TECHNICAL ASSISTANCE TO IORA FOR THE IMPLEMENTATION AND COORDINATION OF IORA ACTION PLAN ON FISHERIES, AQUACULTURE AND MARINE ENVIRONMENT[1]

Webinar on strengthening regional safety standards and quality assurance of aquaculture products in the IORA region

27 April 2021

REPORT

A. INTRODUCTION

The growth of aquaculture has led to significant changes in how its products are perceived and marketed. In becoming an important contributor to the markets for seafood, **aquaculture is increasingly subject to safety mechanisms and controls.** Starting with methodologies such as the statutory hazard analysis critical control point (HACCP), compliances with CODEX alimentarius standards**; the Aquaculture sector need to go further** both for its internal market and export one. World Organisation for Animal Health (OIE) and international markets have brought standards, certification and controls demands that sometime need to be certified by national competent authorities.

As both safety and trade regulations are harmonized at international levels, quantitative risk assessment and traceability start to become integral components of aquaculture management. **Developing countries have increased their share of the seafood export market to nearly 50 per cent of global trade, a significant portion being represented by aquaculture products** (shrimp, salmon, molluscs, etc.), a percentage that should increase with the continued expansion of the sector (FAO, 2020). The long-term viability of aquaculture development will be market driven, accounting for consumer demand and the capacity to adapt to the structure and legislative demands of the target markets. The sector development need to integrate the quality standards and requirements to go along with the development of the activity. Public and private sector are concerned and have complementary role to play and to coordinate.

The aim of the webinar was to share knowledge and information on food safety to give an overview of the issues and concrete regional answers and organization to re-enforce food safety issues for aquaculture products.

[1] Technical Assistance implemented by COFREPECHE in consortium with SOFRECO.

The specific objectives were:

- To present a survey on seafood safety and quality assurance aspects. A quick review of international standards and requirements (WTO, OIE, EU/US/niches markets) and international certifications; as the control mechanisms required;
- To address some of the main bottlenecks faced by the producers and governments-infrastructure development including laboratories, Competent Authorities capacity building, training of actors/role players -, applying international standards and complying with the legislation and requirements of importing countries. A SWOT analysis to be provided for country food safety and Quality Assurance (QA) standards and their implementation;
- To present specific countries organizations to comply with local and export food safety control. Including modeling of legislation and regulation done and national framework for control and enforcement; the example of Kenya and India were selected, corresponding to a nascent and a dynamic aquaculture industry situations withing the IORA;
- To interact with participants on the regional situation for safety standards and quality assurance for aquaculture products. To list the expectations and components to be developed further in a subject as food safety.

The recording of the webinar can be accessed at: https://www.youtube.com/watch?v=dwvi-JYvT-A&t=8038s

B. MODERATOR AND SPEAKERS

Opening: Dr Gatot H. Gunawan, Acting Secretary-General/Director of IORA

Moderator: Aubrey Harris, Main Resident Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO

Speakers:

1. **Pierre-Philippe Blanc,** International Aquaculture Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO

2. **Peter Sol Rogers,** Consultant in trade and development, value chain upgrading, and investor facilitation

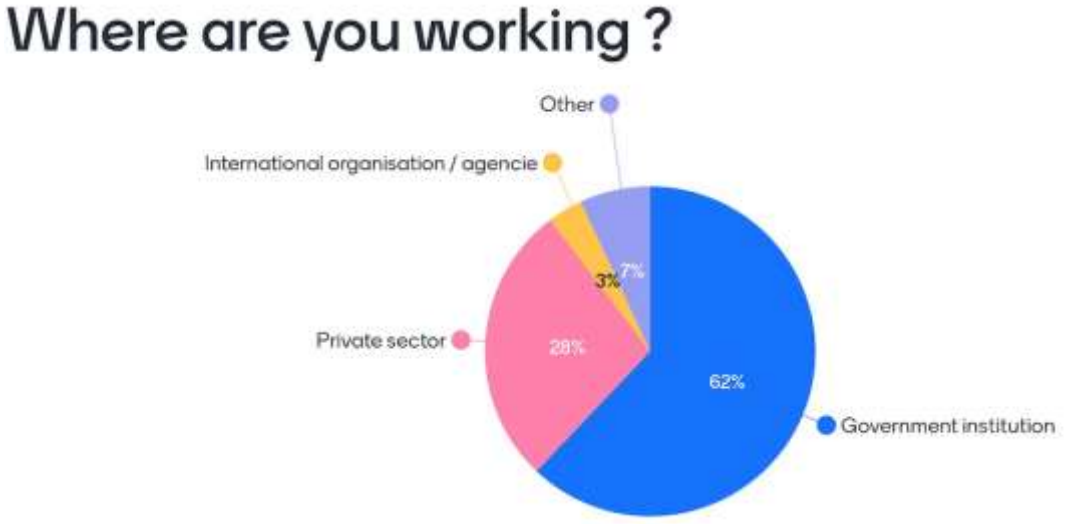
3. **Dr Domitila Kyule-Muendo**, Centre Director of Kenya Marine and Fisheries Research Institute (KMFRI), Government of Kenya

