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**REGIONAL CONSULTATION ON THE DEVELOPMENT OF  
GUIDELINES FOR SUSTAINABLE AQUACULTURE (GSA)**

**Bamako, Mali, 29–30 November 2019**



Report of the  
REGIONAL CONSULTATION ON THE DEVELOPMENT OF GUIDELINES FOR SUSTAINABLE  
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## Preparation of this document

The African Regional Consultation on the Development of Guidelines for Sustainable Aquaculture was held in, Bamako, Mali (Hotel Amitié) from 29 to 30 November 2019. Delegates include 28 government representatives, the Vice Chair of the FAO Expert Consultation as a resource person, one representative from African Development Bank, one representative from CEMAC-CEBEVIRHA and 17 FAO staff members and consultants. The list of delegates is given in Annex 1.

### ABSTRACT

This consultation was the first of a series of regional consultations on the Development of “Guidelines for Sustainable Aquaculture (GSA)”. It aimed to:

1. Share current policies and practices related to aquaculture in the region and inform the African region of the development process of GSA.
2. Review existing regional sustainable aquaculture guidance, and assess potential gaps that GSA could help fill.
3. Develop a list of priority thematic modules, including regional strengths and challenges.
4. Discuss regional case study concepts proposed at the FAO Tenth Session of the COFI Sub-Committee on Aquaculture (SCA) held in Trondheim, Norway on 23–27 August 2019, and identify additional case study topics associated with one or more thematic Guidelines for Sustainable Aquaculture modules, as outlined by the expert consultation on the development of the Guidelines for Sustainable Aquaculture, held at FAO Headquarters in Rome, Italy on 17–20 June 2019.

Delegates came up with a list of existing governance instruments in Africa that would be useful in the global GSA development. Informed by the list of 72 thematic modules from the June 2019 expert consultation, they identified the following additional regional priority areas, which should be addressed in the global GSA. These priority areas include: (i) certification requirements/guidelines for service providers (feed, seed, fish farm); (ii) guidelines to manage aquaculture farms; (iii) access to water and land; (iv) carrying capacity in cage aquaculture and water usage, including conflict management; (v) best management practices along the aquaculture value chain; (vi) genetic management of strains; (vii) usage of supplements; (viii) regulation on trade issues; (ix) economic and environmental management and; (x) building resilience in aquaculture.

Delegates recognized the importance of GSA as one of the most valuable sources of information for sustainable aquaculture development, and recommended that it should be voluntary. They further agreed that GSA should be a live document that can be updated as more information becomes available, and will be distributed in the form of a guidance manual in a same or similar format of the FAO “Transforming Food and Agriculture to achieve the SDGs” guidelines.

The meeting was informed of the following next steps by the Secretariat: (i) Regional meetings are organized in Asia, Latin America, SIDS (2020–2021) and GSA are drafted; (ii) COFI 34 is informed of the GSA process (Feb 2021); (iii) GSA are submitted to COFI SCA for review and adoption (2021); (iv) GSA are submitted to COFI 35 for endorsement (2022); (v) GSA Publication and related implementation materials are published (2022/2023); and (vi) Implementation (capacity building etc.) is initiated (2023).



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## Abbreviations and acronyms

<b>AfDB</b>	African Development Bank
<b>AU PRSFA</b>	African Union's Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa
<b>CCPR</b>	Political and Civil Rights
<b>CEMAC</b>	Economic and Monetary Community of Central Africa
<b>COFI</b>	FAO Committee on Fisheries
<b>EAA</b>	Ecosystem Approach to Aquaculture
<b>EAC</b>	East African Community
<b>ECOWAS</b>	Economic Community of West African States
<b>EMFF</b>	European Maritime and Fisheries Fund
<b>FAORAF</b>	FAO Regional Office for Africa
<b>GMOs</b>	Genetically Modified Organisms
<b>GSA</b>	Guidelines for Sustainable Aquaculture
<b>IMTA</b>	Integrated Multi-Trophic Aquaculture
<b>ISKNV</b>	Infectious spleen and kidney necrosis virus
<b>KMI</b>	Korea Maritime Institute
<b>LCBC</b>	Lake Chad Basin Commission
<b>NEPAD</b>	New Partnership for Africa's Development
<b>OIE</b>	World Organization for Animal Health
<b>SADC</b>	Southern African Development Community
<b>SCA</b>	Sub-Committee on Aquaculture
<b>SDGs</b>	Sustainable Development Goals
<b>WAEMU</b>	West African Economic and Monetary Union



