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# INTRODUCTORY TRAINING COURSE ON RISK ANALYSIS FOR MOVEMENTS OF LIVE AQUATIC ANIMALS FOR RECOFI MEMBERS AND THE ROUND-TABLE MEETING ON RECOFI REGIONAL AQUATIC BIOSECURITY

**Muscat, Sultanate of Oman, 1–5 November 2015**

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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## PREPARATION OF THIS DOCUMENT

This document, Report of the Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members and the Round-table Meeting on RECOFI Regional Aquatic Biosecurity. provides a narrative of two events held in Muscat, Sultanate of Oman from 1 to 5 November 2015, and contains the outcomes of the above-mentioned training course and the round-table meeting: (i) Summary of the results of working group exercise on implementing risk analysis in the RECOFI region (identification of needs and recommendations); and (ii) Revised plan for implementation of the RECOFI Aquatic Animal Health Management Programme.

The preparation of this report was led by Dr M. B. Reantaso, Aquaculture Officer, Aquaculture Branch (FIAA), FAO Fisheries and Aquaculture Department and is based on the consultancy report of Dr J. R. Arthur, FAO International Consultant, with further input from him and with the assistance of Ms Elena Irde, also of FIAA.

**FAO**. 2017.
*Report of the Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members and the Round-table Meeting on RECOFI Regional Aquatic Biosecurity, Muscat, Sultanate of Oman, 1–5 November 2015*.
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## ABSTRACT

The Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members and the Round-table Meeting on RECOFI Regional Aquatic Biosecurity were held from 1 to 4 November and on 5 November, respectively, in Muscat, Sultanate of Oman. Both activities were hosted by the Ministry of Agriculture and Fisheries Wealth (MAFW), Sultanate of Oman.

The training course consisted of three major components, namely: (i) Introductory remarks and presentations; (ii) Introductory training course on risk analysis for movements of live aquatic animals; and (iii) The way forward (discussion of regional needs and future activities on risk analysis). The main outcomes of the Training Course were (i) the training of 19 participants from three RECOFI countries (the Islamic Republic of Iran, Oman, United Arab Emirates) in the basics of risk analysis for movements of live aquatic animals and (ii) a series of recommendations arising from the working group exercise on implementing risk analysis in the RECOFI region (identification of needs and recommendations). The three most important risk sectors for the RECOFI Member Countries that participated in the training course were: environmental, pathogen, and food safety and hygiene risks. The RECOFI Working Group on Aquaculture is requested to discuss and decide particularly on the following issues: (i) standardizing protocols for the application of risk analysis to prevent new pathogens in RECOFI Member Countries; (ii) assisting with training; (iii) exchanging expertise between RECOFI Member Countries; (iv) establishing a regional team for risk analysis; (v) exchanging risk analysis plans and cases between RECOFI countries; and (vi) establishing a list of regional laboratories accredited for aquatic animal health.

The round-table meeting, attended by the same participants completed the following: (i) reviewed the RECOFI Regional Aquatic Animal Health Programme developed in 2008 and the recommendations of the recently concluded Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members; (ii) informed the participants on emerging biosecurity challenges that may hinder the sustainable development of aquaculture in the region; and (iii) updated the regional biosecurity/aquatic animal health programme and its implementation. The main output of the round-table meeting is the Revised Plan for Implementation of the RECOFI Aquatic Animal Health Management Programme, including the priority and time-frame for each activity.

The Risk Analysis recommendations and the revised plan will be tabled for discussion and further action during the Seventh Meeting the RECOFI Working Group on Aquaculture in Doha, Qatar from 26 to 28 April 2016.

**CONTENTS**

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**APPENDIXES**

## BACKGROUND

1. The organization of an Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals was identified as a priority RECOFI activity to be undertaken in the 2011–2012 intersessional period[1]. The proposed activity was postponed and finally implemented in 2015. This exercise was built on a number of important decisions made by RECOFI, namely: (1) the Fourth session of RECOFI (May 2007, Jeddah, Kingdom of Saudi Arabia), which endorsed the preparation of a Regional Strategy on Aquatic Animal Health; and (2) the RECOFI Regional Technical Workshop on Aquatic Animal Health (April 2008, Jeddah), which finalized the proposal for a regional aquatic animal health programme[2].

2. Risk analysis is a decision-making tool that can provide insights that help to avoid the negative impacts that may be brought about by hazards created by or associated with aquaculture development. These include the risks of environmental degradation; introduction and spread of pathogens, pests and invasive species; genetic impacts; unsafe foods; and negative social and economic impacts. Using the risk analysis process can thus help aquaculture development to proceed in a more socially and environmentally responsible manner.

3. During the last several years, the aquaculture sector has been faced with emerging and serious transboundary aquatic animal pathogens. Since aquaculture is an emerging sector that is becoming important for the RECOFI region, it was deemed necessary and timely to take stock of the biosecurity challenges that may hinder the sustainable development of aquaculture in the region.

4. It was agreed that the four-day Introductory Training Course on Risk Analysis (1–4 November 2015) would be undertaken back-to-back with a one-day (5 November 2015) Round-table Discussion to revisit the RECOFI Regional Aquatic Animal Health Programme that was developed in 2008.

## INTRODUCTORY TRAINING COURSE ON RISK ANALYSIS FOR MOVEMENTS OF LIVE AQUATIC ANIMALS

### Objectives

5. The objective of the Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members was to provide a practical introductory training on risk analysis to representatives of participating countries from RECOFI, namely: Bahrain, Iraq, the Islamic Republic of Iran, Kuwait, Oman, Qatar, the Kingdom of Saudi Arabia (KSA) and the United Arab Emirates (UAE).