4. **Dr.T.V.Sankar**, Principal Scientist, ICAR-Central Institute of Fisheries Technology [CIFT], Ministry of Agriculture & Farmer Welfare, Government of India

The webinar agenda and the profiles of the Speakers are presented in Annexes I and II.

C. ATTENDEES

Around 130 persons pre-registered for the webinar. There were a maximum of 68 connections recorded one hour after the start of the webinar. On the response to the question “where are you working”, there were 29 answers (45% of the audience at the time). The response as seen below showed that: 62% were from Government institutions; 28 % from the Private sector; 7% were classed as other, and; 3% were from International organisations /Agencies.



On the pre-registration forms, it was noted that many participants from Government institutions were directly dealing with aquaculture, competent authorities, fisheries, food safety, health, licencing and ocean related-activities. Scientists and researchers in the field were also well represented on the pre-registration list. During the webinar, the audience was mainly composed by active specialists in food safety and quality assurance of aquaculture products.

D. PRESENTATION BY SPEAKERS

1. Presentation by Pierre-Philippe Blanc, International Aquaculture Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO: **Aquaculture Food-safety and quality assurance aspects and controls for aquaculture development in IORA region.**

After a rapid overview of aquaculture production and markets of aquaculture products in the IORA region, and a definition of food safety and quality assurance, a broad review of practical aspects was provided. This included i) A review of food safety issues and hazards considering the special case of aquaculture products; ii) the organization of food safety standards with prerequisites, GMP, GHP, HACCP. iii) and the international requirements and standards (Codex, WTO, OIE, EU/US/niches markets), international certifications, and required control mechanisms. The presentation concluded on a SWOT diagram for country Safety and Quality Assurance (QA) standards and their implementation. A copy of the presentation can be accessed at: https://drive.google.com/file/d/11I5AUI19udLTIPG5Xj3H15IJqcLvJqs_/view?usp=sharing

2. Presentation by Peter Sol Rogers, Consultant in trade and development, value chain upgrading, and investor facilitation: **Food safety and quality assurance aspects to comply for export.**

From a general overview, the presentation showed companies' pathway to export with detailed explanations and practical examples. A review of exporting procedures and an overview on health and safety compliance were undertaken. Specific sample documents were presented and the presenter went over some of the key elements to be considered for private sector and business approaches for development of aquaculture production in the IORA region. A copy of the presentation can be accessed at: https://drive.google.com/file/d/1fTuJP0fIEROy9KjBB_k6qyQNhNpgxFni/view?usp=sharing

3. Presentation by Dr Domitila Kyule-Muendo, Centre Director of Kenya Marine and Fisheries Research Institute (KMFRI), Government of Kenya: **Importance of safety standards and quality assurance of aquaculture products: A case study in Kenyan markets**

In Kenya, the aquaculture industry provides food, employment and incomes to a large population and earns the country foreign exchange. One of the many challenges faced is quality, safety and postharvest losses. The presentation covered efforts geared towards harmonizing approaches on quality assurance and fish safety, with particular reference to aquaculture products. Also, efforts to safeguard consumers' health and ensure that the industry remains vibrant to improve food security, increase income and improve livelihoods. A copy of the presentation can be accessed at: https://drive.google.com/file/d/1XIctKwtJMjLa-KqLJmQwxF4nwXqfArr_/view?usp=sharing

4. Presentation by Dr.T.V.Sankar, Principal Scientist, ICAR-Central Institute of Fisheries Technology [CIFT], Ministry of Agriculture & Farmer Welfare, Government of India: **Safety standards and quality assurance of aquaculture products: A general discussion of issues through India experience**

