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

Webinar on promotion of small-scale rural aquaculture in the IORA region

31 August 2021

REPORT

A. INTRODUCTION

Aquaculture appears to be one substantial opportunity for reducing the unsustainable pressure from coastal and reef fishing and providing meaningful employment opportunities, including for women and youth. Much of the effort in promoting rural aquaculture has been constrained because of the complexity of the task. There are several mechanisms to support the development of small-scale rural aquaculture including:

1. Good environment for aquaculture development and governance
2. Structures and inputs for small-scale aquaculture development
3. Strengthening human capacity
4. Supporting the development of aquaculture research and extension

Perhaps the major question in a framework for the promotion of rural aquaculture is the long-term sustainability of the process. This implies building up the national capacity usually in the form of training of local staff, to ensure that key inputs outside the farmer's own production system are maintained in the absence of externally funded project assistance.

Ideally, national facilitators, governments and NGOs should coordinate efforts to promote rural aquaculture in specific locations within their national boundaries. It follows that international facilitators would be more effective if their financial and technical assistance were better coordinated. Technical assistance should relate to the need for, and potential of, rural aquaculture in specific geographical areas rather than being primarily institution-driven in terms of policies or subject matter interest.

The two reports[2] prepared by the AFD Technical Assistance to the IORA on the general review of the aquaculture experiences in IORA countries, including successful and unsuccessful projects relating to small-scale aquaculture, present some interesting experiences and specificities from IORA MS appear and can be a source of support or approach to IO aquaculture development.

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

[2] *Blanc, P., 2021. Review of aquaculture, governance and development of small-scale aquaculture in the IORA region. IORA/AFD Technical Assistance – Technical Report No. 3, March 2021, COFREPECHE, 90pp.*
- Blanc, P., 2021. Some existing initiatives in small-scale rural aquaculture in the IORA region. IORA/AFD Technical Assistance – Technical Report No. 8, Jun2 2021, COFREPECHE, 33pp

The 23 IORA Member States represented together 26.2 million tonnes of aquaculture production, representing 17% of the world volume production in 2018. The development of aquaculture in the IORA region is also recent, the production multiplied almost 6-fold over the past two decades to represent almost USD 39 billion to IORA Member States' economies in 2018 (FAO). Analysis of the type of aquaculture and species used show the predominance of small-scale aquaculture and the ascendancy of 6 species, over the 80 cultured, representing 80% of the Indian Ocean production (in volume).

The two reports presents the general situation of IORA MS and the disparities between MS in the development of their aquaculture sector. Indeed, five countries alone represent 69% of the IORA's production and some countries have almost no aquaculture activities. The MS can be placed into three thematic categories: "Mature aquaculture sector development", "Emerging aquaculture sector" and "High technical aquaculture development".

This disparity has several roots causes, from size of the country and its population, areas suitable for aquaculture, traditional social structure in rural areas, development approaches, market dynamisms and accessibility and experiences of aquaculture production. The different experiences between members of IORA offer opportunities to share lessons learnt on the approaches of aquaculture development, the drivers, the successes, and the pitfalls.

This review of aquaculture development in the IO region, the situation of the small-scale aquaculture and practical experiences were presented at a webinar on small-scale aquaculture.

The webinar had the following five objectives:

- To present the technical report No.3 "Review of aquaculture, governance and development of small-scale aquaculture in the IORA Region" prepared in the framework of the AFD TA to IORA. The review was focusing on the organization of production (species, farms, and technologies), social and economic aspects providing a detailed situation of Member States' aquaculture development;
- To illustrate the IO small-scale aquaculture experience through some lessons learnt on key problems and the sector development approach;
- To summarize experiences, specificities and IORA MS strengths into technical guidelines and prerequisites that accompany aquaculture development;
- To present some detailed case studies of community development with focus on community organization and involvement;
- To interact with participants on the regional situation for small-scale aquaculture development and register their views on the bottlenecks and regional strengths.

The recording of the webinar can be accessed at:
https://indianoceanrimassociation.webex.com/recordingservice/sites/indianoceanrimassociation/recording/playback/2294052aec57103997fd0050568106ed with the following password: V8JyXSQS7v9

B. OPENING 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. **Timothy Mark Kluckow,** Expert in community development and sea-cucumber sea ranching

3. **Christian Vaterlaus,** Director of mariculture.org, 2021 Blue Champion award of Blue Solutions