### Process

6. The training course, hosted by the Ministry of Agriculture and Fisheries Wealth (MAFW), Sultanate of Oman, was held at the Platinum Hotel, Muscat, from 1–4 November 2015. The course was facilitated by Dr J. Richard Arthur (FAO International Consultant) and Dr Melba B. Reantaso

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[1] FAO. 2011. *Report of the sixth session of the Regional Commission for Fisheries. Rome, 10–12 May 2011.* FAO Fisheries and Aquaculture Report No. 982. Rome, FAO. Regional Office for the Near East and North Africa. 46 pp. (available at: www.fao.org/docrep/014/i2377b/i2377b00.pdf)

[2] FAO/Regional Commission for Fisheries. 2009. *Report of the Regional Technical Workshop on Aquatic Animal Health. Jeddah, Kingdom of Saudi Arabia, 6–10 April 2008.* FAO Fisheries and Aquaculture Report No. 876. Rome, FAO. 119 pp. (available at: ftp://ftp.fao.org/docrep/fao/011/i0572e/i0572e00.pdf)

(Aquaculture Officer), assisted by Mr Dawood Suleiman Al-Yahyai (National Consultant). The training course consisted of three major components, namely:

- Introductory remarks and presentations
- Introductory training course on risk analysis for movements of live aquatic animals
- The way forward (discussion of regional needs and future activities on risk analysis)

7. This intensive exercise was based on the FAO training manual prepared by Drs Arthur and Reantaso[3]. The workshop programme is given as **Annex 1**. The course material given in the manual provided the framework and most of the substance for each course offering; however, each course offering is specifically tailored to the country or region and the participants for which it was being given. This includes the invitation to regional and national experts attending the training session to give presentations summarizing local aquaculture development and aquatic animal health and biosecurity history and issues. In addition, Dr J Richard Arthur prepares two cases studies of high relevance to the region or country that form the basis for the working group exercises that are a major component of the training course. In this instance, these were: (i) importation of whiteleg shrimp (*Penaeus vannamei*) to the Sultanate of Oman and (ii) importation of barramundi (*Lates calcarifer*) to Bahrain.

## Participants

8. The training course was attended by 19 participants representing three of the eight RECOFI Member Countries (the Islamic Republic of Iran – 1, Oman – 16 and UAE – 2), two FAO staff, one International Consultant and one invited resource speaker from KSA. The List of Participants is given as **Annex 2**.

## Workshop highlights

### *Opening of the workshop*

9. The training course was officially opened under the patronage of Mr H.E. Sayyd Hilal bin Musallam Al-Busaidi, Advisor to MAFW.

*Opening Statement by Dr Ahmed Mohammed Al-Mazrooie, Director General of Fisheries Resources Development*

10. In his opening remarks, Dr Ahmed welcomed the delegates from the RECOFI Member Countries and the FAO staff and experts, wishing them a good stay in Oman and a successful workshop. He stressed the importance of aquaculture in the RECOFI region as a growing sector and the need for transporting fingerlings and broodstock for different purposes in aquaculture projects. This transport needs careful assessment before being undertaken, as it may be accompanied by some risks of mortality and diseases. Dr Ahmed also mentioned the importance of regional biosecurity and the need to develop good health monitoring plans and strategies to cope with the expected expansion of aquaculture. He clarified the importance of this issue to the RECOFI Working Group on Aquaculture (WGA), which discussed this topic in its meetings and agreed to conduct this training course on risk analysis for transport of live aquatic animals and biosecurity. This training course is a follow-up activity to the previous workshop on aquatic animal health that was held in Jeddah in April 2008. Dr Ahmed pointed out the importance of biosecurity issues in Oman and highlighted the initiatives conducted by the MAFW, including the hosting of this important training workshop. In closing, Dr Ahmed called upon the attendees to participate effectively in the workshop and to come up with clear and practical recommendations that can help the RECOFI countries to develop their

[3] Arthur, J.R. & M.G. Bondad-Reantaso. 2012. *Introductory training course on risk analysis for movements of live aquatic animals.* FAO SAP, Samoa. 167 pp. (available at: www.fao.org/3/a-i2571e.pdf)

aquaculture sectors in a sustainable manner, taking into consideration the biosecurity and aquatic animal health issues.

*Opening Statement by Mr Al-Zain Al-Muzamul, FAO Representative to Oman*

11. In his opening remarks, the FAO Representative to Oman welcomed on behalf of FAO, the delegates from RECOFI Member Countries and the other participants in the workshop. He pointed out the importance of aquaculture in providing fish for an increasing population, which contributes to global food security. He also highlighted the initiatives conducted by FAO to help countries to develop their aquaculture sectors in a sustainable manner, including the preparation of the FAO Code of Conduct for Responsible Fisheries. He emphasized the importance of conducting risk analysis to reduce the impacts of introducing new species for aquaculture. Mr Al-Zain also pointed out the call of international organizations such as the World Trade Organization (WTO), the World Organisation for Animal Health (OIE) and FAO for countries to take the necessary actions to prevent or reduce the possible impacts of aquaculture activities and also to ensure the availability of safe food for people. Mr Al-Zain highlighted that the main objective of this workshop was to train the participants on the new methods of risk analysis and to provide them with the necessary information to analyze these risks. In closing, he thanked the MAFW for generously accepting to host the workshop and for its continuous cooperation with FAO.

## *Invited presentations*

12. In order to take advantage of the expertise of several of the aquaculture specialists attending the training session, Drs Reantaso and Arthur invited several of them to give presentations on special topics related to aquaculture and aquatic animal health in Oman and KSA. Summaries of these presentations are given below:

*Aquaculture higher education in Oman (Dr Adil Nasr Zaky Gindy, Head, Department of Fisheries and Marine Science, Al-Sharqiuah University)*

13. In this lecture, Dr Adil gave the participants an overview of the opportunities for higher education in aquaculture that are available in Oman. He noted that the Fishermen Training Institute in Al-Khaboura (Al-Batinah Governorate, northern Oman) gives a vocational diploma in aquaculture. The institute accepts secondary school graduates for a study period of three years, of which the first year is for foundation and the subsequent two years are for specialization. During the first year, the students take only English, mathematics and information technology. During the second and third years, various technical subjects are taught that cover most aspects of aquaculture, such as feeding, hatcheries, fish biology and physiology, culture environment, aquatic animal health and fish quality control. Practical training represents 70 percent of the curriculum. During the second year, three months are devoted to practical training outside the institute. Other opportunities for higher education available in Oman include bachelor degrees from Sultan Qaboos University and Al-Shariquah University. These two universities both have a special Department for Fisheries and Marine Science which offers a Bachelor of Fisheries and Marine Science degree. There is no specific degree for aquaculture, but some relevant subjects are included in the curriculum, e.g. fish biology and physiology, marine environment, marine ecology, fish stock assessment and dynamics.