India occupies a significant position in fish production from wild capture fisheries and aquaculture, and contributes to the global seafood stock, substantially. USA and EU are major importers of seafood from India, particularly for shrimp and finfishes, as are the markets of China, Japan and South East Asia. Chemical hazards such as histamine, heavy metals, incidence of pathogens etc. contribute to food safety concerns. The global regulatory mechanisms on food safety removes the concern of the consumers but exporting countries face stiff regulatory control from the importing countries. The exporting countries have tremendous requirement to meet the international regulation while protecting the interest of the domestic consumers. The presentation discussed some of these aspects in the Indian context. With a separate organisation like the Food Safety Standards Authority of India (FSSAI), the country continuously strives to place appropriate regulations in places to safeguard the health of consumers, both national and international. A copy of the presentation can be accessed at: https://drive.google.com/file/d/1qeD0vTaZkRSdPNH-b3dKn5faihVOhwIG/view?usp=sharing

E. QUESTION AND ANSWERS

Mozambique: although there is a competent authority dealing with fish quality and inspection, how can Mozambique further enhance food safety and quality of aquaculture and sea-food products to satisfy the requirements not only for local market but for export as well? If there is any food control structures that can achieve this?

Peter Roger Sol: First, there is a real difference between private standards and import/export standards for food quality safety inspections. One of the things to look at is “what is driving the private sector”. The private sector will not have only the minimum requirements such as a health certificate for food safe for human consumption but will want to be able to drive the industry forward and look at what are the underlying realities, and what is the quality they have to perform for their retailers. Competent authorities have to be proactive, being the “guiding light”, to prepare the sector for export, to “open the gates”. The objective is to make the competent authorities more as a first reference (minimum requirements) source so that companies can look towards export and built on these references higher quality standards for accessing exports markets.

Pierre-Philippe Blanc: Mozambique is already satisfying requirements for the export market. There is a very good competent authority: INIP (Instituto Nacional de Inspecção do Pescado). Mozambique has already authorization for Europe and USA. They are already exporting aquaculture products. The country is already managing to set-up standards, control them and to comply to exports requirements.

Question: What is the financial growth rate for fish species as compared to prawns?

Pierre-Philippe Blanc: The question is a bit outside the food safety issue. But it is one of the characteristics of IORA countries: the climate is warm and the animals are growing faster than other aquaculture in colder climates. As it depends on the type of aquaculture (intensive, semi-extensive or extensive), the answer will be a general one. The lower the density is (more the model is extensive), the quicker the animals will grow. Shrimps will grow (depending on the species and the type of aquaculture) between 0.1 to 0.3g per day, and fish will grow around 1.5g a day. The financial point of view will depend on which production it is. Shrimp have a high value in general, for fish it will depend on the species.

Seychelles: How should research be organized between private sector and government? For example, to conduct research to improve food safety in aquaculture.

Pierre-Philippe Blanc: For many countries, aquaculture is a new activity. There are some good examples in IORA countries with a really an active connection in research, between private sector and government. Madagascar and Mozambique are examples. Working together for sector development is always better. To organize research between private and public sector, first leave open all cooperation possibilities. Then there are some responsibilities with food safety, Producers and processors are responsible for fish safety and quality along the food chain, governments are responsible of controls, structuring policies and regulation and accompany sector development. In addition, government has a role of supporting the development of the sector. We can base the share of organizing research on these roles. The responsibilities for research cannot be only in the hands on one of the actors.

Dr T.V. Sankar: Participatory research will be good because both can benefit.

Moderator: Basically, there is a role for both government and private sector. It might also depend on the very specific situation of the country involved.

E. GROUP EXERCICE AND RESULTS

Six group-oriented questions were provided to better understand the participants' expectations and concerns about food safety and quality assurance in aquaculture. This activity also enabled participants to identity their needs and requirements for future capacity building programmes under this thematic area.

There were on average across all questions of 20 responses which was over 1/3 of the audience at the end of the webinar.

