aquatic animal emergency diseases.

The various components of an EPR system can be under a single agency (e.g. Mexico's SENASICA or China's Ministry of Agriculture (MOA) or functionally integrated between agencies responsible for general veterinary services and fisheries/aquaculture management as is in Brazil (where the Ministry of Agriculture, Livestock, and Supply (MAPA) is the lead agency) and Indonesia (where the Ministry of Marine Affairs and Fisheries has primary responsibility). Jurisdictional responsibility for the EPR system in China for example is the MOA, where both veterinary services and fisheries bureau are involved in the conduct of EPR under the MOA, with the Fisheries Bureau being the executing agency for the national contingency plan for aquatic animal diseases.

China, Mexico and Thailand have designated steering committees to oversee and guide EPR system development as well as response to specific emergencies, but no such arrangements were indicated in Indonesia, Ecuador or Brazil. Correspondingly, the level of agency consolidation of *aquatic animal health management* varies with, for example, Thailand's Department of Fisheries controlling all aspects of aquatic animal health management and countries like Brazil and China where management sits under different but functionally linked agencies. The National Fisheries Institute of Ecuador (INP) within the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP), is recognized as the Competent Authority with respect to fishery and aquaculture products, although no specific EPR system activities are indicated.

1.1 Communications/consultation

Successful detection and response to disease incursions is dependent on effective and rapid communication systems. Such systems are generally present in all the surveyed countries. Rapid information dissemination during emergencies in Mexico for example is achieved through a sophisticated electronic communications system (AUTOSIM) in addition to an internal rapid communication systems within the Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (SENASICA). In Indonesia, there is intensive government communication with AHPND related stakeholders (including producer associations), although this is not yet part of a formal, structured system of communications.

China has a web-based disease reporting and diagnostic system which appears to be a model worthy of consideration for uptake by other countries. Brazil has an email alert system.

Stakeholder consultation too is critical to long term EPR system success, especially in terms of stakeholder buy-in, and therefore engagement in the range of EPR activities from early detection to response. Mexico has a broad animal health and production consultation body – National Advisory Council on Animal Health (CONASA), which provides for extensive stakeholder input on the EPR system. Indonesia makes reference to specific consultation framework for AHPND management. Other than that, established stakeholder consultation processes are *not* evident from the survey returns and is an area of potential development in all countries.

1.2 Risk analysis

Risk analysis appears in all countries to focus on import risks and it is not evident that risk analysis is applied directly in EPR. Risk analysis should ideally be applied to the EPR system planning process so that there is some focus on diseases and/or commodities that represent the greatest risk and as part of the business case for resourcing EPR system implementation and on-going maintenance. Risk analysis (even after establishment of an EPR system) is recommended so that EPR system resourcing can be weighted toward dealing with the highest risks.

1.3 Operational capacity/capability

Operational capacity and capability includes early warning and detection systems, field diagnostics, laboratory diagnostics, disease surveillance, reporting systems and disease management/epidemiology expertise. These capacities vary significantly from country to country. Looking at the two ends of this range, China for example has an impressive National Surveillance System spanning five jurisdictional levels (State, Province, City, County and monitoring points). In 2016 there were more than 4,000 monitoring points, and around 6,000 people involved in monitoring and reporting work. There are more than 30,000 hectares of aquaculture being monitored and inspected for aquatic animal diseases. From 2013, based on a preceding survey and surveillance project, China's national reference laboratories and chief experts were given responsibility by the MOA for analysing surveillance data and writing an annual report for each major disease. In 2014, the Bureau of Fisheries (BOF) commissioned the National Fishery Technology Extension Centre (NFTEC) to organise the national aquatic animal epidemic prevention system's laboratory testing capability; to strengthen testing proficiency; promote accreditation; speed up the establishment of the laboratory assessment management system and to improve the accuracy of disease surveillance and detection. A remote diagnostic network which provides real-time online technological information services on aquatic animal disease prevention and control has also been established – this includes one national remote platform, 36 provincial consultation platforms, 1,970 user terminals, covers 27 provinces and is supported by 18 national platform experts and 184 provincial platform experts. As previously stated, this remote diagnostic system is worthy of study for possible development of similar systems in other countries.

Ecuador's Laboratory of Aquatic Use Products (LAB-EPA) is designated to perform molecular biology analyses to support disease surveillance of the country's shrimp farming industry, covering key shrimp pathogens listed by the OIE.

In the context of this survey, the candid response to the survey questionnaire from Brazil about the effectiveness of its current systems is informative and revealing, and provides an insight to some of the issues that may be facing countries where aquatic EPR systems are less well resourced. The Brazilian submission noted that early detection is unlikely to happen, that aquatic disease surveillance is mostly not in place, that technical expertise is lacking in both the private and public sectors, that laboratory capability is limited, that the private sector tends not to report aquatic animal diseases and that veterinary services tend to have a terrestrial focus. The specifics of EPR system shortcomings will vary from country to country. It is therefore well worth each country undertaking a detailed ERP system audit including through the conduct of emergency simulation exercises.

1.4 Contingency plans

Contingency plans allow fast decisions and effective response to disease incursions, and their development is a good way of getting stakeholder engagement and ownership of the EPR system. The survey revealed that there is a general lack of documented disease specific and non-specific contingency plans in several countries, although plans for some specific diseases are under preparation.

Indonesia may have some dated documented plans developed following the 2003 Koi herpesvirus (KHV) epizootics and the associated FAO EPR system project, but no current contingency plans for AHPND or any other aquatic animal disease exist. Mexico's National Emergency in Aquaculture/Animal Health Device (DINESA) takes carriage of EPR system implementation for specific outbreaks, although there is no indication of documented disease specific contingency plans. China has plans in accordance with its *Contingency Regulations on Major Animal Diseases* (enacted under the Animal Epidemic Prevention Law) ─ China has a documented general contingency plan for aquatic animals that was enacted in 2005. Thailand's Department of Fisheries has a contingency plan for dealing with general aquatic animal disease emergencies and development of disease specific plans for IMN and KHV are under way. Brazil has no substantive EPR system and therefore no contingency plans.

Ecuador reports the existence of a contingency plan against AHPND and other pathogens, presumably shrimp related, as well as a manual of its epidemiological surveillance system and a specific disease surveillance program for vanammei shrimp.

All countries should look to develop documented disease specific and general contingency plans for responding to emergency aquatic animal disease outbreaks.

1.5 Resourcing and personnel skills development

The survey found personnel skills vary significantly from country to country. China has implemented a certification and re-education program for registering of aquatic veterinarians. China also has designated places for aquatic animal disease surveillance and reporting personnel for aquatic animal diseases in the major aquaculture areas. China's NFTEC and provincial and local aquaculture technology extension centres organize and provide training courses for the designated reporting personnel. NFTEC is responsible for the organization of training on disease diagnosis skills and awareness building to the staff in local extension stations. China has national and industrial standardization program for aquatic animal health. The Aquatic Animal Health Work Group under the Aquaculture Standardization Committee develops and updates the standardization plan for aquatic animal health. Scientists can apply the funding for establishment or revision of the standards according to the plan. Thailand has

placed a high priority on staff training within the Department of Fisheries (DOF), the Inland Aquatic Animal Health Research Institute (IAAHRI) and Coastal Aquatic Animal Health Research Institute (CAAHRI). Mexico too reported good training systems for government officials/staff and auxiliary industry groups, including emergency drills (simulation exercises).