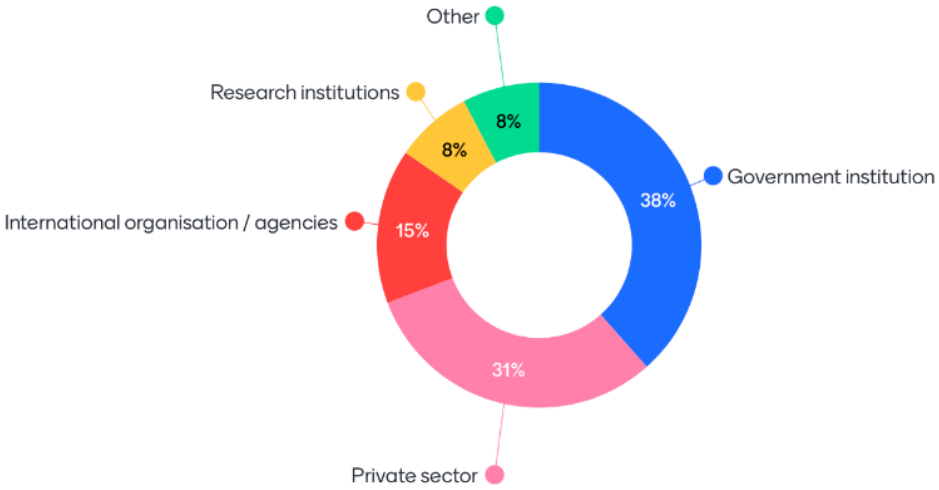
4. **Dr. Raphaela le Gouvello,** International consultant in aquaculture, integrated coastal management, sustainability and circular economy in the blue economy.

The profiles of the Speakers are presented in Annexe I of this report.

C. ATTENDEES

Around 142 persons pre-registered. There was a maximum of 62 connections recorded one hour into the webinar which remained above 60 attendees until the end.

The survey made with the question "where are you working" had the following result:



On the pre-registration forms, it was noted that many from Government institutions were directly dealing with aquaculture, competent authorities, fisheries, seafood value chain, biology, licencing and ocean related activities. Scientists and researchers in the field were also well represented on the pre-registration list.

D. PRESENTATION BY SPEAKERS

1. First presentation: **Review of aquaculture, governance and development of small-scale aquaculture in the IORA Region Pierre-Philippe Blanc (International Aquaculture Expert for the AFD technical assistance to IORA implemented by COFREPECHE and SOFRECO):**

From the two reports done on the Review of aquaculture, governance and development of small-scale aquaculture in the IORA region and some practical case studies, the presentation provided a summary of the importance of aquaculture for the area were the 23 IORA members states represented together 17% of the world aquaculture production in 2018. The analysis of the type of aquaculture and species used in the region was specified to show the predominance of small-scale aquaculture and the ascendancy of 6 species, over the 80 cultured. This introduction was followed with figures on the disparities between IORA member States whichwere not at the same development stage of their sector, with five countries representing a mature sector development with important aquatic animal production, while several countries are still at an early stage with only few emerging initiatives. This disparity has several roots causes, from size of the country and its population, areas suitable for aquaculture, traditional social structure in rural areas, development approaches, market dynamisms, market accessibility: and experiences of aquaculture production. These different experiences were

presented with an analysis to share lessons learnt in the area on the approaches of aquaculture development, the drivers, the successes, and the pitfalls. Some cases studies were summarized to conclude the presentation. A copy of the presentation can be accessed at : https://www.dropbox.com/s/ughtawafkbzz76i/1%20-%20Presentation%201%20PPh.pdf?dl=0

2. Second presentation: **Aquaculture development with rural coastal communities: success factors for implementation and appropriation. Timothy Mark Kluckow (Expert in community development and sea-cucumber sea ranching):**

The presentation provided a detailed analysis of set-up and managment aspects to be considered for the development of a new coastal aquaculture project. Through practical experiences of sea-cucumber aquaculture, over several countries in the Indian Ocean, the presentation highlighted key factors that can facilitate the development of functional aquaculture models that can be successfully appropriated by fishing communities. Functional, profitable, and sustainably managed rural aquaculture projects rely on community engagement, and their eventual ownership of the livelihood introduced. A copy of the presentation can be accessed at : https://www.dropbox.com/s/hl9acq6s9hq3vls/IORA_%20Aquaculture%20development%20with%20rural%20coastal%20communities_.pdf?dl=0

3. Third presentation: **Opportunities for communities through development of small-scale aquaculture activities. Christian Vaterlaus (Director of mariculture.org):**

The presentation provided a multi-faceted approach of non-food aquaculture development in communities on the east coast of Zanzibar. The success of marinecultures.org on building ecological aquaculture farms that provide a sustainable alternative to fishing and reduce pressure on natural resources in coastal waters was presented in detail. Besides collecting sea animals and farming seaweed, the presentation has shown how cultivation of sponges has become a new profession for some women on the east coast of Zanzibar. From this example, other opportunities that aquaculture can present for Indian ocean islands such as Unguja and Pemba were explored during this presentation. A copy of the presentation can be accessed at: https://www.dropbox.com/s/hvbx27w5ipml6rc/iora_marinecultures.org_21_final.pdf?dl=0

4. Fourth presentation: **Sustainability issues and small-scale aquaculture (SSA). Dr. Raphaela le Gouvello (consultant in aquaculture, integrated coastal management, sustainability and circular economy in the blue economy):**