Exercise 1, Word cloud exercise: "In one or two words, describe what is food safety (components, outputs, pre-requisites, consequences)"

A total of 19 different words were recorded:

Quality	Health	Sanitary	Safe/safety	HACCP
Preservation	Hygiene	Consumers	Export	Control
Competent authority	No Hazards	Biosecurity	Sanitation	restriction
Global concern	Foodborne	Constraint/stringent	Taste	

The graphic above visually illustrates the frequency of each response. Most of the answers are on outputs of food safety (Quality, health, safe, etc.). Four answers are on the means and controls (HACCP, competent authorities, export, control) and two answers are on the negative impact of food safety (Restrictions, constraint, stringent). This information shows a good overview of food safety, its component and outputs. "Health", "hygiene", "quality", "safe" and "control" are the mains answers in frequency.

Exercise 2, scaling exercise: "Give a score between "1- Strongly disagree" and "5-Strongly agree" as to the importance of these components for NATIONAL food safety"

This exercise focused on standards, requirements, responsibilities for national issues on food safety (not for "export" requirements and organization).

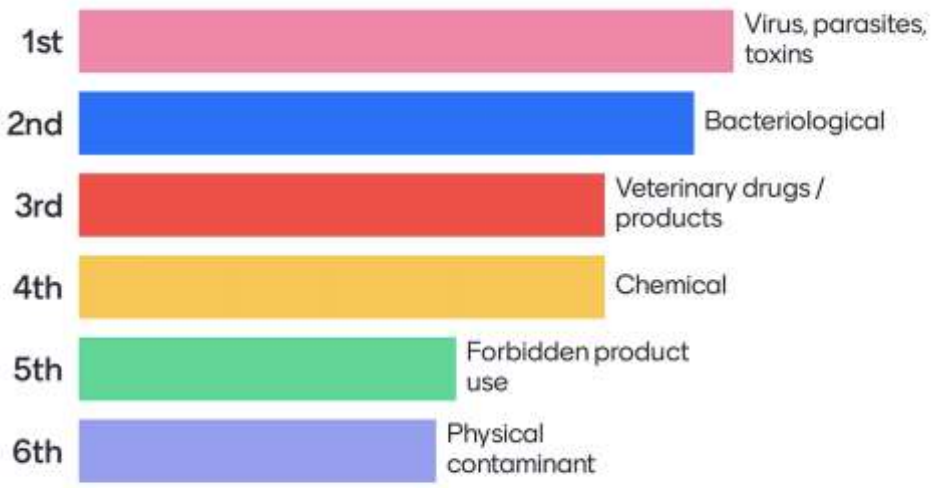
The importance of "government legislation and regulation", "the competent authorities" and "the dedicated laboratory facilities" are considered as major components then "farmers and wholesalers' responsibility". This result perhaps reflects that since 2/3 of the audience were working in public institutions, they may have been inclined towards scoring the importance of public institutions higher.

A reverse of ranking importance was rather expected as the first responsibilities are in the hands of producers and actors of the value chain. The government actions for food safety strengthening are to structure the industry production and market access conditions (policies and regulations), to develop appropriate controls and to enforce food safety issues. The lack of fully operational efficient governments actions (for policies, competent authorities or analysis) could be the reason for insisting on their importance. It might express needs to streamline the actions of governments and competent authorities (capacity building, equipment, organization, field control, laboratories, etc.) in the countries of the participants that have answered.

The average score of 2.8 on the statement "There are more issues on food safety in capture fisheries than aquaculture" illustrates the awareness of the participants on the specific issues existing in aquaculture production. Aquaculture has additional issues such as veterinary drugs and those linked with higher density culture (aquatic animal health and cross-infection) and with possible human contamination. But the aquaculture model offers better control of freshness and control of the processing time-temperature; together with better traceability. If the score was 2.5 it would indicate an equal amount of issues in fisheries and aquaculture. The average score of 2.8 (in favour of aquaculture) illustrates that the audience considered that positive aspects of food-safety control in aquaculture outweighed the possible additional risks.

The high average score of 4.2 for "awareness of customers" was expected as food safety actions is highly related to the need for the customers to understand the purposes of these actions and their necessity. If local customers do not consider food safety an important issue for aquaculture products, actions to strengthen the sub-sector will not be followed and supported. If there are more stringent actions than perceived benefits, food safety is seen as a constraint.