*Status of shrimp culture in Bentout, Oman (Mr Rajendran Loganathan, Farm Manager)*

14. Bentout shrimp farm, located in Bintoot (Al-Wusta Governorate) is the only currently operational aquaculture farm in Oman. Mr Loganathan gave some general information about the farm, its history and current production. The farm started in 2005 and the first production was harvested in 2007. Farm construction was completed in 2011, with 86 ha of ponds under cultivation. By 2014, production had risen to 280 tonnes, with an expected production of 200 tonnes for 2015. This species being cultured is the local Indian white prawn (*Penaeus indicus*). The current 86 ha under production

consists of ponds ranging from 1–5 ha in size. The farm contains a hatchery with a capacity of producing 50 million postlarvae (PL)/year. The shrimp are harvested at a size of 14–20 g. He then presented some information on the main equipment used and the daily work conducted on the farm, which includes monitoring of pond and shrimp health and quality status. Mr Loganathan stated that 99.9 percent of the farm practices are "organic" and do not involve the use of any chemicals or medicines. The broodstock are collected from the wild near the farm site during the fishing season. To date, the farm has not faced any health or disease issues. A major problem is the presence of large numbers of migratory birds in the farm site. Due to the demand for shrimp, the company wants to expand the farm's size and production capacity and has completed the necessary requirements for this expansion.

*The status of tilapia culture in Oman (Dr Adrian Hartley, Aquaculture Expert, Directorate of Aquaculture Development, MAFW)*

15. Nile tilapia (*Oreochromis niloticus*) is an exotic species that was introduced in Oman in the early 1980s as a biological control for mosquitoes. For aquaculture purposes, the MAFW conducts practical and scientific research on this species and has shown its suitability for culturing in the private farms available in Oman. Dr Hartley gave some general information about an important initiative that the MAFW has undertaken by establishing ten model tilapia farms within the plantation farms of local Omani owners. To demonstrate the success of tilapia culture in Oman, the MAFW initially supports these farms both financially and technically. The farms are distributed in different governorates in Oman. The tilapia culture unit in these farms is according to a design prepared by the specialists in the MAFW. Each farm unit is designed to produce 36 tonnes/year of tilapia. The project started in 2013, and the farms that are now in production continue to produce and sell fish. These farms are monitored regularly by a team from the Aquaculture Development Department, the Aquaculture Centre and the Fish Quality Control Centre. The MAFW plans to develop this type of aquaculture for small and medium-sized enterprises (SMEs), and hopes to develop 50 farms of 10 ha each. Each farm will include a tilapia culture unit, a greenhouse for agriculture products, and greenfield agricultural products. This strategic project is an integrated activity involving the aquacultural and agricultural sectors.

*Oman Aquaculture Development Company (OADC) (Mr Andreas Ntatsopoulos, Operational Manager)*

16. The Oman Aquaculture Development Company (OADC) is a governmental company established by the MAFW in 2014 in cooperation with the Oman Investment Fund (OIF). OADC will play a main role in developing investor confidence by investing in feasible commercial projects and running its businesses successfully. It will invest in commercially viable aquaculture projects that develop Oman’s aquaculture sector. The company will endeavour to diversify its investments, making the most of Oman’s natural resources. Mr Ntatsopoulos provided the participants with a general overview of the projects being planned by the company. These include shrimp culture, shrimp hatchery, finfish hatchery, grouper recirculating aquaculture system (RAS), finfish cage culture and an abalone culture project. The OADC will act as a catalytic investor in aquaculture projects, taking majority ownerships in investments/joint ventures where necessary. It will also seek to start joint ventures with foreign aquaculture companies to: (a) help build the confidence of foreign investors in the Omani aquaculture market and (b) to leverage process and product expertise and market knowledge of the foreign partner in order to enrich the Omani experience. The company will also invest in commercial research and development (R&D) as required in the normal course of business at the individual project level.

*Regional experiences in risk analysis and approval process of introduction of Penaeus vannamei and Lates calcarifer to KSA (Mr Shuaib T. Muhammed, NAQUA)*

17. Mr Shuaib T. Muhammed began his presentation with a brief overview of shrimp farming history in KSA. *Penaeus indicus* was initially farmed in the country, with production contributed by six major companies situated along the Red Sea coast. He described the outbreaks of whitespot syndrome virus (WSSV) in KSA in 2010, and the surveillance programme that concluded that the prevalence of WSSV in the environment was high and that there was no *P. indicus* broodstock population free of WSSV in the country. These observations led to the decision to introduce specific pathogen free (SPF) *Penaeus vannamei*. He mentioned the major suppliers of SPF *P. vannamei* and the reasons for importing WSSV-tolerant *P. vannamei* from Promarisco Ecuador. A detailed explanation about the importation process, the quarantine facilities, quarantine biosecurity, the co-habitation trial with local species (*P. indicus*), the *P. vannamei* tissue feeding trial, and the sampling and analysis conducted to confirm that the imported *P. vannamei* was unlikely to cause any negative impacts on the local species and did not carry any of the OIE-listed pathogens. In closing, he also showed graphically a comparison of the production of *P indicus* and *P vannamei* in KSA. He also explained about the introduction of *Lates calcarifer*; its importation process, and the regulations regarding aquatic organisms in KSA, and as well as the list of major suppliers of broodstock *L. calcarifer* approved by KSA, the quarantine facilities, sampling and approval from authorities, the list of pathogens of concern (both OIE and ADMA listed), and information about the national and international diagnostic laboratories accredited for testing for the listed pathogens.