The last presentation focussed on the sustainability issues of small-scale aquaculture which must be considered and adapted, using appropriate operational and assessment tools. For instance, environmental impacts may be significant and associated with SSA if not properly anticipated and handled. With the previous examples presented in this webinar, and others explored by the IUCN E-bAG expert group, SSA sustainability issues were highlighted, insisting upon the general frameworks of ecosystemic approach for aquaculture (EAA), and ecosystem services. The recent Nature-based Solution concept and its IUCN Global Standard were presented as opportunities to initiate, to explore and to enhance the sustainability of a local aquaculture sector, beneficial to the communities and to coastal ecological systems. A copy of the presentation can be accessed at:

https://www.dropbox.com/s/b278cfktdhq2zy4/webinair%20310821%20R%20le%20Gouvello%20SSA%20and%20sustainability.pdf?dl=0

The full webinar programme and presenters profiles are included in Annexe I.

E. QUESTION AND ANSWERS

- **Question 1** from Mr Kluckow (Madagascar): In the industry we often talk about regenerative or restored aquaculture, what you've done in IUCN is putting together a systematic way of gauging the interaction of aquaculture projects with the environment. I wonder how we will be able to use that? It will be done by IUCN? It will be available as toolkits? The project will do its own assessment?

Raphaela le Gouvello: The standards were just released last year. With the set of the 8 criteria, and I was working also for the last year with IUCN to test some excels tools with a scoring system. We are just going to release these data, that are unpublished today. I made a case study with Zanzibar seaweed sector, to see how it was coherent. Of course, the result will be shared and discussed with the people in the field. But it is interesting because this kind of tool, it is pointing out some aspects that can be improved and monitored in the systems and to be discussed with the stakeholders to design a kind of broad map of the system and improvement of its sustainability, pointing out some critical issues.

- **Question 2** from Anna Szeguari (Réunion Island): Concerning the public interventions and public policies, we (Réunion Island) are going to organise a regional scheme of aquaculture development. We just engaged a consultancy agency which is going to do it. It is very interesting to benchmark what are the possibilities in Réunion and the region's aquaculture development. I wanted to share this with you. We are going to build this strategy in the 18 coming months, and we will focus on the Indian Ocean. If you want to go along with our process, it is really welcomed to develop, not only for Réunion, but for all the Region.

- **Question 3 from** Daroomalingum Mauree (Mauritius): I have some queries on polyculture aquaculture and in integrated multitrophic aquaculture that were not developed in the presentations. The second aspect I wanted to clarify: I was impressed by the presentation of Timothy, but he said that there was not to be "copy and paste" strategies. However, I want to differ on that, if you take countries like Bangladesh, India, Thailand, Indonesia, even Oman or Tanzania, they are performing very well. If we want to extrapolate from them, to try to adapt in other parts of Indian Ocean, I think we should take advantage of this, but I also believe there is need to have private investment, private initiatives.

Pierre-Philippe Blanc: I will start on polyculture and multitrophic aquaculture. On the time available and the number of experiences in the area, I did not go into details, but it is fully in line with the presentations that have followed mine, showing that the aquaculture has to be integrated and ecosystem friendly. Timothy can also talk about its examples and the integration of several species with this culture, to enhance a multitrophic approach. Those two aquaculture approaches (multitrophic and polyculture) it is maybe one of sector development pathways that is the more interesting because it offers the possibilities to rely on several products and production and to be biomass balanced.

- **Question 4** from Patrice Jilani (Kenya): We know the EAA and now the NBS are good frameworks for implementation within country projects and programs being implemented. How do you ensure that Governments in the IORA Countries adopt the implementation of these frameworks?

Raphaela le Gouvello: First I want to say that the Ecosystem approach and Nature Base Solution is within the same approach. Ecosystem approach is the "cathedral", the structure englobing all, and NBS is a practical way of doing things and implement the ecosystem approach. Next week is the IUCN congress with all IUCN members. IUCN is promoting NBS and the ecosystem approach to empowered and put in place these concepts.

- **Question 6** from Mr Vaterlaus (Zanzibar): I would be interested to hear if there are any funding opportunities in the IORA. For example, we have difficulties to finance the knowledge exchange between Zanzibar and Tunisia. It's very difficult for small players to access funding. Who has any information's and ideas?

Answer from a participant, Dr El Manouchi Madji: I am interested in this seminar because I've learned a lot. I am from Tunisia and for the last 20 years, we are trying to develop small scale aquaculture. We do have some industrial aquaculture of marine fish. We have some initiative in blue swimming crabs, in pearls, we have some clams. The solution is maybe to find in the ocean strategies for aquaculture opportunities. We need to look at the value chain to support the development.

- **Question 7** from a participant: How Indonesia is so predominant in Aquaculture? What are the conditions that have brought these results?

Dr Gatot H. Gunawan: Indonesia have more water territories than land. So it is encouraging fisheries and aquaculture.