Exercise 3, ranking exercise: "According to your experience, please rank the six hazards accordingly to their importance for food safety issues for export"

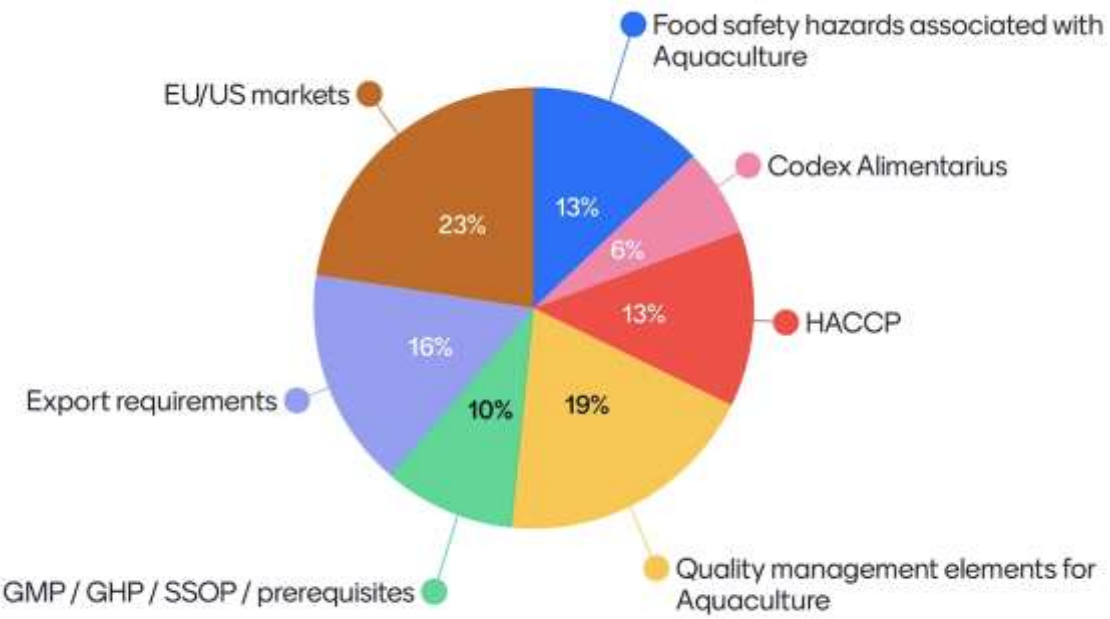


The ranking of hazards for aquaculture products does not follow their likelihood of occurrence. "Bacteriological" issues are usually the main hazards for fisheries products. Except in shellfish aquaculture (which is undertaken in a small minority of IORA countries and destined mainly for national market, not export), there are few viruses, parasites and toxins that can impact consumer health.

The importance of aquatic animal health issues (not related directly with food-safety because most are not foodborne sources of disease) for export might be the reason of the ranking. Indeed, the OIE (World organization for Animal Health, Office Internationale des Epizooties) actions to control aquatic animal diseases are following food safety control and management. Competent authorities, controls, analysis, health certificates, and often regulations and legislation are tackling animal health and food safety together for aquatic production. This might explain the importance of "virus, parasite and toxins" in this exercise.

The second more important hazard was a bacteriological one. Veterinary products and chemical sources of hazards both follow with an equal level of importance. The efforts made on forbidden product use over the last 20 years explains the lower ranking obtained (even if some rejections are still linked to forbidden products). The hazard with lowest ranking was physical contaminants.

Exercise 4, multiple choice exercise: "In the future, which area of food safety should focus be on?"