On the less well resourced end of the spectrum, Indonesia has an *ad hoc* group that appears to focus on disease identification/diagnosis, although there is no indication of on-going training. Brazil acknowledged their lack of trained staff at national and state level to support an EPR system. Those countries that do not have adequate in-country expertise should make development of these skills a priority. All countries should ensure the existence of on-going programs to build and maintain national expertise in the range of disciplines needed to support an EPR system.

In terms of general resourcing of EPR system infrastructure, China's has run programs of infrastructure building for its Aquatic Animal Disease Prevention and Control System since 2000, investing in more than 300 national, provincial, and county level aquatic animal disease prevention and control centres, laboratories and stations. There is also a recently approved program for system improvements that will build national, regional, provincial, municipal centres for aquatic animal disease surveillance and control; national reference laboratories, technological laboratories, and research bases.

In Thailand, DOF is assessing needs following its AHPND response and recently increased budget allocation to enhance an EPR system including for increasing staffing and skills, improving diagnostic laboratories, increased surveillance and monitoring and research.

No country other than China reported allocated EPR system funding for aquatic animal disease in terms of costs specifically associated with for example, stock destruction and compensation. China has specific EPR system funding (from the Ministry of Finance of China) for "national rapid response for public emergencies", which would cover costs such as stock destruction and compensation of farmers. Ecuadorian authorities are reportedly in the process of restructuring to support the development and implementation of an EPR system.

In most countries, on-going resourcing tended to focus on laboratory diagnostics. All countries should review the funding basis for meeting costs of disease emergencies, outside of that associated with maintaining laboratory capacity.

1.6 Legislation

All surveyed countries have a range of aquatic animal health related legislation covering aquaculture management, import controls and disease control, including some disease specific legal instruments – e.g. White spot disease in Mexico and AHPND in Indonesia. Emergency response is generally through legal instruments that cover all agricultural diseases, including terrestrial livestock, such as China's Contingency Regulations on Major Animal Diseases enacted under the Animal Epidemic Prevention Law and Thailand's Epidemic Act administered by the Department of Livestock Development (DLD) with delegations to DOF staff for aquatic emergency disease responses ─ although if a serious disease did occur, eradication in Thai farms would typically be voluntary except in the case of registered farms where non-compliance could lead to de-registration.

Indonesia is in the process of developing legislation/regulations that will underpin a broader national EPR system arrangements. Ecuador has a range of legal instruments (Ministerial

Agreements) to support aquatic animal health management including a Ministerial Agreement on declaring epidemiological surveillance as the primary measure and establishing a temporary ban on imports for a period of one year in the Asian countries positive for AHPND, although no legislation specific to EPR systems is indicated.

If not already tested, review of legislation to test the relevant authority's powers in terms of enforcing containment/eradication measures (such as movement controls and forced stock destruction) should be conducted. The political appetite to enforce legislating should also be periodically tested through simulation exercises, which both help to manage stakeholder (including political) expectations and make for faster decision making.

1.7 Systems review and improvement

Review and improvement, especially through emergency simulation exercises are an essential component of an EPR system, not just operationally but also important for building farmer acceptance of, and therefore cooperation in, containment/eradication efforts. The surveyed countries are at varying stages of development in EPR system review using simulation exercises, ranging from no simulation exercises (to date) in Brazil, through planned exercises in Indonesia, to a regular program of exercises in Mexico.

In China, the veterinary administrative departments at all levels are responsible for the systemic training on preparedness for major animal diseases. There are annual field exercises organized by MOA as well as EPR training organised by local government. Notably, China's Contingency Regulations on Major Aquatic Animal Diseases is currently undergoing revision.

Thailand's authorized inspectors and veterinarians (including fisheries biologists from Fisheries Provincial Offices, Inland Fishery Research and Development Centers (IFRDCs), Coastal Fishery Research and Development Centers (CFRDCs), IAAHRI and CAAHRI) have been trained in their respective EPR system roles including through a simulation exercise. Shortcoming identified through the simulation are being addressed through revision to the contingency plan. The plan is also modified when new scientific information comes to light or when agency structures change.

Mexico undertakes regular simulation drills for animal disease emergency response and has a sophisticated electronic data management system AUTOSIM to support these activities. Indonesia had a recent EPR system development initiative undertaken in collaboration with FAO ─ a simulation exercise is planned as a next step.

Workshop discussions highlighted the importance of simulation exercises and recommended that all countries consider an on-going program of simulations to test the effectiveness of country EPR systems.

SECTION 2. EPR system operational components

2.1 Early warning systems

All countries reported routine international reporting to OIE and the Network of Aquaculture Centers in Asia-Pacific (NACA) as relevant to their region. Correspondingly, intelligence gathering through general monitoring of OIE databases, especially as part of import risk analysis (IRA), as well as conference attendance and monitoring scientific literature was also reported. For example, DOF (especially IAAHRI and CAAHRI) monitors aquatic disease events in other countries by communicating with researchers in other countries; reviewing

NACA, OIE reports and; attending regional and international meetings, workshops and conferences, and monitoring scientific literature. Mexico has a sophisticated integrated information management system (SINEXE) that monitors health information including surveillance sampling and diagnostic outcomes. Countries also reported information gathering through trading partner networks, mainly as part of trade negotiations, including formal inspections or competent authority evaluations, as well as informal contact between OIE focal points. Ecuador for example reports ongoing communication with trading partner countries, and is subjected to around eight external animal health management system audits per year.

Supported by FAO TCP/INS/3402, Indonesia established the Indonesian Aquatic Animal Disease Alert System (IAADAS), which fast tracks disease reporting by extension workers and fish farmers at the district level, triggering mobilization of disease experts and laboratory staff to conduct farm level investigations. The system is currently being piloted in three districts.

Workshop discussions identified the importance of each country complying with OIE/NACA reporting obligations as well as monitoring of NACA/FAO/OIE's consolidated quarterly aquatic animal disease (QAAD) reports, especially in terms of early warning of emerging aquatic animal diseases. The need for each country to ensure linkage between OIE focal points and aquaculture and fisheries authorities was also noted.

2.2 Early detection systems

2.2.1 Personnel competencies

Thailand indicated a high level of confidence in early detection as DOF staff (including extension officers and provincial government fisheries officers) and farmers have the knowledge to recognize a suspected disease emergency since they have been trained in Level I diagnosis and reporting responsibilities. Indonesia appears to have a regimented system of reporting at farm level, albeit only for AHPND at this stage. Farms in Mexico receive regular training and laboratories are required to report findings of concern. Ecuador too reports a level of competency in farm biologists (presumably large commercial farms) local fisheries officers, both groups working with the National Fisheries Institute to rule out exotic diseases in the event of large mortalities.