Pierre-Philippe Blanc: For sure, there are many islands an important population. It is 250 million people. The figures I showed are in volume, but we need to consider that they are the main world producer of seaweed. Seaweed represents huge volume but of low value. The predominance is lower when we consider the value of the aquaculture products. I encourage you to ask for the report where you will find details of production and value for each component of the aquaculture sector. It is also one of the countries, with Bangladesh leading on growth of their aquaculture sector. They have reached a level of production and technicity that allows the system to grow quicker.

E. GROUP EXERCICE AND RESULTS

Five group-oriented questions were provided so as to get answers from the attendees. The objective was to understand the participants' expectations and concerns on small scale aquaculture development.

There were on average across all questions of 20 responses which was low according to the high level of participation, many attendees had left the webinar after the question-and-answer session.

Exercise 1, Word cloud exercise:

A total of 48 different words or idea were recorded (bigger the word is in the graphic, more often it has been proposed)

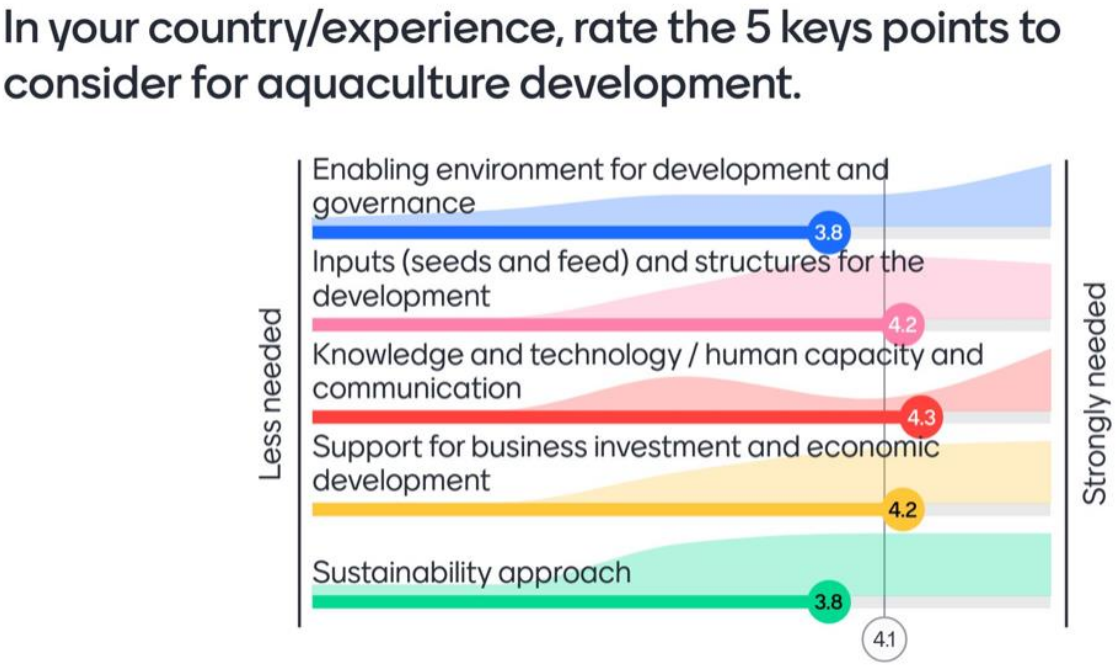
The responses indicated that the core concerns are:

- On economic side ("market", "finance", "funding", "business", but also "subsidies", "government investment" … a total of 14 words or concepts were used);
- On Government support ("policies", "political support", "enabling environment", a total of 10 words were used involving government actions and 4 more if we consider the "infrastructure", "energy access", "spatial planning" and "land access" has partly depended on government actions);
- On capacity building ("Technical assistance", "extension support" and "mentoring" are along the 5 concepts around this approach);
- On environment and pollution (4 words and concepts);
- A list of other aspects were pointed out: "Scoping studies", "labels", hatcheries", participation", "work", "inspiration" and "stability" among them.