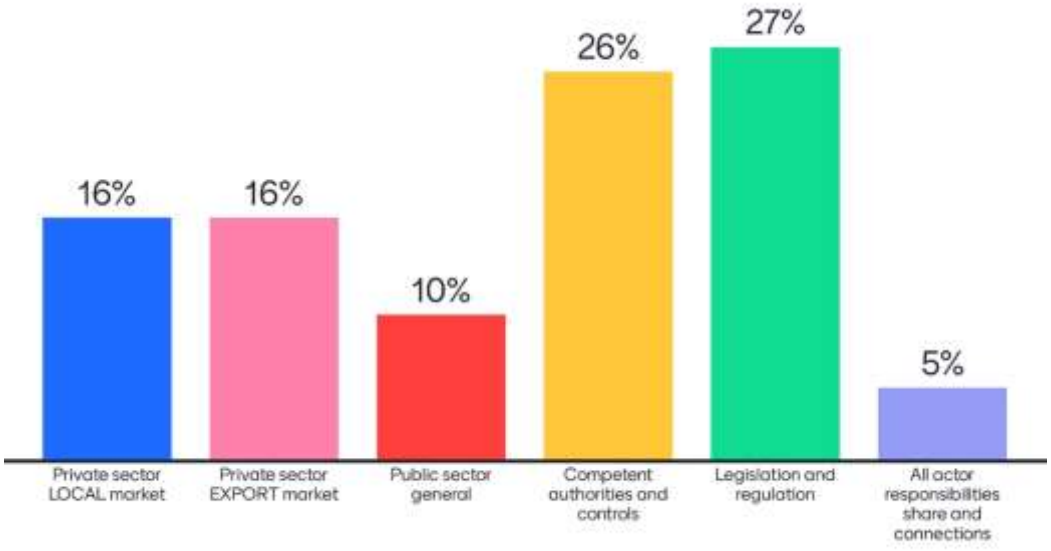


The answers from this exercise showed less interest on the "base" of food safety control which are Codex Alimentarius and GMP/GHP/SSOP and other prerequisites. Those two categories combined accounted for only 16% of the choices. Even HACCP, represented only 13% of the choices. There was a marked interest on "export" with "Export requirements" and "US/EU markets" collecting almost 40% of the choices. Specific aquaculture management and hazards directly associated with pre-harvest value chain activities together accounted for 32% of the choices.

Exercise 5, multiple choice exercise: "In the future, which component of the production component should focus be on?"

Component	***% votes***
Farms	19 %
Feed	15 %
Hatchery	17 %
Processing	17 %
Additive, other inputs	13 %
All the value chain approach	19 %

There were no marked differences between the different production components. Perhaps of slightly lower interest was additives, inputs and feed.



Exercise 6, multiple choice exercise: "In the future, which food safety actors should focus be on?"

Participants considered that higher focus should go to competent authorities, legislation and regulation in future. This choice is perhaps linked with the prevalence of attendees from public institutions but may also confirm the needs of strengthening these aspects of food safety organization as noticed in question 2. The thematic on the general view of "all actors responsibilities share and connections" seemed to have been of minor importance for the audience during the webinar. The difference between local and export market (i.e., not same food safety issues and control in many IORA countries) did not appear in the answers given with a similar interest shown towards private sector actors for both markets.

F. WEBINAR EVALUATION

At the end of the webinar session, a questionnaire was shared for the participants to rank the quality and their feeling about the webinar, its presentations and the speakers. Responses were received from 26 participants.

Overall, the scores were high. The lowest score of 4.1 out of 5 was on whether the information was "new or useful". The highest scores were on "knowledge of the speakers" at 4.6 and "presentation skills" at 4.5.

G. CONCLUSION/RECOMMENDATIONS

The food safety issues for aquaculture production and quality assurance stay a subject of high expectation and interest with need to re-enforce capacity building. The results of the group exercises showed an expectation of more focused topics to be specifically tackled, within the thematic of food safety and quality assurance for aquaculture products, in the future.

The topics of emphasis by the audience based on the participant scores were the need for:

- ⇨ A focus on competent authorities, legislation and regulation;
- ⇨ A focus on export and food safety specificities in aquaculture production;
- ⇨ A focus on aquatic animal health (its link with food safety but also its international requirements and standards).

These focus topics can give opportunities to go further in capacity building on food safety needs for aquaculture development in IORA countries. It is also a direct answer to specific needs of the people involved in this sector.

There are some specific needs for more focused thematics and may be also for some focus groups of countries within IORA's 23 Members States. In the field of aquaculture production, IORA is not a homogenous group of countries, there are countries with important and mature aquaculture sectors while other have nascent industries; there are some countries with no agreement of export with EU (all IORA countries that are not mentioned in annex II of the implementing regulation (UE) 2019/626); all IORA countries do not have the same level of organization of competent authorities, policies set up and control framework.

Webinars or workshops can be planned on the following thematics to reinforce food safety issues and control for aquaculture products and to support IORA Member States' efforts in order to enhance overall aquaculture sector development in the IORA region. The three following thematics could be considered:

- Thematic 1: "Key elements of the governance of food safety in the aquaculture value-chain: effective enforcement of regulatory requirements";
- Thematic 2: "Strengthening aquatic animal health and biosecurity of aquaculture products";
- Thematic 3: "Strengthening access to export markets, requirements and product compliances needed for EU, US, China and other selected markets".

For each workshop above, training can be planned to have more time for increased and targeted participation of the audience with practical case studies, group participation, focused exercises and an evaluation of learning achievements.