China has an impressive, structured early detection system supported by 1,886 certificated aquatic veterinaries and 1,206 certificated aquatic veterinary assistants in provincial and local fishery offices, technology extension stations, and aquatic animal disease control institutions, and 17,732 registered village aquatic veterinaries in the technology extension stations and aquatic animal disease control stations, and distributors of feed or aquatic drug manufactures in counties, towns and villages. These front-line individuals typically have a university education in aquaculture or aquatic veterinary sciences and have been trained in aquatic animal disease diagnosis and control.

Brazil has triggers for reporting but considered farmer reporting to be unreliable as farms are not necessarily aware of impact on profits, and therefore the importance of reporting.

The effectiveness of response to disease emergencies is primarily a function of how quickly action is taken. So, the ability of on-ground farmers, government officers and fish health workers to recognize a potential disease incursion is paramount. Workshop discussions

identified the need for each country to consider the need to commit to an on-going program of training and general on-ground awareness building where such programs do not already exist.

2.2.2 Standard operating procedures

Documented standard operating procedures (SOPs) are an essential tool in EPR systems, both in terms of ready, consistent application of preparedness and response measures and as a training tool. SOPs, coupled to pre-agreed contingency plans and simulation exercises are useful in managing stakeholder acceptance of response measures. From an audit perspective, the absence of SOPs or similar instructional materials or the low frequency with which such material are reviewed and updated are an indicator of the possible lack of seriousness on the part of authorities toward EPR. The survey indicated a relative emphasis in some countries on SOPs for laboratory analysis but less so for other aspects of EPR systems. SOPs for other aspects of aquatic animal health management outside of EPR such as SOPs for farm sanitary inspection, quarantine facility inspection and for aquatic animal health certification is reported for example in Thailand.

China has instructions on how to carry out the above tasks in the Contingency Regulations on Major Animal Diseases, although it is unclear how often these SOPs are reviewed and updated. Thailand has instructional materials related to early warning and early detection system such as SOPs for farm sanitary inspection both for government officers and farmers, and SOPs for disease diagnosis (level I, II and III). Brazil, Indonesia and Ecuador did not report the existence of SOPs.

Well documented and regularly reviewed SOPs or instructional materials covering the range of EPR system elements are recommended for all countries.

2.2.3 Awareness building

Awareness building goes to how quickly disease emergencies can be detected (especially through passive surveillance) and the speed and confidence with which emergency response decisions can be made and implemented. Workshop discussions acknowledged that community awareness in pre-agreed contingency plans can be a useful tool in managing stakeholder expectations and therefore, implementing effective but unpopular response decisions such as ordering movement restrictions or stock destruction.

China has a range of capacity building/awareness building programs to support its Epidemic Prevention System for Aquatic Animals, including hundreds of industry lead initiatives (e.g. by feed or drug manufacturers or seed producers) and national and sub-national government, NGO and university lead training courses and workshops on aquatic animal disease diagnosis and prevention every year.

Thailand reported having disease specific programs lead mainly by IAAHRI and CAAHRI through websites and publications, as well as stakeholder meetings in the event of specific outbreaks. IAAHRI and CAAHRI are also planning a regular program of annual training for DOF staffs and farmers.

Mexico reports similar ongoing training programs carried out by its auxiliary bodies (industry associations). Brazil's central government designs training but uptake at state level is low due

to resource constraints. Indonesia has only reported training for laboratories (including a twinning program with OIE laboratory for shrimp diseases and koi herpesvirus).

Ecuador's National Fisheries Institute makes on-going announcements to shrimp farmers on exotic diseases, providing capacity for initial disease recognition in the event of an outbreak.

2.2.4 National information sharing

Both China and Thailand report sharing of EPR related information through the internet, social network and face-to-face meetings. However, as a general observation for all countries, information sharing at laboratory level appears more developed than at the farmer/front line government officer level. Individual countries should consider if there is a need to review information sharing across the EPR system.

China's NFTEC coordinates meetings of advisory experts, workshop of expert committee among other regular and ad hoc meetings every year. For emerging diseases, related experts are responsible for reporting to MOA and NFTEC. China's information sharing network includes a national web based platform connecting a remote diagnostic network that provides real-time online information services on aquatic animal disease prevention and control. The platform has 36 provincial consultation platforms, 1970 user terminals and covers 27 provinces, with 18 national experts and 184 provincial experts supporting the network.

Mexico's central authority reported coordinating meetings between government, researchers and industry. Similarly, Indonesia has informal and formal arrangements including meeting of taskforce members and a network of fish health management and producer associations.

Brazil reported somewhat less developed information sharing networks with its national reference laboratories meeting occasionally to discuss EPR informally, and otherwise minimal information exchange.

2.2.5 Disease surveillance

The rigor of surveillance systems aimed at supporting early detection of emergency disease incursions varies greatly across the surveyed countries. China has early warning and forecasting carried out by extension stations in provinces, districts and municipalities – it has a National Surveillance System on major aquatic animal diseases (operating in 31 aquaculture jurisdictions).

In Thailand, when potentially serious disease incidents are detected in Thai farms, the owners can report to the local Fisheries Provincial Office or one of a range of aquatic animal health related agencies (e.g. IAAHRI, CAAHRI, IFRDC or CFRDC). These systems appear to be passive in nature. Thailand also has active surveillance programs for 13 finfish diseases and 10 shrimp diseases).

Mexico reports a comprehensive active surveillance program for OIE listed diseases. Brazil has mandatory veterinary supervision and associated non-targeted passive surveillance, as well as some pilot active, targeted surveillance for e.g. streptococcus and OHV. Ecuador's National Fisheries Institute undertakes random health checks as part of its National Control Plan (aimed at verifying health status of exported products), the results of which are shared nationally and reported to OIE.

Indonesia has passive (and some active) surveillance at local level.

It would be useful for each country to investigate the level of confidence that stakeholders have in the effectiveness of the country's surveillance systems. Workshop discussions also identified the need for countries to establish clear definition and understanding of surveillance and monitoring, as well as passive and active, and targeted and non-targeted surveillance.

2.2.6 Disease reporting

All surveyed countries have at least minimum reporting requirements (including OIE/NACA listed diseases) and mechanisms for reporting, and maintain a list of reportable diseases consistent with the list of diseases of OIE and NACA. Mexico has an impressive National Epidemiological Surveillance System (SIVE), a comprehensive system covering exotic and endemic diseases, and which can be used for disease zoning.