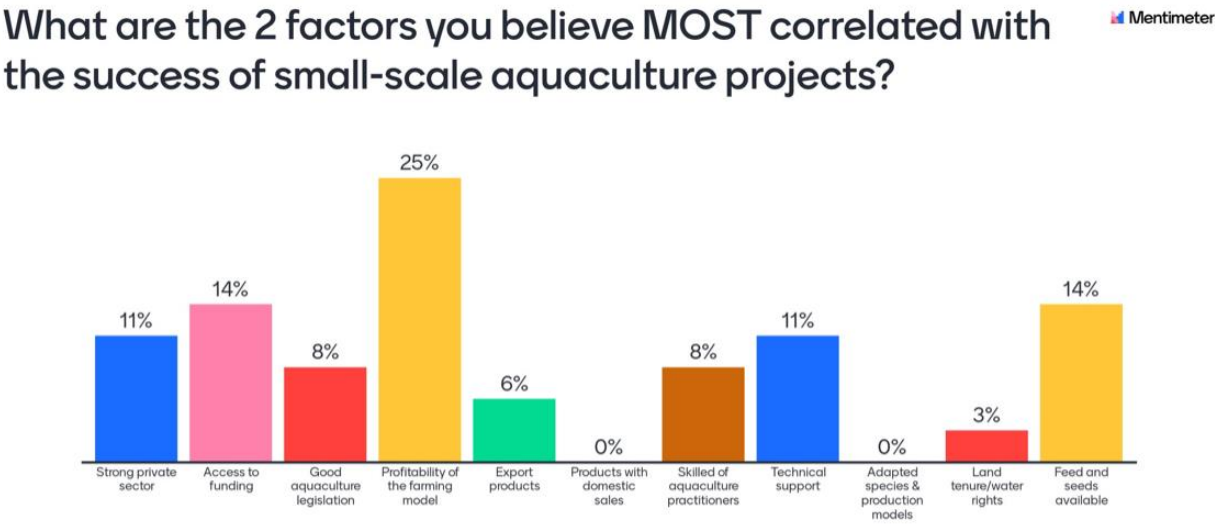
Exercise 2, scaling exercise: "Give a score between "1- less needed" and "5-Strongly needed" as to the importance of these components for aquaculture development"

All five key points were scored as a need for sector development by participants. All scores were above 3.7. "Technical knowledge and human capacity" had the higher overall score, followed by "support for business investment" and "inputs and structure" for the sector development.

On this question, the "governance aspects and enabling environment" presented many disparities of repartition of individual scores going from 1 to 5. The other question that had much variation of the repartition of individual scores from the participants was "Technical knowledge and human capacity" that had more than 1/3 of the marks at "3" . Note that the "wave" behind the average scores show the repartition of the polling.



Exercise 3, multiple choice exercise: "What are the 2 factors you believe MOST correlated with the success of small-scale aquaculture projects"

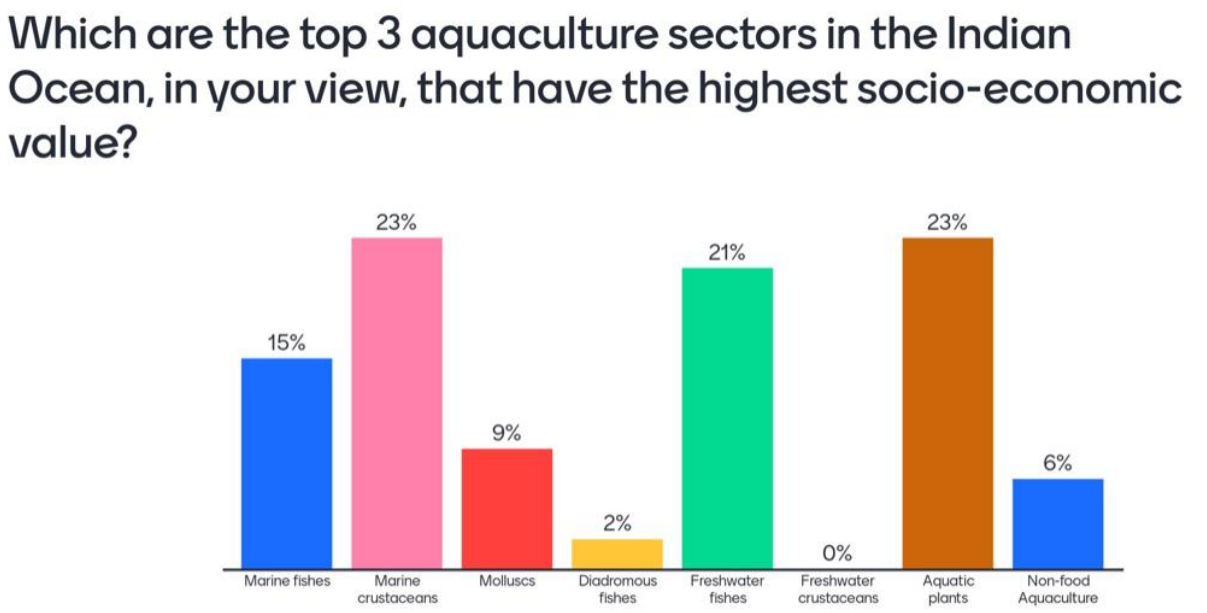


This question brings more details on the previous question's responses.

- The importance of economic aspects remains predominant. The "profitability" on its own represents 1/4 of the answers;
- "Funding", "feed" and "seeds" available together account for 1/3 of the answers;
- "skilled farmers" and "technical support" account for 1/5 of the answers.

These 3 groups of factors represent together almost 3/4 of the answers.

Exercise 4, multiple choice exercise: "Which are the top 3 aquaculture sectors in the Indian Ocean, that have the highest socio-economic value?"