Annex I: Webinar agenda

TECHNICAL ASSISTANCE TO IORA FOR THE IMPLEMENTATION AND COORDINATION OF IORA ACTION PLAN ON FISHERIES, AQUACULTURE AND MARINE ENVIRONMENT

Webinar on strengthening regional safety standards and quality assurance of aquaculture products in the IORA region (activity 4.2)

27 April 2021

0700 hrs (GMT)

Draft AGENDA

7:00 to 7:05

- Arrival and connection to the webinar

7:05 to 7:10

- **Gatot H. Gunawan** (Acting Secretary-General/Director of IORA)
- ⇨ Opening remarks

7:10 to 7:15

- **Aubrey Harris** (Main resident Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO)
- Introduction and presentation

7:15 to 7:45

- **Pierre-Philippe Blanc** (International Aquaculture Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO):
  - ⇨ General introduction of the webinar, presentations, objective of the webinar;
  - ⇨ Group exercise on food safety and product quality – Importance, knowledge, objective;
  - ⇨ First presentation: **Aquaculture Food-safety and quality assurance aspects and controls for aquaculture development in IORA region.**

After a rapid overview of aquaculture production and markets of aquaculture products in the IORA region, and a definition of food safety and quality assurance, a broad review of practical aspects will be provided. This will include i) A review of food safety issues and hazards considering the special case of aquaculture products; ii) The international requirements and standards (Codex, WTO, OIE, EU/US/niches markets), international certifications, and required control mechanisms; and iii) the

national actions and prevention measures to be implemented. The presentation will conclude on a SWOT diagram for country Safety and Quality Assurance (QA) standards and their implementation.

7:50 to 8:10

- **Peter Sol Rogers** (Consultant in trade and development, value chain upgrading, and investor facilitation)
  - ⇨ Second presentation: **Food safety and quality assurance aspects to comply for export.**

From a general overview, the presentation will show companies' pathway to export with details explanations and practical examples. A review of exporting procedures and an overview on health and safety compliance will be done. The presentation will then present specific sample documents and go over some of the key elements to consider for private sector and business approaches for development of aquaculture production in the IORA region.

8:10 to 8:30

- **Dr Domitila Kyule-Muendo** (Centre Director of Kenya Marine and Fisheries Research Institute (KMFRI), Government of Kenya)

  - ⇨ Third presentation: **Importance of safety standards and quality assurance of aquaculture products: A case study in Kenyan markets**

In Kenya, the aquaculture industry provides food, employment and incomes to a large population and earns the country foreign exchange. One of the many challenges faced is quality, safety and postharvest losses. The presentation will cover efforts geared towards harmonizing approaches on quality assurance and fish safety, with particular reference to aquaculture products, to safeguard consumers' health and ensure that the industry remains vibrant to improve food security, increase income and improve livelihoods.

8:30 to 8:50

- **Dr.T.V.Sankar,** (Principal Scientist, ICAR-Central Institute of Fisheries Technology [CIFT], *Min. of Agriculture & Farmer Welfare,* Govt. of India)

  - ⇨ Fourth presentation: **Safety standards and quality assurance of aquaculture products: A general discussion of issues through India experience**

India occupies a significant position in fish production from wild capture fisheries and aquaculture, and contributes to the global seafood stock, substantially. USA and EU are major importers of seafood from India, particularly for shrimp and finfishes, as are the markets of China, Japan and South East Asia. Chemical hazards such as histamine, heavy metals, incidence of pathogens etc. contribute to food safety concerns. The global regulatory mechanisms on food safety removes the concern of the consumers but exporting countries face stiff regulatory control from the importing countries. The exporting countries have tremendous requirement to meet the international regulation while protecting the interest of the domestic consumers. The presentation discusses some of these aspects in the Indian context. With a separate organisation like the Food Safety Standards Authority of India (FSSAI), the country continuously strives to place appropriate regulations in places to safe guard the health of consumers, both national and international.

8:50

- Group exercise on specific aspects of Food safety and quality assurances for aquaculture products in IORA region: Priorities, support/focus needed, strength and weaknesses

8:55

- Question and answers
- Evaluation and open up questionnaire
- Webinar Closure

Annex II: Profiles of speakers

Peter Sol Rogers

Peter has over 23+ years' international experience in the fisheries and aquaculture related trade and development, value chain upgrading, and investor facilitation.