China has early warning and forecasting carried out by extension stations in provinces, districts and municipalities – it has a National Surveillance System on major aquatic animal diseases (operating in 31 aquaculture jurisdictions). Aquatic animal disease surveillance findings are collated by NFTEC and reported in China's national aquatic animal and plant disease reporting system which can be accessed by extension stations in provinces, districts and municipalities. In Thailand, when potentially serious disease incidents are detected, farm owners can report to the local Fisheries Provincial Office or one of a range of aquatic animal health related agencies (e.g. IAAHRI, CAAHRI, IFRDC or CFRDC). These reports are then forwarded to IAAHRI or similar agency for investigation.

Ecuador indicates mandatory reporting requirements for farmers with nominated contact points in each region, noting that these arrangements are currently under review.

Indonesia has a Software System on Fish Diseases Monitoring (SSMPI) for routine reporting and the Indonesian Aquatic Animal Disease Alert System (IAADAS) for rapid reporting. Brazil has reporting requirements but acknowledges the need for building awareness of reporting responsibilities and mechanisms. Brazil's farmers, laboratories and health professional have reporting obligations but its system is hampered by the absence of penalties for non-compliance, other than in the case of veterinarians.

All countries surveyed appear to have mandatory reporting to central authorities but because it is unclear from the survey responses whether these mechanisms are formally linked to EPR, countries should ensure such linkages through for example, contingency plans.

2.2.7 Rapid diagnostic capability/capacity

Diagnostic laboratory sectors are relatively well supported, but ready access to lab services at ground level may be limited in many countries. The diagnostic components of EPR systems (in comparison to other components of EPR) appear well developed across all the countries surveyed.

All six countries have instructional material/standards for sample collection and transport to laboratories. Similarly, all countries have good laboratory capacity/capability.

In the case of Brazil, its national reference laboratory (RENAQUA) appears well resourced but ready access to diagnostic services at a local level is challenging. RENAQUA is working toward International Organization for Standardization (ISO) certification.

Mexico's laboratory standards were reported to be OIE consistent. Similarly, Ecuador's central laboratory is ISO 17025 Quality Standard accredited, including on-going evaluation through interlaboratory testing with international reference laboratories. There are two laboratories capable of supporting EPR; namely, at the National Fisheries Institute and the National Marine Research Center (CENAIM), as well as and other private laboratories that service large aquaculture enterprises and which could be utilised in the event of an emergency.

Mexico has calibration (ring-testing) exercises with OIE reference laboratory at the University of Arizona for shrimp diseases. China has three OIE aquatic animal disease reference laboratories of its own and a range of other government and academic diagnostic facilities. Thailand too has an OIE reference laboratory as well as other well recognised diagnostic facilities. Thailand also has participated in proficiency testing conducted by the Australian National Quality Assurance Program (ANQAP) and the University of Arizona. Thailand's IAAHRI/CAAHRI's laboratories are accredited for ISO/IEC 17025: 2005.

All countries have confirmatory testing arrangements and all maintain lists of diagnostic experts.

2.3 Early response systems

2.3.1 Personnel capacity and capability

Several countries surveyed do not have pre-agreed access to staffing capacity to handle surge activity during emergency responses. China, Thailand and Mexico do have pre-agreed staff resources to handle surge activity, including through agreement with national research centres.

The survey indicates there to be EPR system capability at national government level but decreasing confidence at sub-national and at farm level in some countries. The key question here is whether farmers are knowledgeable enough about broader risks to take precautionary action independently (prior to confirmation) if a potentially serious disease problem occurs, e.g. by taking samples and imposing biosecure compartments or introducing self-imposed movement controls.

There is local/state government capability reported in China, Thailand, Indonesia and Mexico, but not in Brazil which reported poor awareness at sub-national levels. All countries other than Brazil appear to have vertically integrated government systems where there is good liaison down to field officer level to implement controls e.g. stock destruction or stock movement controls. Ecuador reported having experienced and accredited personnel trained in various aspects of disease surveillance and diagnosis.

At the state (sub-national) level Brazil reported limited expertise except for veterinary services ability to report. Brazil has confidence in systems at central government level but regions are under-resourced, so the EPR system is let down at the point of implementing controls. Indonesia appears to have capacity up to the point of disease identification and confirmation, but no indication of capacity to implement response measures.

Regional staff in Mexico are well versed with officers trained to take precautionary measures based on presumptive diagnosis.

China reports annual training of farmers, farmers associations, health professionals, fisheries extension officers and officers of local disease control centres every year. Similarly, in Thailand, farmers, farmer associations, government health professionals, fisheries extension

officers and officers of local disease control centres have been trained in responding to disease outbreaks by epidemiologically isolating affected populations.

2.3.2 Awareness building/training

Training is an on-going process, so there need to be on-going training/awareness building programs rather than one-off projects. No doubt there is much work to do in training/awareness building in some countries. The involvement of industry associations in awareness building in some countries is encouraging.

No on-going awareness building and training programs were reported in Indonesia or Brazil, although Brazil has planned awareness building through assistance of the industry peak body, Brazilian Confederation of Agriculture and Livestock (CNA). Mexico has awareness building systems through its auxiliary agencies (industry bodies). Training on aquatic animal disease diagnosis and quarantine is held every year in China. At the laboratory level, testing capability is assessed annually. Similarly, in Thailand IAAHRI and CAAHRI have planned and set up a budget for training and evaluation programs for DOF staff and farmers to enhance their knowledge in aquatic animal health management including quarantine, disease diagnosis and disease reporting.

2.3.3 Documentation

Documented contingency plans and operational instructions help speed of decision making, response implementation and effectiveness of interventions. The survey found there to be a wide range in level of documentation between countries.

SOPs/job cards are not generally used in this context in most surveyed countries. Brazil and Indonesia have no EPR system documentation/manuals. Mexico has bulletin 'bioSAFETY' that provide instructions on what to do in the event of an emergency.

Ecuador reports the existence of a contingency plan against AHPND and other pathogens that detail the steps to undertake at regional and national levels.

China's MOA is responsible for formulating a major epidemic emergency plan at the national level and provincial and county level governments have responsibility for developing and delivering local response plans. Thailand has a contingency plan manual that documents responsibilities and actions to take in the event of a suspected disease emergency and includes flow charts, forms and SOPs for disinfection and collecting, packaging and transporting samples to laboratories.

RECOMMENDATIONS

The following provides a summary of findings with respect to each key element of the self-assessment questionnaire on national emergency aquatic disease preparedness and response systems undertaken by Brazil, Ecuador and Mexico (representing South/Central America) and China, Indonesia and Thailand (representing Asia), and makes twenty recommendations aimed at aimed at improving the administration and operation of national level EPR systems.

1. General administration

Sound leadership, governance, administration and coordination is an essential prerequisite to an effective EPR system. All surveyed countries have nominated high level EPR system

leadership and oversight, indicating a high degree of importance being attached to EPR from a government perspective.

Jurisdictional responsibility for EPR in each country sits with animal health (veterinary) services, or with fisheries/aquaculture agencies. The various components of an EPR system can be under a single agency (e.g. Mexico's SENASICA or China's BoF) or functionally integrated between agencies responsible for general veterinary services and fisheries/aquaculture management as is in Brazil (where MAPA is the lead agency) and Indonesia (where the Ministry of Marine Affairs has primary responsibility).