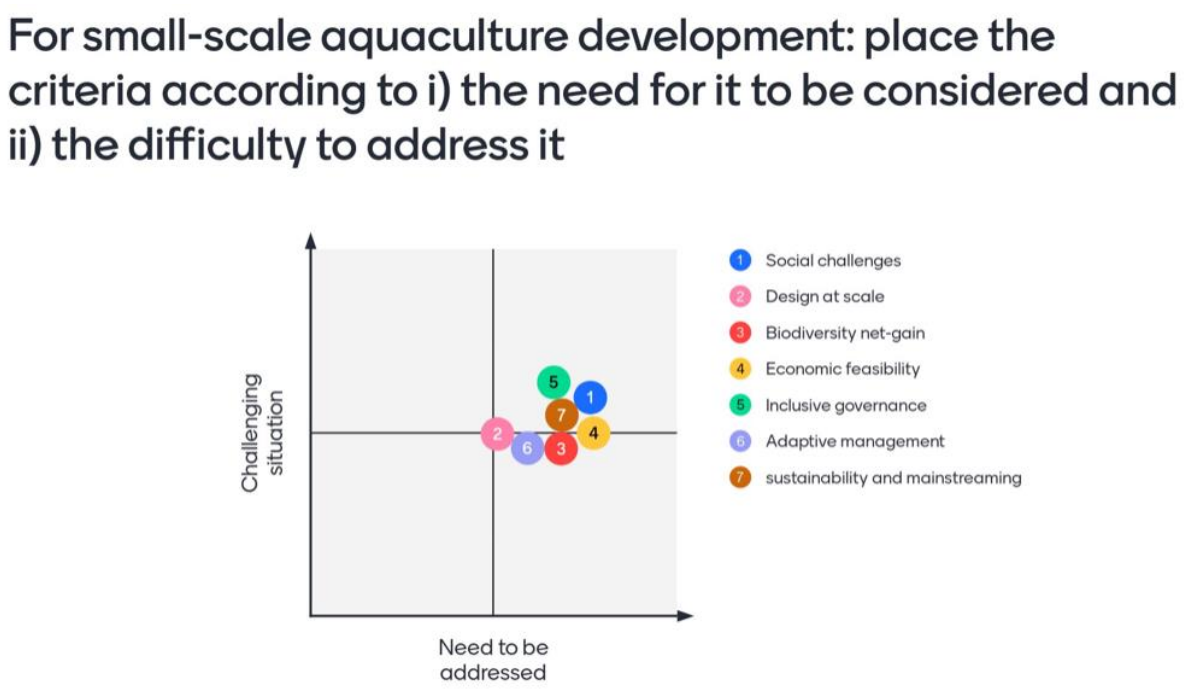
The question put forward the social aspects to consider communities and farmers outputs and interest in the development of aquaculture activities.

The results reflect the Indian Ocean aquaculture sector with an important part on marine crustacean, freshwater fishes, and aquatic plants. The existing sector development and examples are determining the choice of the participants.
The freshwater crustacean sector is not considered as having socio-economic value, and diadromous fishes as having very little.

Exercise 5, Ranking exercise: On a grid, 7 criteria had to be ranked according to the need to be addressed (Low to high) and the challenge to do it (from low to high).

The seven criteria were:

- Social challenges
- Design at scale
- Biodiversity net-gain
- Economic feasibility
- Inclusive governance
- Adaptive management
- Sustainability and mainstreaming