Peter has successfully implemented numerous SPS & TBT compliance and trade missions, feasibility studies, due diligence, business assessments and development projects in Europe, Asia and other international destinations for major food and agribusiness clients. These projects span the fisheries and aquaculture value chain from raw material-inputs, commercial scale fishing practices and primary production through food processing, packaging, distribution retail and food service.

Peter's career has focused on managing projects that focus on fisheries trade and business development in East Africa, where he has led a range of strategic reviews, industry re-structuring and start-up projects for the fisheries private sector, as well as the trainings with government officials in Tanzania, Mozambique, Seychelles, Kenya and Somalia as a private sector development technical advisor.

Peter is a strong advocate for coastal States reforming their trade policy, legislation, and fisheries agreements in order to establish socially equitable and environmentally sustainable fisheries that benefits these coastal communities. During his career, he has consulted projects funded by DFID, World Bank, EU, and USAID and numerous international consultancy firms.

Dr. Domitila Kyule-Muendo

Dr Kyule-Muendo has a vast knowledge and experience in fish and fish products development and their safety. She has published 3 books and over 15 papers in peer reviewed journals.

Dr Kyule-Muendo has successfully collaborated with various institutions in aquaculture and in food safety/phytosanitary requirements in fish processing research managed by international and regional organizations such as UNIDO, AAK-Kenya, AFIPEK, ASARECA, KAPAP, CSAP projects implementation with funds from European Union (EU) and World Bank. has innovated thirteen fish products and an improved fish smoking kiln that have been adopted, validated and upscaled by fish traders across the country.

Dr Kyule-Muendo is currently the Centre Director of Kenya Marine and Fisheries Research Institute (KMFRI), and is involved in coordinating research activities at the centre and a facilitator in aspects of post-harvest technologies, value addition and fish safety and general aspects of aquaculture. She sits in Technical & Vocational Education & training (TVET) Curriculum development committee on occupational standards for aquaculture Technicians, Kenya. She is also a liaison officer and technical committee member on county engagements and collaborations.

Dr T. V. Sankar

Dr. T.V.Sankar is a researcher in the area of biochemistry and post-harvest technology of fish, under the Indian Council of Agricultural Research of Governemen. of India.

Dr T. V. Sankar has over 35 years of experience with a scientific career at the Central Institute of Fisheries technology (part of Indian Council of Agricultural research – ICAR – CIFT) concluded as head of the division of quality Assurance and management. He held after the position of director at Kerala University of Fisheries & Oceans Studies. He is specialised in the quality assurance and management of fish and fish products since 2008 and is core member of Scientific Panel of the Food Safety Standards Authority of India, the Nodal centre for Codex and the Apex body to food safety in the country. He was also the Member of the Panel for Biological hazards of the Authority previously and also the principal member of Bureau of Indian standards of the Government of India. He has contributed in the area of fish proteins, functional properties of fish proteins, and quality control. He has over 150 publications to his credit including 7 books and 5 FAO publications.

Pierre-Philippe Blanc

Pierre-Philippe has 20 years of experience (15 of them in the Indian Ocean), in aquaculture and natural resource management in 4 different continents; in the private and public sectors, government institutions, NGO, International development institutions, communities' professional groups, research institutes and United Nations Agencies. From communities to global levels

With Three Master degrees, one in Natural resource management (communities development elective), one in Agronomic and Economic Development and one in animal production, Pierre-Philippe Blanc has worked in 4 continents, in developing countries, in the field of Aquaculture, development and technical support. Supporting the growth of aquaculture sector and its implementation in tropical areas, through all the different sector component (seeds production, feed, grow-out stage, research, processing, technology, disease management, market and value chain) both at production and implementation levels than on institutional and regulatory set up and coordination. Successively implementing farms, processing plant and hatcheries in Indian Ocean and south east Asia, Pierre-Philippe Blanc was also technical adviser of government institutions to accompany aquaculture development and director of the one the main French technical centre of tropical aquaculture (Station aquacole de Saint Vincent, NC). Today Pierre-Philippe Blanc participate to several projects as International environmental and commodity specialist for FAO value chain analysis of fish and aquaculture products and has completed the drafting of the 10 years strategic plan of action for fisheries and aquaculture development of the Organisation of African, Caribbean and Pacific States (OACPS, 79 members states).