## Outputs

18. Participants to this three-day introductory course, which included 13 training course proper presentations and seven working group exercises, now have a better awareness, having acquired new knowledge and a good understanding and appreciation of risk analysis as a concept, as a process and as decision-making tool and its use in aquaculture development, particularly with reference to aquatic animal movements.

19. An important output of the training course was the results of Working Group Exercise 7, which was used during the subsequent RECOFI Round-table Meeting (see **Annex 3**).

20. The three most important risk sectors for the RECOFI Member Countries that participated in the course were: environmental, pathogen, and food safety and hygiene risks.

21. Two completed case studies, (i) importation of whiteleg shrimp (*Penaeus vannamei*) to the Sultanate of Oman and (ii) importation of barramundi (*Lates calcarifer*) to Bahrain will also form part of a compendium of risk analysis training course case study materials being collated by FAO and will be published at a later date.

## Conclusions and the way forward

22. Despite the attendance of representatives from only three of the eight RECOFI member countries, this offering of the training course was highly successful, thanks to the good participation of staff from Oman's government, academia and the private sector.

23. The RECOFI Working Group on Aquaculture is requested discuss and decide particularly on Question 5 of **Annex 3** on issues pertaining to the following: (1) standardizing protocols for application of risk analysis to prevent new pathogens in RECOFI Member Countries; (2) assisting with training ; (3) exchanging expertise between RECOFI countries; (4) establishing a regional team for risk analysis; (5) exchanging risk analysis plans and cases between RECOFI countries; and (6) establishing a list of regional laboratories accredited for aquatic animal health.

## ROUND-TABLE MEETING ON RECOFI REGIONAL AQUATIC BIOSECURITY PROGRAMME

24. The Round-table Meeting on the RECOFI Regional Aquatic Biosecurity Programme was held on 5 November at the Platinum Hotel, Muscat and was attended by representatives of the three participating RECOFI Member Countries (the Islamic Republic of Iran, Oman and UAE).

### Objectives

25. The objective of the Round-table Meeting on RECOFI Regional Aquatic Biosecurity Programme (5 November 2015) was to review the RECOFI Regional Aquatic Animal Health Programme developed in 2008, and to be informed of emerging biosecurity challenges that may hinder the sustainable development of aquaculture in the region, with a view of updating the regional programme and the regional biosecurity programme and its implementation.

26. The objectives of this meeting were as follows:

- to review the RECOFI Regional Aquatic Biosecurity Programme developed in 2008 and the recommendations of the recently concluded Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members;
- to be informed of emerging biosecurity challenges that may hinder the sustainable development of aquaculture in the region; and
- to update the regional biosecurity programme and its implementation

### Participants

27. The Round-table Meeting was attended by 18 participants, including representatives from three of the eight RECOFI Member Countries (the Islamic Republic of Iran – 1, Oman – 13, UAE – 1) and FAO staff (3) (see **Annex 2**).

### Process

28. Prior to the RECOFI Round-table Meeting, it was decided to update the RECOFI Regional Aquatic Animal Health Performance and Capacity Survey, a key document that assists in identifying gaps in capacity and regional needs. To this end, a revised survey form was prepared by Drs Arthur and Reantaso and was distributed to the National Focal Points (NFPs) of all eight RECOFI Member Countries several months in advance of the meeting date. However, at the time of the meeting, completed survey forms had only been received from Bahrain, Oman and KSA, thus making an updated regional analysis impossible. In an attempt to improve knowledge of regional progress in aquatic biosecurity, based on Table 1 the Report of the Regional Technical Workshop on Aquatic Animal Health. Jeddah, Kingdom of Saudi Arabia, 6–10 April 2008 (FAO, 2009)[4], Drs Arthur and Reantaso then prepared a listing of the programme activities that were to be undertaken by the Member Countries, which was sent to the NFPs with a request to indicate what progress, if any, had been achieved since 2007. However, responses were received only from Iraq, Oman, and Qatar. None the less, this additional information assisted in providing a picture of the very limited progress made by RECOFI Member Countries towards completing the national components of the regional programme.

29. The Round-table Meeting consisted of four introductory presentations (summarized in Annex 4) followed by a plenary discussion chaired by Dr Reantaso during which the Plan for

[4] FAO/Regional Commission on Fisheries. 2009. *Report of the Regional Technical Workshop on Aquatic Animal Health. Jeddah, Kingdom of Saudi Arabia, 6–10 April 2008.* FAO Fisheries and Aquaculture Report No. 876, FAO. Rome, 119 pp. (available at: ftp://ftp.fao.org/docrep/fao/011/i0572e/i0572e00.pdf)

Implementation of the RECOFI Aquatic Animal Health Management Programme was reviewed, and the programme revised and approved by the participants. During this session, the participants examined the Programme Components, Elements and Activities that were developed during the 2008 RECOFI meeting held in Jeddah, KSA, considered the relevance of each activity, and agreed on its priority (high, medium, low) and time frame (short-, medium-, long-term). The changes to this programme as suggested by the participants included the removal of several activities that were either completed or no longer relevant, and in several instances, the combining of activities into a single activity, without loss of content.

## Outputs

30. The primary output of the Round-table Meeting was the Revised Plan for Implementation of the RECOFI Aquatic Animal Health Management Programme, including the priority and time frame for each activity (**Annex 5**). This revised plan will be tabled for discussion and further action during the Seventh Meeting the RECOFI Working Group on Aquaculture in Doha, Qatar from 26–28 April 2016.