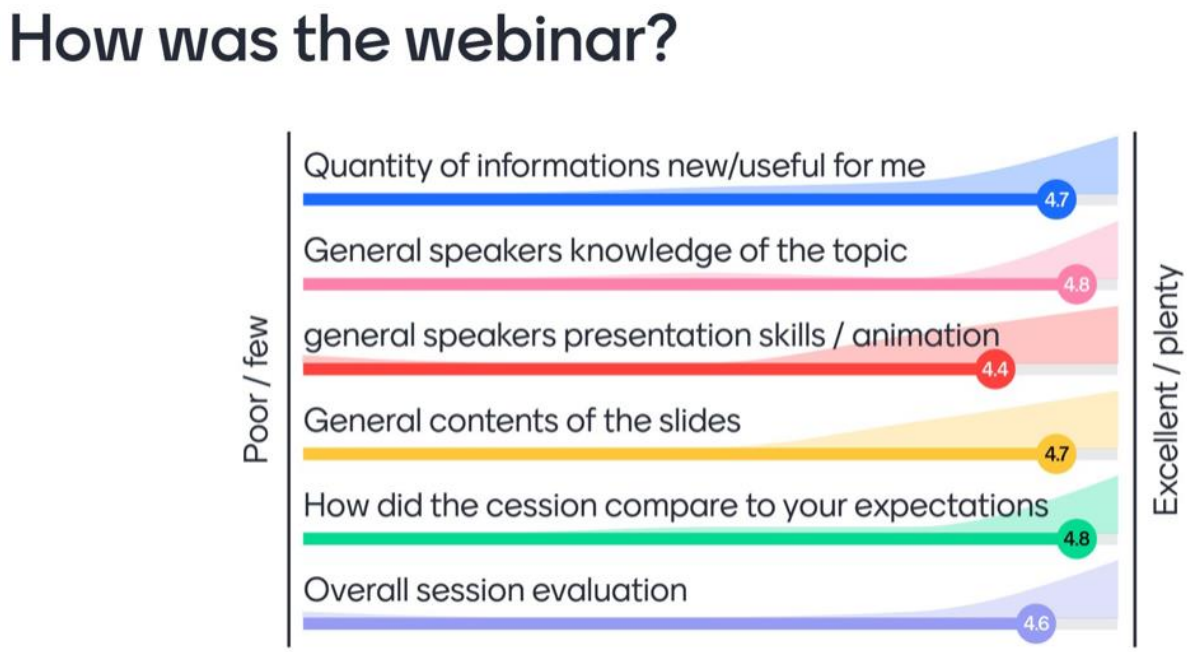


Participants considered that higher focus should go to “social challenge” and “economic feasibility”. The “scale of design” and the “adaptive management” received lower marks.
The 3 main challenge criteria to consider where “inclusive governance”, “social challenge” and “sustainability”

It must be noted that there were many disparities in the ranking by participants. The global result represents all criteria grouped with littles separation of needs and of the challenge to address them.

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. Few responses were recorded (13).



Overall, the scores were high. The lowest score of 4.4 out of 5 was on the speakers skills / animation. The highest scores were on "knowledge of the speakers" at 4.6 and on how the session compared to their expectations at 4.8.

G. CONCLUSION/RECOMMENDATIONS

The webinar provided the opportunity to inform interested persons in IORA (and elsewhere) of the reports that had been produced by the AFD technical assistance reviewing the aquaculture situation, governance and development of small-scale aquaculture in the IORA region. It also provided an insight of some important aspects of the community development approach and of environmental sustainability concerns.

Among other things reflected in the questions as well as the response of participants was a distinct need to know more about the experiences and possibilities of exchanges of experience in the IORA region. The importance of Indian Ocean for world aquaculture development and the disparity of sector development within the same area (similar environment) are important aspects that may need to be further prominence. Sharing information and experiences could be a means.

In that regard, the publications provided by the AFD technical assistance to IORA on this subject may be seen as an important start of a process that should alert the universities and institutions in the IORA region of the importance of the aquaculture sector and of the opportunities and resources that exist in the region. A list of practical experiences could be proposed as a means to go more into a more detailed technical level. This could be based on a training approach or through a manual presenting practical sub-sector development approaches.

Possible actions to enhance the regional aquaculture sector knowledge and an east-west cooperation approach include:

- Publication of the AFD TA IORA technical reports "review of aquaculture, governance, and development of small-scale aquaculture in the IORA region";
- Practical training or manuals on examples and experiences of aquaculture developments (it could be defined through a survey of stakeholders, their preference for focused support);
- Support of one or two aquaculture initiatives and with communication on each step of the setup and development of the initiative.

ANNEX I : Webinar agenda and presenter profiles

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

Webinar on promotion of small-scale rural aquaculture (activity 3.1)

31 August 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 and objective of the webinar

  - ⇨ First presentation: **Review of aquaculture, governance and development of small-scale aquaculture in the IORA Region**

The Indian Ocean Rim Association (IORA) 23 members states represented together 17% of the world aquaculture production in 2018. Analysis of the type of aquaculture and species used in the region show the predominance of small-scale aquaculture and the ascendancy of 6 species, over the 80 cultured. All member states of IORA are not at the same development stage of their sector. Five countries represent a mature sector development with important aquatic animal production, while several countries are still at an early stage with only few emerging initiatives. This disparity has several roots causes, from size of the country and its population, areas suitable for aquaculture, traditional social structure in rural areas, development approaches, market dynamisms, market accessibility: and experiences of aquaculture production. These different experiences will be presented with an analysis

to share lessons learnt in the area on the approaches of aquaculture development, the drivers, the successes, and the pitfalls. Some cases studies will conclude the presentation.

7:45 to 8:00

- **Timothy Mark Kluckow** (Expert in community development and sea-cucumber sea ranching):

    ⇨ Second presentation: **Aquaculture development with rural coastal communities: success factors for implementation and appropriation.**

Functional, profitable and sustainably managed rural aquaculture projects rely on community engagement, and their eventual ownership of the livelihood introduced. Through practical experiences over several countries in the Indian Ocean, this presentation will highlight key factors that can facilitate the development of functional aquaculture models that can be successfully appropriated by fishing communities.

8:00 to 8:15

- **Christian Vaterlaus** (Director of mariculture.org):

    ⇨ Third presentation: **Opportunities for communities through development of small-scale aquaculture activities.**

On the east coast of Zanzibar, marinecultures.org is building ecological aquaculture farms that provide a sustainable alternative to fishing and reduce pressure on natural resources in coastal waters. Besides collecting sea animals and farming seaweed, the presentation will show how cultivation of sponges has become a new profession for some women on the east coast of Zanzibar. From this example, other opportunities that aquaculture can present for Indian ocean islands as Unguja and Pemba will be explored during this presentation.