## Opening remarks

On behalf of the FAO Director-General, Mr QU Dongyu, Mr Rodrigo Roubach, Senior Aquaculture Officer, welcomed all delegates to the consultation. He recalled the context and the demand for the Guidelines for Sustainable Aquaculture ('hereafter referring as GSA') expressed by the COFI Sub-Committee on Aquaculture ('hereafter referring as SCA') during the 8<sup>th</sup> Session. On behalf of the Government of Mali, Mr Madi Keita, Technical Advisor to the Minister and Chairman of the Permanent Assembly of Chambers of Agriculture, in the Ministry of Livestock and Fisheries welcomed all delegates to the consultation, and gave a brief of aquaculture in Mali emphasizing its importance towards food and nutrition security and creating employment for the citizenry. The full text of the opening statements is contained in Annex 2.

## Session 1: Setting the scene

The Secretariat set the scene of the consultations by presenting the genesis of the consultations, objectives, methodology and deliverables of the Regional Consultation, after which all delegates and the Secretariat introduced themselves. It was recalled that the purpose of the consultation is to have a clear view of the scope and contents of the existing and new paths of success and of what methodologies to use for the GSA development, in order to help decision-making by COFI-SCA by providing options, recommendations and advice. The Expert Consultation proposed a roadmap and methodology, which was submitted to SCA at its tenth session in Trondheim (Norway) in August 2019. SCA indicated its strong support to the proposal to convene regional consultations, as suggested by the global expert consultation and noted the need to ensure that all regions were part of these consultations.

### **More specifically, the deliverables of the Expert Consultation:**

- i. A proposed methodology and criteria for selecting strategies and experiences of aquaculture developments worldwide and for identifying the lessons learned from them
- ii. A methodology for documenting and analyzing the lessons learned
- iii. A list of thematic modules
- iv. A gap analysis between existing guidelines and needs for new ones

### **Regional Consultation objectives**

The specific objectives of the Consultation were to:

1. Share current policies and practices related to aquaculture in the region and inform the development process of GSA.
2. Review existing regional sustainable aquaculture governance instruments, and assess if there are gaps that the GSA could help fill.
3. Develop a list of priority thematic modules, including regional strengths and challenges.

4. Discuss regional case study concepts proposed at the SCA meeting in Trondheim (see below), and identify potential additional case study topics associated with one or more thematic Guidelines for Sustainable Aquaculture modules, as outlined by the Expert Consultation on the Development of GSA held in June 2019 in Rome (<http://www.fao.org/3/na410en/na410en.pdf>).

To achieve these objectives, the meeting was organized according to the Agenda shown in Annex 3.

## **Session 2: Existing governance instruments in Africa**

The delegates reviewed the existing regionally developed aquaculture governance instruments in Africa (Annex 4), and brainstormed to develop a list of existing information that would be useful in the global GSA development. They noted that GSA could help the African region achieve the three main pillars of sustainability. Their specific importance for the sector development was emphasized.

It was noted that many countries still lack specific legislation for aquaculture. Further discussions took place on what delegates wished to see included in the GSA. The followings are the highlights:

- i. Biosecurity and animal health (biosecurity issues with transfers)
- ii. Certification requirements/guidelines for inputs (specifically feed, seed)
- iii. Fish farms certification at all stages of the production to ensure quality and healthy products and feed products
- iv. Feed and seed quality
- v. Promotion of use of local ingredients in feed production
- vi. Best management practices along the aquaculture value chain
- vii. Guidelines to mapping aquaculture possible sites (EAA development)
- viii. Guidelines for developing investment protocols
- ix. Research
- x. Promotion of commercial aquaculture
- xi. Aquaculture diversification at all levels, including small scale, medium and industrial
- xii. Regulation on trade issue; export and import of aquatic resources
- xiii. Carrying capacity in cage aquaculture and water usage conflict management (EAA development)
- xiv. Ornamental fish; sanitation
- xv. Access to water and land
- xvi. Information sharing
- xvii. Genetic management of strains; usage of supplements
- xviii. Economic and environmental management
- xix. Building resilience on aquaculture
- xx. Guidelines for small scale aquaculture to ensure food security ex. Rice-Fish culture

xxi. Other potential sources<sup>1</sup>

### Session conclusions

The delegates acknowledged the importance of aquaculture in their countries and the need for governance structures to guide the development of the sector. In the region, most countries have strived to develop governance frameworks, however specific aquaculture governance instruments are still lacking in majority of the countries. From the existing regionally developed aquaculture governance instruments, **a list of existing information that would be useful in the global GSA development was established.**

## **Session 3: Thematic modules**

The purpose of this session was to add regional nuances to provide a consolidated list of thematic modules, available guidelines and needs for the development of GSA using the list of 72 thematic modules developed by the experts (June, 2019) as a reference point. A gap analysis was undertaken indicating areas that need additional guidance.