## Conclusions and the way forward

31. The poor participation by RECOFI Member Countries is a major constraint to making progress in the implementation of the Regional Aquatic Animal Health Management Programme and in the conduct of future training activities. The RECOFI Working Group on Aquaculture (WGA) needs to stress to RECOFI Member Countries and NFPs the importance of this initiative and the essential need for their full participation and cooperation. The poor response of the NFPs to the request for updating the Regional Aquatic Animal Health Capacity and Performance Survey (4 of 8 countries) and in providing an indication of national progress towards completing the activities outlined in the 2008 implementation plan (2 of 8 countries) indicates that many countries do not consider this a priority.

32. Despite the poor RECOFI representation, the enthusiastic participation of a large group of participants from Oman, including representatives from two ministries, academia and the private sector, and the representatives of the Islamic Republic of Iran and UAE made for a successful workshop which led to a productive RECOFI Round-table Meeting and the development of a Draft Framework for a Roadmap to Biosecurity and Aquatic Animal Health Management in the Sultanate of Oman following the training course.

33. The RECOFI Working Group on Aquaculture is requested to discuss and decide on activities identified as high priority (H) and short-term [S] (essential and immediate action) and develop further an implementation plan including the sources of funding (**Annex 5**).

**ANNEX 1**
**Programme**

| Date | Activities |
|---|---|
| 31 October, Saturday | Arrival of participants |
| **1 November, Sunday** | **DAY 1** |
| 09:00–09:30 | Registration |
| 09:30–10:00 | Workshop Opening<br>▪ Welcome statement by Ministry of Fisheries & Agriculture<br>▪ Welcome statement by FAO<br>Self- introduction of participants |
| | **Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals** |
| 10:00–10:30 | **Coffee break and taking of the Group Photograph** |
| 10:30–11:00 | **Introductory Presentation 1.** Background, objectives and expected outcomes of the Regional Workshop (Dr Melba Reantaso, FAO) |
| 11:00–11:30 | **Training Course Part 1: Course introduction**<br>(Dr Richard Arthur, FAO Consultant) |
| 11:30–12:30 | **Training Course Part 2:** Overview of trade in aquatic animal commodities<br>(Dr Melba Reantaso) |
| 12:30–14:00 | **Lunch break** |
| 14:00–14:40 | **Training Course Part 3:** Overview of risks in aquaculture<br>(Dr Richard Arthur) |
| 14:40–15:30 | **Training Course Part 4:** Overview of risk analysis<br>(Dr Richard Arthur) |
| 15:30–16:00 | **Coffee break** |
| 16:00–16:40 | **Training Course Part 5:** Relevant international treaties, agreements and guidance (Dr Melba Reantaso) |
| 16:40–17:10 | **Training Course Part 6: Risk communication**<br>(Dr Richard Arthur) |
| 17:10–18:00 | **Working Group Exercise 1 -** Risk communication |
| **2 November, Monday** | **DAY 2** |
| 09:00–09:50 | **Training Course Part 7:** Pathogen risk analysis – transboundary aquatic animal diseases (TAADs)<br>(Dr Melba Reantaso) |
| 09:50–10:30 | **Training Course Part 8:** Pathogen risk analysis – introduction and preliminaries<br>(Dr Richard Arthur) |
| 10:30–11:00 | **Coffee break** |
| 11:00–12:00 | **Working Group Exercise 2:** Identifying issues and potential risks in proposals for species translocations for aquaculture development |
| 12:00–12:30 | **Training Course Part 9:** Pathogen risk analysis – Hazard identification<br>(Dr Richard Arthur) |
| 12:30–14:00 | **Lunch break** |

| | |
|---|---|
| 14:00–14:30 | **Training Course Part 9:** Pathogen risk analysis – Hazard identification (continued) (Dr Richard Arthur) |
| 14:30–15:30 | **Working Group Exercise 3:** Case Studies: Pathogen risk analysis – scoping to hazard identification |
| 15:30–16:00 | **Coffee break** |
| 16:00–16:30 | **Working Group Exercise 3:** Continued |
| 16:30–17:30 | **Training Course Part 10:** Pathogen risk analysis – risk assessment (release, exposure & consequence assessment, risk estimation; risk management (ALOP, precautionary principle, risk evaluation)<br>(Dr Richard Arthur) |
| **3 November, Tuesday** | **DAY 3** |
| 09:00–10:30 | **Working Group Exercise 4:** Case Studies: risk assessment (release, exposure & consequence assessment); risk estimation; risk management (risk evaluation)) |
| 10:00–10:30 | **Coffee break** |
| 10:30–11:00 | **Working Group Exercise 5:** Determining the national ALOP<br>(country exercise) |
| 11:00–12:00 | **Training Course Part 11:** Pathogen risk analysis – risk management (option evaluation, implementation, monitoring and review)<br>(Dr Richard Arthur) |
| 12:30–14:00 | **Lunch break** |
| 14:00–15:30 | **Working Group Exercise 6**: Risk management (option evaluation, implementation, monitoring and review) |
| 15:30–16:00 | **Coffee break** |
| 16:00–17:00 | **Training Course Part 12: Concluding session**<br>(Dr Richard Arthur) |
| Evening | **Official Dinner** |
| **4 November, Wednesday** | **Day 4** |
| 9:00–10:00 | **Summary Presentation of the Case Studies**<br>• Working Group 1: Barramundi<br>• Working Group 2: Whiteleg prawn |
| 10:00–10:30 | **Coffee Break** |
| 10:30–11:30 | **Regional experiences in risk analysis and approval process for introduction of:**<br>• *Penaeus vannami* to KSA (Mr Thaiparampil Muhammed Shuaib)<br>• *Lates calcarifer* to KSA and Oman (Mr Thaiparampil Muhammed Shuaib) |
| 11:30–12:30 | **Analysis of the Case Studies and Plenary Discussion**<br>(Dr Richard Arthur) |
| 12:30–14:00 | **Lunch break** |
| 14:00–15:30 | **Working Group Exercise 7**: Implementing risk analysis: identification of needs and recommendations (country exercise) |
| 15:30–16:00 | **Coffee Break** |
| 16:00–17:00 | **The Way Forward:** plenary discussion of regional needs and future activities<br>(Dr Melba Reantaso) |