The level of agency consolidation of aquatic animal health management varies from a single agency controlling all aspects of aquatic animal health management as in Thailand to countries like Brazil and China where management sits under different but functionally linked agencies.

1.1 Communications/consultation

Successful detection and response to disease incursions is dependent on effective and rapid communication systems. Such systems are generally present in all the surveyed countries. Rapid information dissemination during emergencies in Mexico for example is achieved through a sophisticated electronic communications system (AUTOSIM) in addition to an internal rapid communications systems within SENASICA.

> **Recommendation 1** China has a novel web-based disease reporting and diagnostic system which appears to be a model worthy of consideration for uptake by other countries.

Stakeholder consultation too is critical to long term EPR system success, especially in terms of industry buy-in to, and therefore engagement in, EPR activities. Other than Mexico's animal health and production consultation body – CONASA and Indonesia's AHPND specific consultation forum, established stakeholder consultation processes are *not* evident.

> **Recommendation 2** Each country should review the need for and introduce stakeholder consultation processes to support its EPR system.

1.2 Risk analysis

Risk analysis appears in all countries to focus on import risks and it is not evident that risk analysis is applied in EPR. Risk analysis should ideally be applied to the EPR system planning process so that there is some focus on diseases and/or commodities that represent the greatest risk and as part of the business case for resourcing the implementation and on-going maintenance of ERP systems.

> **Recommendation 3** Risk analysis even after establishment of an EPR system is recommended so the system's resources can be weighted toward dealing with the highest risks.

1.3 Operational capacity/capability

Operational capacity and capability includes early warning and detection systems, field diagnostics, laboratory diagnostics, disease surveillance, reporting systems and disease management/epidemiology expertise. These capacities vary significantly from country to country. Looking at the two ends of this range, China has an impressive National Surveillance

System spanning five jurisdictional levels (State, Province, City, County and monitoring points). In 2016, there were more than 4,000 monitoring points, and around 8,000 people involved in monitoring and reporting work. China also has a remote diagnostic network which provides real-time online technological information services on aquatic animal disease prevention and control supported by 18 national platform experts and 184 provincial platform experts.

> **Recommendation 4** China's remote diagnostic system is worthy of study for possible development of similar systems in other countries.

In the context of this survey, the candid response to the survey questionnaire from Brazil about the effectiveness of its current systems is informative and revealing, and provides an insight to some of the issues that may be facing countries where aquatic EPR systems are less well resourced. The Brazilian submission noted that early detection is unlikely to happen, that aquatic disease surveillance is mostly not in place, that technical expertise is lacking in both the private and public sectors, that laboratory capability is limited, that the private sector tends not to report aquatic animal diseases and that veterinary services tend to have a terrestrial focus.

> **Recommendation 5** It is recommended that each country consider the need to undertake a detailed ERPS audit and conduct of emergency simulation exercises to evaluate the effectiveness of existing systems.

1.4 Contingency plans

Contingency plans allow fast decisions and effective response to disease incursions, and their development is an effective way of getting stakeholder engagement and ownership of EPR systems. The survey revealed that there is a general lack of documented disease specific and non-specific contingency plans in several countries, although preparation of some plans for specific diseases is under way.

> **Recommendation 6** All countries should look to development of documented general and disease specific contingency plans for responding to emergency aquatic animal disease outbreaks where such plans do not exist.

1.5 Resourcing and personnel skills development

The survey found personnel skills varied significantly from country to country. China has a program of re-educating and registering of aquatic veterinarians. China also has designated aquatic animal disease surveillance spots and reporting personnel for aquatic animal diseases in key aquaculture areas. On the less well-resourced end of the spectrum, Indonesia has an *ad hoc* group that appears to focus on disease identification/diagnosis, although there is no indication of on-going training, and Brazil acknowledges their lack of trained staff at national and state level.

> **Recommendation 7** All countries should ensure the existence on on-going programs to build and maintain national expertise in the range of disciplines needed to support EPR systems.

No country reported specific allocated EPR system funding for dealing with aquatic animal disease emergencies in terms of costs associated with, for example, stock destruction and

compensation. In most countries on-going resourcing tended to focus on laboratory diagnostics.

> **Recommendation 8** All countries should review the funding basis for meeting costs of disease emergencies, outside of that associated with maintaining laboratory capacity.

1.6 Legislation

All surveyed countries have a range of aquatic animal health related legislation covering aquaculture management, import controls and disease control, including some disease specific legal instruments – e.g. white spot syndrome virus (WSSV) in Mexico and AHPND in Indonesia. Emergency response is generally through legal instruments that cover all agricultural diseases, including terrestrial livestock.

> **Recommendation 9** If not already tested, review of legislation to test relevant authority's powers in terms of enforcing containment/eradication measures (such as movement controls and forced stock destruction) should be assessed.

> **Recommendation 10** The political appetite to enforce legislating should also be periodically gauged through simulation exercises, which both help to manage stakeholder (including political) expectations and make for faster decision making.

1.7 Systems review and improvement

Review and improvement, especially through emergency simulation exercises are an essential component of an EPR system, not just operationally but also important for building farmer acceptance of, and therefore cooperation in, containment/eradication efforts. The surveyed countries are at varying stages of development in EPR system review through simulation exercises, ranging from no simulation exercises to date in Brazil, through planned exercises in Indonesia, to a regular program of exercises in Mexico.

> **Recommendation 11** All countries should consider an on-going program of simulations to periodically test the effectiveness of EPR systems.

2. Operational components

2.1 Early warning systems

All countries reported routine international reporting to the OIE and NACA as relevant to their region. Correspondingly, intelligence gathering through general monitoring of OIE databases, especially as part of an IRA, as well as monitoring scientific literature and conference attendance was reported. Countries also reported information gathering through trading partner networks, mainly as part of trade negotiations, including formal inspections or competent authority evaluations, as well as informal contact between OIE focal points.

> **Recommendation 12** It is recommended that each country ensure effective linkage between OIE focal points and aquaculture and fisheries authorities/agencies.

2.2 Early detection systems

2.2.1 Personnel competencies

The effectiveness of repose to disease emergencies is primarily a function of how quickly action is taken. So, the ability of farmers and on-ground government personnel to recognize a potential disease incursion is paramount.

> **Recommendation 13** It is recommended that where such programs do not already exist, each country to consider the need to commit to an on-going program of training and general on-ground awareness building.

2.2.3 Standard operating procedures

Standard operating procedures (SOPs) are an essential tool in an EPR system, both in terms of ready, consistent application of preparedness and response measures and as a training tool. SOPs, coupled to pre-agreed contingency plans are also useful in managing stakeholder acceptance of response measures. From an audit perspective, the absence of SOPs or similar instructional materials and the frequency with which they are reviewed and updated are indicators of the possible lack of seriousness on the part of authorities toward EPR. The survey generally indicated a relative emphasis on SOPs for laboratory analysis but less so for other aspects of EPR systems.