Highlights provided on the purpose of this session were as follows:

- i. To see if the chapters capture the elements of the GSA, and where they do not, bring in additions
- ii. Under strengths, identify lessons that can be learnt from the chapter
- iii. Identify challenges, what exists and what should exist but is not there
- iv. Prioritize the chapters and suggest two thematic modules in the region

In this session, delegates were broken into two groups to identify and discuss the main strengths and challenges of aquaculture development in Africa in order to help the FAO Secretariat to refine the list of thematic modules and prioritize the latter.

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<sup>1</sup> According to AfDB a study on research done on ‘food’ species and ‘high commercial species’ in Africa will be published next year and can be used to source for case studies.

## Group discussion

The groups reported the results of their discussions (Annex 5) in the plenary. Each group prioritized the chapters and the themes (thematic modules) within each chapter.

Working Group A presented their regional strengths and weakness in each of the chapter where applicable. In addition, they prioritized the chapters (the number in parentheses next to the chapter).

### *Group A. Priorities*

#### Chapter 1. Sustainable aquaculture and the 2030 agenda (2)

1. Capacity building
2. Financing
3. Gender in aquaculture
4. Fair and inclusive development
5. Implementation of CCPR

Regional strength: a favorable physical environment and existence of a young workforce; African region's high demand for aquaculture products; mastery of the *Tilapia* and *Clarias* breeding technique. Regional challenge: inadequate financing and insufficient skilled workers.

#### Chapter 2. Aquaculture governance and development planning (1)

1. Favorable environment:
  - Infrastructures
  - Equipment
  - Funding
  - Search
  - Extension and training
  - Capacity building
  - Networks
  - Education
  - Access to land and water
  - Market access
2. FAO Blue Growth Initiative
3. Aquaculture planning and policy
4. Public-private partnerships in aquaculture
5. Governance / collective management of common resources
6. Natural disaster management

Regional strength: a sustainable aquaculture strategy has been developed through support from West African Economic and Monetary Union (WAEMU), under directives 3 and 4 specific to fisheries and aquaculture, there is a regional investment program for agriculture, food and nutritional security in West and Central Africa, including existence of laws and strategic plans dedicated to aquaculture in certain countries.

Regional challenge: the development or revision of laws specific to aquaculture, the application of the legislations, harmonization of legislations and strengthening of research.

#### Chapter 3. Biodiversity and genetic resources (10)

1. Management, development and conservation of genetic resources
2. Biodiversity, habitat, ecosystem functions and aquaculture
3. Introduction and transfer of species for aquaculture purposes
4. Use of GMOs in aquaculture

Regional strength: abundance of endogenous specific diversity in the region.

Regional challenge: the lack of development and promotion of aquaculture management plans and the lack of interest in other species.

The group acknowledged that the use of GMOs in aquaculture can be a good example for best management practices (BMPs) in terms of improving aquaculture production, food security and generating economic benefits.

#### Chapter 4. Best management practices in aquaculture (3)

1. Construction, engineering, maintenance or rehabilitation of systems
2. Best management practices and codes of practice
3. Storage and inventory management (food, inputs, equipment, etc.)
4. Efficient use of resources and reduction of losses and waste
5. Human and labor rights, decent work and acceptable working conditions

Regional challenge: the difficulty of carrying out production according to standards

#### Chapter 5. Sustainable feed (4)

1. Use of fish oil and fishmeal in aquaculture feed, Use of alternative food ingredients to oil and fishmeal, e.g. algae, insect meal, single-cell proteins, vegetable proteins, etc.
2. Nutrition, animal feed (formulation of natural products, of agricultural and commercial origin)

Regional strength: availability of agricultural by-products in certain countries

Regional challenge: finding quality food at affordable prices, looking for alternative ingredients / raw materials, promoting artisans and feed mills.

#### Chapter 6. Water management (7)

1. Efficient use of energy and alternative / renewable energy sources in aquaculture (e.g. solar)
2. Wastewater and water quality management / water pollution from various sources (pesticides, mining, etc.)
3. Water withdrawal and conservation
4. Effluent management, waste management / elimination and use of wastewater

Regional strength: the existence of trans-boundary river basin management organizations (RBOs). The African RBOs adhere to a consensual and collaborative approach to water resource management across countries, and in practice, water management is an ongoing negotiation to address conflicting interests and competing claims between upstream and downstream countries.