| | |
|---|---|
| 17:00–17:20 | **Closing Session**<br>(Dr Melba Reantaso)<br>▪ Closing Remarks (FAO)<br>▪ Closing Remarks (MFA) |
| **5 November, Thursday** | **Round-table Meeting on RECOFI Regional Aquatic Biosecurity** |
| 09:00–09:20 | Round Table Opening<br>▪ Welcome statement by Ministry of Fisheries & Agriculture<br>▪ Welcome statement by FAO |
| 09:20–09:30 | **Presentation 1.** Background, objectives and expected outcomes of the Round-table Meeting (Dr Melba Reantaso) |
| 09:30–10:00 | **Presentation 2.** Update of the 2008 RECOFI Regional Aquatic Animal Health Performance and Capacity Survey<br>(Dr Richard Arthur) |
| 10:00-10:30 | **Coffee break** |
| 10:30–11:30 | **Presentation 3:** Emerging Biosecurity Issues that may Impact Aquaculture Development in the RECOFI region (Mr Thaiparampil Muhammed Shuaib) |
| 11:30–12:30 | **Round-table discussion:** Regional Aquatic Animal Health Management Programme and Follow-up to Agreed Actions from 2008 (Dr Melba Reantaso) |
| 12:30-14:00 | **Lunch break** |
| 1400-15:30 | **Round-table discussion:** Preparation of Updated Regional Aquatic Animal Health Management Programme and Revised Implementation Plan (for presentation during the next RECOFI meeting in 2016)<br>(Dr Melba Reantaso) |
| 15:30–16:00 | **Coffee break** |
| 16:00–17:30 | **Round-table discussion:** Preparation of Updated Regional Aquatic Animal Health Management Programme and Revised Implementation Plan (for presentation during the next RECOFI meeting in 2016)<br>(continued, if necessary) (Dr Melba Reantaso) |
| 17:30–17:40 | Closing Remarks |

## ANNEX 2

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## ANNEX 3

### Summary of the results of Working Group Exercise 7 (Country Exercise): Implementing Risk Analysis in the RECOFI Region: Identification of Needs And Recommendations

The results of Working Group Exercise 7 are summarized in tabular format as follows:

**Question 1.** How important is understanding and applying risk analysis to managing the main problems/constraints to applying risk analysis in your country? (list from highest to lowest importance).

| **Country** | **Importance** |
|---|---|
| Iran (the Islamic Republic of) | • Very important |
| Oman | • Very important |
| UAE | • Important (to help us pre-, during & post management of aquatic animals and pathogens |

**Question 2.** Rank the seven areas of risk analysis according to their importance to sustainable aquaculture development (1-highest; 7- lowest).

| **Risk area** | Iran (the Islamic Republic of) | **Oman** | **UAE** |
|---|---|---|---|
| Financial | 7 | 7 | 7 |
| Social | 6 | 6 | 6 |
| Environmental | 1 | 1 | 3 |
| Pathogen | 4 | 2 | 1 |
| Food safety & hygiene | 5 | 3 | 2 |
| Genetic | 3 | 5 | 4 |
| Ecological | 2 | 4 | 5 |

**Questions 3 and 4 (responses combined).** 3. Main problems/constraints to applying risk analysis in your country (list from highest to lowest importance); and 4. For each constraint, list some possible solutions (these should be practical and have a real possibility of being implemented in your country, even if no external funding is obtained).

| **Country** | **Constraint** | **Solutions** |
|---|---|---|
| Iran (the Islamic Republic of) | • Budget | • Request FAO TCP to revise current policy & implement |
| Oman | • Qualified staff/knowledge<br>• Infrastructure<br>• Legislation | • Increase expertise via higher studies & training<br>• Building quarantine, accredited laboratory<br>• More enforcement |
| U.A.E. | • Legislation<br>• Capacity building<br>• Knowledge<br>• Infrastructure<br>• Budget | • Team of experts<br>• Training (In house and long term)<br>• New laboratories<br>• Finance to develop this programme |

**Question 5.** Other recommendations you would like to make to the competent authorities of your country/FAO/RECOFI**.**

| **Country** | **Action requested** |
|---|---|
| ***Iran (the Islamic Republic of)*** | • Standardize protocols for application of risk analysis to prevent new pathogens in RECOFI Member Countries |
| Current status | • FAO implements an introductory course upon government request<br>• Chapter 2 of the OIE Code outlines the general process that should be followed for Import Risk Analysis<br>• There is no detailed regional guidance on conducting risk analysis<br>  ○ Does RECOFI need a regional guidance document outlining recommended procedures for conducting IRA for its Member Countries?<br>  ○ Should this document be broader than pathogen risk analysis, possibly including genetic, pest (invasive species) and ecological risk analysis?<br>  ○ Commission an expert who will do the document?<br>  ○ Organize capacity building (training) to implement this?<br>  ○ If agreed, secure funding to do the above |
| ***Oman*** | • Assist with training<br>• Exchange expertise between RECOFI countries<br>• Establish a regional team for risk analysis<br>• Exchange risk analysis plans and cases between RECOFI countries<br>• Establish a list of regional laboratories accredited for aquatic animal health |

| | |
|---|---|
| Current status | • An introduction to aquatic animal health, risk analysis and national strategy development was done in Jeddah, with the participation of five RECOFI countries (Bahrain, KSA, Oman, Qatar, UAE)<br>• A risk analysis training course was recently conducted in Muscat, Oman, with thee countries represented. A number of RECOFI nationals (Oman-13, UAE-1, the Islamic Republic of Iran-1) now have a good understanding of the risk analysis process and can initiate or supervise a risk analysis<br>• Establish a regional team from the three countries and organize a follow-up training for this regional team that will represent RECOFI<br>• KSA is the only country that has completed a full risk analysis (Introduction of whiteleg shrimp to KSA – pathogen, ecological and genetic risks)<br>• Two case studies were completed for the Oman workshop (1. Importation of whiteleg shrimp (*Penaeus vannamei*) to Oman; and 2. Importation of baramundi (*Lates calcarifer*) to Bahrain<br>From FAO the self-assessment survey, the following countries have officially designated national laboratories for aquatic animal health: Bahrain, the Islamic Republic of Iran, Iraq, Kuwait and KSA<br>• The Islamic Republic of Iran and KSA have accredited laboratories. KSA is accredited by the Saudi Arabian Standards Organization (SASO). No information on the accrediting body was provided by the Islamic Republic of Iran.<br>• RECOFI should establish a regional accreditation process, ether by adopting an existing scheme or by developing a set of RECOFI criteria, and decide on the accrediting organization |
| UAE | • Set up a proposal to develop biosecurity & pathogen risk analysis (national level) |