> **Recommendation 14** Well documented and regularly reviewed SOPs or instructional materials are recommended for all countries, where they do not currently exist.

2.2.4 Awareness building

Awareness building goes to how quickly disease emergencies can be detected (especially through passive surveillance) and the speed and confidence with which emergency response decisions can be made and implemented. Workshop discussions acknowledged that community awareness in pre-agreed contingency plans can be a useful tool in managing stakeholder expectations and therefore, implementing effective but unpopular response decisions such as ordering movement restrictions or stock destruction.

2.2.5 National information sharing

As a general observation information sharing at laboratory level appears more developed that at the farmer/front line government personnel level.

> **Recommendation 15** Countries should consider if there is a need to review information sharing across an EPR system.

2.2.6 Disease surveillance

The rigor of surveillance systems aimed at supporting early detection of emergency disease incursions varies greatly across the surveyed countries.

> **Recommendation 16** Individual countries should investigate the level of confidence that stakeholders have in the effectiveness of the country's surveillance systems, consistent with international standards.
>
> **Recommendation 17** Each country should establish clear definitions for key terms: surveillance versus monitoring, passive versus active and targeted versus non-targeted types of surveillance.

2.2.7 Disease reporting

All surveyed countries have mandatory reporting requirements (including OIE/NACA listed diseases) and mechanisms for reporting, and maintain lists of reportable diseases consistent with OIE and NACA lists. Mexico has an impressive National Epidemiological Surveillance System (SIVE), a comprehensive system covering exotic and endemic diseases, that can also be used for disease zoning. Farmers, laboratories and health professional have reporting obligations but Brazil's system is hampered by the absence of penalties for non-compliance, other than in the case of veterinarians.

> **Recommendation 18** All countries should ensure operational linkages between disease reporting and EPR systems (for example through contingency plans).

2.2.8 Rapid diagnostic capability/capacity

Diagnostic laboratory sectors are relatively well supported, but ready access to lab services at ground level may be limited in some countries. The diagnostic components of an EPR system (in comparison to other EPR system components) appear well developed across all the countries surveyed.

All countries have confirmatory testing arrangements and all maintain lists of diagnostic experts. Mexico has calibration (ring-testing) exercises with OIE reference laboratory in Arizona for shrimp diseases. China has three OIE aquatic animal disease reference laboratories of its own and a range of other government and academic diagnostic facilities. Thailand too has an OIE reference laboratory as well as other internationally recognised diagnostic facilities.

2.3 Early response systems

2.3.1 Personnel capacity and capability

Several countries surveyed do not have pre-agreed access to staffing capacity to handle surge activity associated with emergency responses. China, Thailand and Mexico do have pre-agreed staff resources to handle surge activity, including through agreement with national research centers.

The survey indicates there to be EPR system capability at national government level but decreasing confidence at sub-national and at farm level in some countries.

There is local/state government capability reported in China, Thailand, Indonesia and Mexico, but not in Brazil which reported poor awareness at sub-national levels. All countries other than Brazil appear to have vertically integrated government systems where there is good liaison and understanding down to field officer level to implement controls.

China reports annual training of farmers, farmer associations, health professionals, fisheries extension officers and officers of local disease control centres every year. Similarly, in Thailand farmers, farmer associations, government health professionals, fisheries extension officers and officers of local disease control centres have been trained in responding to disease outbreaks by epidemiologically isolating affected populations.

2.3.2 Awareness building/training

Recommendation 19 Training is an on-going process, so countries should ensure there are training/awareness building programs rather than one-off projects.

3.3.3 Documentation

Documented contingency plans and operational instructions help speed of decision making, response implementation and effectiveness of interventions. The survey found there to be a wide range in level of documentation between countries.

Recommendation 20 Each country should review the status of the degree to which its EPR system is documented, including SOPs and contingency plans.

APPENDIX 1: Questionnaire survey form

FAO TCP/INT/3501
Emergency Preparedness and Response Systems
Capacity and Performance
Self-Assessment Survey

Introduction

Emergency preparedness and response (EPR) systems for managing aquatic animal disease outbreaks are contingency planning arrangements that can minimize the impacts of serious aquatic animal disease outbreaks, whether at the national, subnational or farm level ─ such systems have the objective of containing (preventing the further spread) or eradicating emergency disease outbreaks, thereby greatly reducing the impact, scale and costs of outbreaks. An effective EPR system ensures that there are pre-agreed protocols and resources in place to act quickly in responding to suspected outbreaks of emergency diseases. Importantly, they established a clear structure for effective and rapid decision-making with clearly defined responsibilities and authority.

Purpose

The purpose of this survey is to obtain information on national capacity and the agencies mandated to implement emergency preparedness and response systems with respect to *aquatic animal diseases*. The results of this survey will help guide regional and national strategic planning with respect to improving aquatic EPR systems, thereby improving aquatic animal health more broadly and assuring adequate and rational support services to achieve sustainable aquaculture development.

This FAO questionnaire on aquatic EPR system capacity and performance is a country level self-assessment survey with four sections: (1) general administration, (2) operational components, (3) support systems and (4) additional information.

Section 1 (General Administration) contains questions that will generate information on the administrative structure and the scope of responsibilities of the Competent Authority on various elements (e.g. communication, risk analysis, contingency plan, personnel skills, etc.) that are essential when dealing with aquatic EPR.

Section 2 (Aquatic EPR System Elements) contains questions on the priority system elements identified by the OIE. These are: early warning system, early response system, and early detection system.

Section 3 (Support Systems) contains questions about broader supporting systems in relation to legislation, information management, communications and resourcing.

Section 4 (Additional information) presents an opportunity for countries to provide any other information or raise any other issues that they feel have not been adequately covered in Sections 1-3.

Process

This survey should be completed by the national Competent Authority on aquatic animal health through the designated National Project Coordinator (NPC) of TCP/INT/3501 and a second delegate of the Technical Cooperation Programme (TCP), both with primary responsibility for national aquatic animal health issues, in consultation with national, state/provincial and local

government agency officers with responsibility for responding to aquatic animal disease emergencies (or agencies that that have responsibility for managing aquatic animal health in general), and in consultation with industry, especially aquaculture representatives (including commercial, small scale and subsistence sectors, as applicable to the country).

The following **guidance** is provided in implementing the survey:

- Review the survey questionnaires to determine the relevant stakeholders that will be involved in the survey;
- Prepare a list of stakeholder respondents
- Prepare an official communication (signed by the Competent Authority of the country) to the identified respondents describing the survey, its scope, its purpose, process and target deadline
- Implement the survey through email correspondence
- For some countries, it may be necessary to translate the document into the local language; however, the returns should be sent back to FAO in English
- Ensure that responses are correct and accurate.