8:15 to 8:30

- **Dr. Raphaela le Gouvello** (consultant in aquaculture, integrated coastal management, sustainability and circular economy in the blue economy):

    ⇨ Fourth presentation: **Sustainability issues and small-scale aquaculture (SSA)**

The sustainability issues of small-scale aquaculture have to be considered and adapted, using appropriate operational and assessment tools. For instance, environmental impacts may be significant and associated with SSA if not properly anticipated and handled. With the previous examples presented in this webinar, and others explored by the IUCN E-bAG expert group, SSA sustainability issues will be highlighted, insisting upon the general frameworks of ecosystemic approach for aquaculture (EAA), and ecosystem services. The recent Nature-based Solution concept and its IUCN Global Standard will be presented as an opportunity to initiate, to explore and to enhance the sustainability of a local aquaculture sector, beneficial to the communities and to coastal ecological systems.

8:30 to 8:50

- Question and answers

8:50

- Group exercise on specific aspects of small-scale aquaculture in IORA region: Priorities, support/focus needed, strength and weaknesses

- Evaluation and open up questionnaire

- Webinar Closure

PRESENTER PROFILES

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

With three Master degrees, one in Natural Resource Management (with community development as an elective), one in Agronomic and Economic Development and one in Animal Production, Pierre-Philippe Blanc has worked in aquaculture, development and technical support as technical adviser for private sector and government institutions to accompany local and regional aquaculture development; he has also been Director of one of the main French technical center of tropical aquaculture (Station aquacole de Saint Vincent, Nouvelle Calédonie) and expert for international organizations. His career was oriented to support of the growth of the aquaculture sector and its implementation in tropical areas, through the different sector components (seeds production, feed, grow-out stage, research, processing, technology, disease management, market and value chain). This was both at production and implementation levels including institutional and regulatory set-up and coordination. In 2020 and 2021, Pierre-Philippe Blanc participated in several projects as an international environmental and commodity specialist for FAO in value chains analysis of fish and aquaculture products. Recently he completed the drafting of the 10-year strategic plan of action for aquaculture development of the Organization of African, Caribbean and Pacific States (OACPS, 79 members states).

Timothy Mark Kluckow. Originated from southern Africa, he has developed in-depth practical experience working with coastal fishers to build community-led aquaculture enterprises with a focus on low intensity and regenerative models. He has been seeking solutions that empower fishers and their communities to create profitable livelihoods from their marine resources that bring dependable incomes whilst reducing reliance and pressure on wild ecosystems.

Over the last decade, Timothy Kluckow has worked with Blue Venture on sea-cucumber and seaweed farming in Madagascar, and has contributed to project setups in other countries of east Africa. He has worked with many hundreds of fishers in various contexts paying attention to those factors that often determine the success of aquaculture development projects. Today Timothy Kluckow supports projects across the Indian Ocean area up to Indonesia bringing his expertise and building technical solutions.

Christian Vaterlaus is the managing director of an NGO on marine aquaculture in Zanzibar. This NGO, marinecultures.org, has a focus on community-based aquaculture development, marine conservation, and natural resource management. In 2021, mariculture.org won the Blue Champion award of Blue Solutions for its actions: i) Development of sponge farming in Zanzibar *https://news.trust.org/item/20210804070018-f4vl3*; ii) 7 years of coral farming and coral restoration *https://www.marinecultures.org/en/news/-/id_mod_news/211*; iii) Coral reef protection and Marine Protected Area (MPA) demarcations by mooring buoys in Zanzibar, Pemba, Mafia and Maziwe island and iv) Fisheries management, octopus closures, artificial reef production, marine awareness programs, Locally-Managed Marine Area (LMMA) setups. Today Christian Vaterlaus also consults and partners with main regional initiatives on developing small-scale aquaculture.

Raphaela le Gouvello, DVM, PhD is an independent consultant in aquaculture, integrated coastal management, sustainability and a circular economy in the Blue Economy. She is an IUCN expert, and associate researcher in the UMR AMURE/UBO, Brest (Marine and Coastal Environmental Socio-economics). Recently, she completed a thesis on the concept of a circular economy applied to social and ecological systems dependent on local coastal fisheries and/or aquaculture. She has been working for long on the sustainability of aquaculture, co-chairing the Ecosystem-based Aquaculture Group (E-bAG) within the IUCN Commission on Ecosystem Management; exploring synergies between marine aquaculture, marine conservation, and coastal communities with case studies in Zanzibar, Indonesia, Tunisia and French Polynesia.

Raphaëla le Gouvello is also the founder and the president of the French NGO RespectOcean (www.respectocean.com), a network federating more than 60 enterprises, acting in the blue economy, which aims at developing and promoting good practices and innovations towards marine and coastal ecosystem conservation and restoration.