## ANNEX 4

### Summary of introductory presentations

Annex 4 presents brief summaries of the formal presentations given at the Round-table Meeting.

***Presentation 1: Background, objectives and expected outcomes of the Round-table Meeting (Dr Melba B. Reantaso)***

To open the Round-table Meeting, Dr Reantaso presented the four "Ps" – purpose, process, participants and products. She stated that the purpose of the meeting was: (i) to review the RECOFI regional biosecurity programme developed in 2008 and the recommendations arising from the Muscat Risk Analysis Training Course; (ii) to be informed of emerging biosecurity challenges that may hinder the sustainable development of aquaculture in the region; and (iii) to update the regional biosecurity programme and its implementation. The Process was to consist of: (i) three presentations (a. 2008 RECOFI aquatic animal health programme, b. Regional recommendations arising from the Muscat Risk Analysis Training Course, and c. Emerging aquatic animal health issues that may affect RECOFI.); (ii) Plenary discussion; (iii) Review of programme components/elements, priority setting and implementation; and (iv) Summary, wrap-up and closing. The Participants were the representatives from the three attending RECOFI Countries (the Islamic Republic of Iran, Oman, UAE), while the Product to be achieved by the meeting was an updated RECOFI programme on aquatic animal health that includes indicators for priority and implementation (time frame).

***Presentation 2: 2008 Regional Programme for Improving Aquatic Animal Health in RECOFI Member Countries (Dr Melba Reantaso)***

In this short presentation, Dr Reantaso prepared the participants for the task ahead by briefly reviewing the regional programme as presented in Appendix H of FAO (2009). The programme as then formulated consists of 5 Programme Components, 18 Elements and 44 Activities. These are as follows (given as Programme Component, Elements within each Component, and number of activities within each element (in parentheses): Governance, Legislation (3); Disease diagnostics, disease diagnostics (3), laboratories (1); Aquatic Biosecurity, standardized guidelines/procedures for new aquaculture species (2), pathogen risk analysis (2), surveillance, monitoring & reporting (3), emergency response planning (1), pathogen list (1), health certification and regionally standardized health certificates for aquatic animals (3), border inspection and quarantine procedures (3), zoning (1). Access to Information, pathogen database (1), aquatic animal import/export database (1), legislation database (1), aquatic animal health expertise database (1), Regional aquatic animal health website (1); and Regional cooperation and Networking, Regional aquatic animal health meetings (2).

***Presentation 3: Recommendations resulting from the Risk Analysis Training Course (Dr Richard Arthur)***

Dr Arthur then presented the Results of Working Group Exercise 7 (Country Exercise): Implementing Risk Analysis in the RECOFI Region: Identification of Needs and Recommendations (see Annex 3), which was conducted during the preceding Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members. The participants were asked to consider the recommendations arising from this exercise in their discussions on revising the 2008 Regional Programme for Improving Aquatic Animal Health in RECOFI Member Countries.

***Presentation 4: Emerging biosecurity issues that may impact aquaculture development in the RECOFI region (Mr Shuaib T. Muhammed, NAQUA)***

Mr. Shuaib T. Muhammed began his presentation with the FAO definition of biosecurity, then explained about the risk pyramid and the level of impact. He presented a tabular summary of the sanitary status of different geographical regions related to shrimp diseases. He also classified the diseases based on their economic impact. Then he discussed the major biosecurity risks related to aquaculture development and the actions to be taken by government, industry and academia to mitigate the risks. He also discussed the major biosecurity challenges, and related them to both internal and external biosecurity. He also illustrated the historic movements of major shrimp diseases between countries/regions through importations. The major external biosecurity challenges for government are the control of importations of live, fresh and frozen shrimp; regional and international collaboration; and the treatment of ballast waters to mitigate the risk of disease introduction. The actions needed to mitigate external biosecurity risks at the industry level were identified as the use of SPF/SPR (disease tolerant) broodstocks, improved water treatment, use of biosecure fresh feeds for maturation purposes, and tighter control on production. From the academic side, the proposed actions included development and maintenance of SPF/SPR broodstocks, development of biosecure maturation feeds, development of markers for tolerance identification, definition of welfare parameters and the development of cost-effective diagnostic techniques. The actions needed to mitigate internal biosecurity risks were identified as zoning or compartmentalization by government and the use of SPF/SPR broodstocks for production by the industry.

## ANNEX 5

### Revised Plan for Implementation of the RECOFI Aquatic Animal Health Management Programme

**Background:** This revised implementation plan was discussed and approved by the participants at the Round-table Meeting on RECOFI Regional Aquatic Biosecurity Programme which was held on 5 November in Muscat, Sultanate of Oman. It is the primary output of the meeting and replaces Annex H, Table 1 of FAO/RECOFI (2009).[5] Note that the Round-table Meeting addressed only those activities noted to be a regional responsibility in the original table.