If the information to respond to a question cannot be found, do not respond by writing "not applicable" – please write "information not found". If there is a question that relates to an item that is not relevant to the situation in your country, please state this categorically, i.e. "not relevant to the country". For example, for the question "Describe the legislation that directly or indirectly gives the national authority the power to apply control measures during emergencies?" do not respond "not applicable" if there is no such legislation. In this situation, please write, "The country does not have any legislation giving power to the national authority".

Similarly, if there is a closed question like "Are there Standard Operating Procedures (SOPs) for diagnostic analyses at national reference laboratories?", then try to not simply write "yes" or "no", but rather to include supporting information. We are trying to gather as much information about the country's aquatic EPR system as possible within the time and resource constraints of this survey.

Some answers may need to be repeated as some questions are very similar. If there is uncertainty about the meaning of a question, you should seek clarification from FAO. Please note that completing the questionnaire will be an iterative process where you may need to contact FAO on several occasions, and you should feel free to do so. Similarly, FAO will be contacting you if clarification is required about any of the responses that you have provided.

If there is information about the country relating to its aquatic EPR system that you feel has not been adequately captured in the responses to the specific questions below, then that information should be included in the "additional information" of this document (Section 4).

The FAO International Consultant responsible for collating and preparing a summary and analysis of the survey returns is Dr Ramesh Perera. He can be contacted by email: rameshpperera@gmail.com. Please feel free to communicate with him.

Please send back the completed survey returns on or before 26 October 2016.

A summary and analysis of the survey returns will be presented during the FAO TCP/INT/3501 Workshop on Emergency Preparedness and Response and Contingency Planning that will be held in Beijing, China from 10-12 November 2016.

Details of person completing the survey questionnaire

Country:

Contact information for person completing this survey:

Name:

Title:

Institution:

Mailing address:

Telephone:

Facsimile:

E-mail:

Signature of completing official:

Date:

SECTION 1. General administration

1.1. Provide a brief description of the national government agency (national authority) that carries primary responsibility for managing the country's aquatic emergency disease preparedness and response system.

1.2. Provide a diagram of the hierarchy of key policy, administrative and technical staff within the national agency responsible for preparedness and response to emergency aquatic animal diseases.

1.3. Provide a diagram showing the relationship between this agency and other national agencies and state/provincial and local government agencies.

1.4. Describe the degree to which the national authority's aquatic EPR system is integrated with other emergency preparedness and response arrangements (e.g. equivalent terrestrial animal disease response arrangements or a national disaster response plan).

1.5. Describe how the country's aquatic EPR system is integrated with other elements of the country's national aquatic animal health management framework (e.g. IRA, import control, farm biosecurity plans, zoning/compartmentalization)?

1.6. Is there a nominated officer (or officers) responsible for the country's EPR system?

a. Describe the officer's responsibilities with respect to planning and coordinating the national aquatic animal emergency disease preparedness and response system.

b. Is the officer a high-level government officer within the agency that has primary responsibility for aquatic animal emergency disease preparedness and response, such as the national chief veterinary officer or director of fisheries?

1.7. Is there a National Aquatic Emergency Preparedness and Response Committee (or similar group) with responsibility to oversee and drive the planning and on-going maintenance of a national aquatic animal emergency disease preparedness and response system?

a. What is the relationship between the committee and the 'responsible officer" – what is the responsible officer's role in that committee – for example, is he/she the chair of that committee?

b. What are the committee's terms of reference?

1.8. Does the country have a National Emergency Disease Planning Officer/s (NEDPO) or equivalent with knowledge of aquatic epidemiology or on-ground aquatic animal disease management?

a. What are his/her responsibilities? Do these responsibilities include acting as adviser to the aquatic EPR committee?

Communications

1.9. Describe the degree of consultation that the national authority has undertaken (or intends to undertake) in developing the country's aquatic EPR system (including farmers, processors, transporters, wholesalers/traders, provincial/local government jurisdictions, neighbouring countries).

1.10. Describe any rapid communication plans that are in place for accurate information dissemination during emergency disease responses?

Risk analysis

1.11. Has the national authority conducted risk analysis to identify high priority aquatic disease threats on which to focus response plans? If so, describe these analyses.

Operational capacity/capability

1.12. Describe the degree to which the national authority maintains national operational capability including establishment of early warning systems, early detection systems, national field diagnostic capability for emergency diseases, laboratory diagnostic capability, disease surveillance, reporting systems and access to disease management/epidemiology expertise.

Contingency plans

1.13. Describe any national contingency plans the national authority has developed for dealing with aquatic animal disease emergencies.

Personnel skills

1.14. Has the national authority ensured designated government and industry personnel have the necessary skills to support emergency preparedness and response activity, including through recruitment standards, succession planning, training and awareness building? If so, briefly outline these capabilities.

Resource allocation

1.15. Has the national authority assessed infrastructure and personnel requirements for an effective aquatic EPR system, and set up systems for allocating finances/resources during emergency responses?

Legislation

1.16. Describe the legislation that gives the national authority power to apply control measures during emergencies?

Systems review and improvement

1.17. Describe if and how the national authority regularly tests and improves the effectiveness of the aquatic EPR system; for example, through simulation exercises, field exercises and regularly review contingency plans to ensure effective and well-coordinated implementation?

SECTION 2. Aquatic EPR System Elements

EARLY WARNING SYSTEM

Intelligence gathering

2.1. Describe if and how the national authority monitors aquatic animal disease events in other countries (such as through the internet e.g. via the International Biosecurity Intelligence System (IBIS) [http://biointel.org/], monitoring of scientific literature and conference attendance)?

International reporting

2.2. Describe if and how the regularly national authority checks (and contributes to) Network of Aquaculture Centres in Asia-Pacific (NACA) or World Organisation for Animal Health (OIE) disease reporting systems?

Trading partner networks

2.3. Describe any formal and/or informal lines of communication that the national authority has with key aquatic animal commodity trading partner countries with respect to information exchange on disease incidents?

EARLY DETECTION SYSTEM

Personnel competencies

2.4. Describe the degree to which front line individuals at the 'pond level' (including, farmers, farmer associations, health professionals, fisheries extension officers and officers of local disease control centres have the knowledge required to:

a. recognize a suspected disease emergency

b. report findings to the appropriate provincial or national authority responsible for declaring a disease emergency and coordinating a response?

2.5. Describe the degree to which local government (such as at the village or county level) and industry personnel (including extension staff, designated departmental officers, farmers leaders, research staff officers of local disease control centre, fisheries organizations, processors and brokers) have the knowledge required to:

a. recognise a disease emergency

b. report to the appropriate authority?

2.6. Describe the degree to which national level government staff (personnel from national research laboratories, main authority departments, national disease control centres) have the knowledge required to:

a. organise and coordinate surveillance for early warning

b. organise and coordinate disease reporting?

Standard operating procedures (SOPs)

2.7. Describe any SOPs or similar instructional material provided to designated government and industry personnel given responsibility for the above tasks. How often are these SOPs reviewed and updated?

Awareness building / training programmes

2.8. Describe any on-going awareness building and training programs to ensure designated government and industry personnel are trained to undertake the tasks described above.

National information sharing networks

2.9. Describe any arrangements for sharing of EPR related information nationally (through either formal or informal lines of communication) with academics/researchers, industry representatives and aquatic animal health professionals; for example, through the establishment and regular meetings of advisory groups.

Surveillance systems

2.10. Describe any national, state/provincial or local passive surveillance programs for targeted and non-targeted diseases or active surveillance programs for targeted diseases.

Disease reporting

2.11. Does the national authority maintain a national list of reportable diseases, incorporating internationally reportable diseases and other diseases on concern to the country?

2.12. Is there a national aquatic animal disease reporting system that allows for rapid reporting of suspected diseases or disease agents of concern?

2.13. Does the reporting system include:

a. legal obligations on farmers, aquatic animal health management professionals, diagnostic laboratories to report any abnormal moralities/morbidity to government authorities — for farmers, health professional and diagnostic laboratories this could for example be done as part of license or permit requirements?

b. a widely known, ready means of notifying the relevant agencies (for example through a free-call telephone number)?

2.14. Is there legislation to support the country's requirements for mandatory reporting?

2.15. Is there a formal communication system for notifying the central authority?

2.16. Is there a clear reporting mechanism for farmers, health professional etc, with information ultimately being reported to the national authority and the Responsible Officer?

Rapid diagnostic capability/capacity

2.17. Are there clear instructions to aquatic animal health personnel in the field with respect to security measures for collecting, packaging and transporting samples to designated laboratories?

2.18. Does the country have access to rapid laboratory diagnostic capability/capacity for confirmation of a disease or disease agent of concern, including ability to differentiate exotic or emerging diseases from endemic ones? This diagnostic capacity should ideally be within the country, but can also be in other countries provided that there are formal arrangements for ready access to confidential diagnostic services (e.g. through MOUs).

2.19. Are there Standard Operating Procedures for diagnostic analyses at national reference laboratories?

2.20. Are there documented procedures for confirmation of diagnosis, if necessary, at an OIE Reference Laboratory (recommended for OIE-listed disease agent detection for the first time in a country, or for a suspect detection in an "abnormal" aquatic host species)?

2.21. Is there a regularly updated national list of expertise and laboratory capacity for disease diagnosis, including identification of exotic disease agents of concern?

EARLY RESPONSE SYSTEM

Personnel competencies

2.22. Describe the degree to which front line individuals at the 'pond level' (including, farmers, farmers associations, health professionals, fisheries extension officers and officers of local disease control centres have the knowledge required to:

a. introduce precautionary movement controls if necessary, pending advice from relevant authorities'

b. facilitate implementation of the response proper, provide assistance to affected the site and assist in communication of information as it becomes available, and

c. provide local/national authorities with information as well as any movement of live animals prior to disease outbreak?

2.23. Describe the degree to which local government (such as at the village or county level) and industry personnel (including extension staff, designated departmental officers, farmers leaders, research staff officers of local disease control centre, fisheries organizations, processors and brokers) have the knowledge required to:

a. coordinate early response controls between affected farmers, fisheries interest, related stakeholders, local authorities and State/Province level authorities

b. implement recommended control options to prevent diseases spread, both prior to and following diagnosis confirmation

c. coordinate early response controls between affected farmers.

2.24. Describe the degree to which state/provincial level government staff (departmental officers, research personnel and officers of state/provincial authority disease control centres) have the knowledge required to:

a. Identify a disease emergency

b. Identify risks associated with suspected outbreak of pathogen

c. Assist with confirmation of suspected diagnosis using local/ national expertise or an OIE reference laboratory

d. Report confirmation to the national authority

e. Ensure implementation of suggested control options, both pending and following diagnostic confirmation.

2.25. Describe the degree to which national level government staff (personnel from national research laboratories, main authority departments, national disease control centres) have the knowledge required to:

a. confirm the disease diagnosis with the reference laboratory

b. analyse risks associated with the reported outbreak scenario

c. define disease zones based on data from reporting laboratories.

Awareness building / training

2.26. Describe any programmes in place for on-going awareness building and training to ensure designated government and industry personnel have the skills to undertake the tasks described above.

Standard operating procedures (SOPs)

2.27. Are there regularly updated SOPs for designated government and industry personnel given responsibility for the above tasks?

2.28. Are there standard 'job cards' summarizing tasks for key personnel involved in response?

Contingency plan documents

2.29. Describe any documentation that the national authority maintains for purposes of emergency response; for example, a summary document, response management manuals, enterprise manuals, disease strategy manuals or operational procedures manuals.

SECTION 3. Operational Support Systems

Legislation

3.1. Describe the country's legislation supporting the range of potential actions that may be taken in responding to a disease emergency, such as access to farm premises, taking of samples, movement controls or mandatory stock disposal.

3.2. Is there a summary of legislative powers documented separately or incorporated into relevant response manuals?

Information management systems

3.3. Describe the country's information management systems that allow data collection, collation and analysis, including spatial mapping capability.

Communications systems

3.4. Describe any prearranged systems for communication with key stakeholders including interaction with the media.

Resources

3.5. Does the country have ready access to technical expertise in aquatic animal disease control, including epidemiology? Are these arrangements documented?

3.6. Does the country have pre-agreed access to staffing resources to handle surge activity associated with emergency responses? Are these arrangements documented?

3.7. Does the country have pre-agreed stand-by financial resources to fund preparedness and response activities? These may include for example pre-agreed funds to compensate farmers against stock losses due to mandatory destruction. Are these arrangements documented?

SECTION 4. Other information

4.1 Please provide any information about the country relating to its aquatic EPR system that you feel has not been adequately captured in the responses to the specific questions above.

APPENDIX 2: Group picture

Figure 2. FAO/YSFRI First Interregional Workshop of TCP/INT/3501, 9 -11 November 2016, Beijing, People's Republic of China.

As part of the FAO Project TCP/INT/3501: *Strengthening Biosecurity Governance and Capacities for Dealing with the Serious Shrimp Infectious Myonecrosis Virus (IMNV) Disease*, a survey of national emergency aquatic disease preparedness and response (EPR) systems was conducted for Brazil, Ecuador and Mexico (representing South/Central America) and China, Indonesia and Thailand (representing Asia). The self-assessment questionnaire used to undertake the survey provided insight into each country's capabilities in terms of policies, procedures and institutional capabilities in place to detect the incursion of an emergency aquatic animal disease and to respond to that incursion by containing or eradicating the disease. The survey responses reveal a range of capacities across the two regions and highlights the urgent need for national preparedness and response systems capable of meeting the ever-increasing threat that aquatic animal diseases pose to aquaculture, capture fisheries and the environment. Analysis of the survey responses form the basis of twenty recommendations in this report aimed at improving the administration and operation of national EPR systems including with respect to early warning, early detection and early response to emergency aquatic animal disease incursions. The cooperation of the participating countries and the candid feedback provided by survey respondents is gratefully acknowledged.

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