**Table 1.** Indicative activities for regional level implementation of the RECOFI Aquatic Animal Health Management Programme. Priority: H = high, M = medium, L = low; Time frame: S = short (1-2 yrs), M = medium (2-5 years), L = long (5+ years)

| Programme components | Programme elements | Activities | Priority | Time frame |
|---|---|---|---|---|
| **1. Governance** | 2. Legislation and regulation | 3. Results of the legal review process undertaken by the Biosecurity Working Group (see 3.5) to be presented at a workshop on harmonizing national aquatic animal health legislation<br>5. Regional workshop on harmonizing aquatic animal health legislation | M<br>M | M<br>M |
| **2. Disease diagnostics** | 3. National capacity for aquatic animal disease diagnosis | 7. Assessment of national needs for diagnostic capability by an international expert assisted by national focal points (to be guided by regional capacity and performance survey).<br>8. Short-term training course on recent laboratory techniques in disease diagnosis.<br>9. Regional workshop on fish disease diagnosis | H<br>H<br>H | S<br>S<br>S |
| | 4. Regional and national diagnostic laboratories | 11. Official designation of a regional lead laboratory for aquatic animal health (to be accomplished by the RECOFI WGA) (see RA recommendation) | H | ? |
| **3. Aquatic biosecurity** | 5. Biosecurity Working Group | 12. Establish an ad hoc Biosecurity Working Group under the RECOFI WGA to address all issues on biosecurity (to be assisted by the FAO Legal Office for activities related to aquatic animal health legislation) | H | S |

[5] FAO/RECOFI. 2009. *Report of the Regional Technical Workshop on Aquatic Animal Health, Jeddah, Kingdom of Saudi Arabia, 6-10 April 2008. F*AO Fisheries and Aquaculture Report No. 876, Rome, FAO, 109 pp. (available at: ftp://ftp.fao.org/docrep/fao/011/i0572e/i0572e00.pdf)

| | | | | |
|---|---|---|---|---|
| | 6. Regionally standardized guidelines/ procedures for new aquaculture species | 14. Develop a regionally standardized guideline for the introduction a new aquatic species and conduct a regional technical workshop on development of guidelines for introductions and transfers of aquatic animals. (see RA recommendation) | H | S |
| | 7. Pathogen risk analysis | 16. Review of regional risk analysis capacity and needs (to be guided by regional performance and capacity survey)<br>17. Regional training workshop on pathogen risk analysis. | H<br>Completed | S |
| | 8. National and regional disease surveillance, monitoring and reporting | 19. Review of existing national capabilities and protocols.<br>20. Regional training workshop on surveillance, monitoring and reporting of aquatic animal diseases.<br>22. Establishment of national aquatic animal disease reporting system and an aquatic animal health information system linked to a regional disease reporting system. Expert and a technical workshop. | H<br>H<br>H | S<br>S<br>S |
| | 9. Regional emergency response planning | 23. Training workshop on contingency planning and emergency preparedness | M | M |
| | 10. National and regional lists | 26. Workshop on national and regional pathogen lists. Expert and a technical workshop. | H | S |
| | 11. Health certification and regionally standardized health certificates for aquatic animals, and review of border inspection and quarantine procedures | 27. Conduct a detailed review of current health certification practices among RECOFI Members, draft regionally standardized health certificates for import and export of live aquatic animals, and hold a regional workshop on standardization of health certification. Expert and a technical workshop. | H | S |
| | | 29. Review current border inspection and quarantine procedures in RECOFI, develop regional guidelines or best management practices and their application, and conduct a regional workshop on inspection and quarantine. | H | M |
| | 12. Disease zoning | 32. Training workshop on zoning for aquatic animal diseases. | H | M |
| **4. Access to information** | 14. Pathogen database | 34. Development of a regional pathogen database | H | M |

| | | | | |
|---|---|---|---|---|
| [1] | 15. Aquatic animal import/export database | 35. Development of a regional database on exports and imports of live aquatic animals | H | M |
| | 15. Legislation database | 36. Preparation of a regional legislation database (assistance from FAO legal office) | H | S |
| | 16. Regional aquatic animal health expertise database | 37. Preparation of a regional aquatic animal health expert database. A component of Activity 22. | H | S |
| **5. Regional cooperation & networking** | 17. Regional aquatic animal health website | 38. Establishment of a regional aquatic animal health component to the existing WGA website. Information that will be uploaded to the website must be identified. | H | S |
| | 18. Regional aquatic animal health meetings | 39. Appointment of national aquatic animal health focal points and organization of regular regional meetings.<br>40. Organization of a regional (Middle East) aquatic animal health symposium. | L | L |

[1]All databases to be incorporated into the existing RECOFI WGA website Regional Aquaculture Information System (RAIS http://www.raisaquaculture.net/index.php?id=927).

# ANNEX 6

## Photographs


Photo 1: Opening Statement delivered by Dr Ahmed Mohammed Al-Mazrooie, Director General of Fisheries Resources Development

Photo 2: Opening ceremony of the FAO/RECOFI Introductory Training Course on Risk Analysis for Aquatic Animal Movement

Photo 3: Working group discussions


Photo 4: Group photo – participants and resource experts to the FAO/RECOFI Introductory Training Course on Risk Analysis for Aquatic Animal Movement

**The Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals for RECOFI Members and the Round-table Meeting on RECOFI Regional Aquatic Biosecurity were held from 1–4 November and on 5 November, respectively, in Muscat, Sultanate of Oman. Both activities were hosted by the Ministry of Agriculture and Fisheries Wealth (MAFW), Sultanate of Oman and were attended by 19 participants from three RECOFI countries (the Islamic Republic of Iran, Oman and United Arab Emirates). The training course achieved the following objectives: (i) 19 participants from three RECOFI countries traininedin the basics of risk analysis for movements of live aquatic animals and (ii) a series of recommendations arising from the working group exercise on implementing risk analysis in the RECOFI region (identification of needs and recommendations). The main output of the round-table meeting is the Revised Plan for Implementation of the RECOFI Aquatic Animal Health Management Programme, including the priority and time frame for each activity. This revised plan will be tabled for discussion and further action during the Seventh Meeting the RECOFI Working Group on Aquaculture in Doha, Qatar from 26 to 28 April 2016.**

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