Regional challenge: difficulty in managing shared water resources

#### Chapter 7. Biosecurity and aquatic animal health and welfare. (6)

1. Biosecurity and aquatic health management
2. Microbiological control
3. Animal welfare

Regional strength: existence of laboratories specializing in water quality analysis in certain countries.

Regional challenge: lack of expertise in analysis.

#### Chapter 8. Specific farming systems (8)

1. Promotion of aquaculture innovation and adoption of technologies to users, including BMPs.
2. Integrated aquaculture systems
3. Capture-based aquaculture and culture-based fishing
4. Aquaculture in special environments
5. Cultivation of other aquatic products

Regional strength: diversity of water bodies.

Regional challenge: restocking of water bodies regional challenges.

#### Chapter 9. Aquaculture value chains, consumers, markets and trade (5)

1. Fair and productive aquaculture value chains
2. Marketing of aquaculture products
3. Nutritional value, quality and safety of aquaculture products
4. Quality certification and voluntary systems
5. Public perception and acceptability
6. Compliance with international standards

Regional strength: presence of market, promotion of the value chain of the fish sector in certain countries, and existence of traditional/indigenous knowledge are regional strengths.

There was no significant challenge in this chapter.

#### Chapter 10. Aquaculture statistics and information (9)

1. Collection, monitoring, processing and management of databases and dissemination of information

In the same way, **Working Group B** also prioritized each chapter (as numbered) reflecting the needs of the region.

*Group B. Priorities*

## Chapter 1: Sustainable Aquaculture and the 2030 Agenda

1. Food and nutrition security
2. Youth in aquaculture
3. Climate smart aquaculture
4. Gender in aquaculture

Regional strength: existence of water retention and resilient rural communities, a youthful population is available in the region; in terms of gender aspect, both men and women are participating in the aquaculture value chain and there is increased availability of financial support targeting women; existence food and nutrition policies, e.g., ECOWAP and high aquaculture potential in the region.

Regional challenge: limited capacity and support for climate smart interventions, limited skills and knowledge and support for youth, aquaculture sector is unattractive to the youth, gender limitations in land ownership due to cultural characteristics and limited implementation of policies.

## Chapter 2. Aquaculture governance and development planning t

1. Legislation
2. Spatial planning and zoning (EAA)
3. Water use regulation
4. Operating procedures
5. Standards – inputs, products and services
6. Internal and external trade regulation – border points control

Regional strength: following strategies and policies are regional strength: SADC Protocol on Fisheries, SADC Regional Aquaculture Strategy and action plan, SADC Regional Aquatic Biosecurity, SADC Aquaculture Guidelines, EAC Fisheries and Aquaculture Policy, EAC Cage Culture guidelines 2018 and Harmonized Fisheries and Aquaculture border inspection manual for East Africa and AU PRSFA.

Regional challenge: inadequate operating protocols/certifications, e.g, hatchery operating procedures and sex reversal procedures; no uniform standards for the region and there is no well-coordinated spatial planning and zoning of Aquaculture and Environment; conflicts in water use, inadequate border control units to regulate exotic species and disease, and limited implementation of governance documents.

## Chapter 3. Biodiversity and genetic resources

1. Genetic characterization and conservation of indigenous species.
2. Genetic improvement of indigenous species.
3. Environmental risk analysis guidelines for exotic species

Regional strength: available local capacity to conduct genetic characterization, diverse fish genetic resources available in the region and available expertise to conduct risk analysis

Regional challenge: limited work on the characterization of indigenous species, limited work on genetic improvement and non-availability of risk analysis guidelines.

#### Chapter 4. Best management practices in aquaculture

1. Climate smart aquaculture practices.
2. Good husbandry practices.
3. Compliance to legislation

Regional strength: basic competencies are well established through aquaculture farms and legislation in accordance with basic standards.

Regional challenge: problems of natural disasters such as droughts and floods, inconsistent documentation of standards for good aquaculture practices, and limited coordination across countries and inadequate enforcement.

#### Chapter 5. Sustainable feed.

1. Quality and availability of feed
2. Feed Formulation i.e. on farm
3. Alternative feed ingredients
4. Feeding regimes

Regional strength: feed companies that produce certified feeds are located in South Africa, Zambia, Ghana, Nigeria, etc., and have expertise in feed formulation, availability of raw materials and appropriate technical know-how.

Regional challenge: high cost and limited availability of commercial feeds, competitive use for raw materials for fish feeds, lack of technical know-how to cultivate aquatic organisms as feed ingredients, and limited awareness of cost-saving supply strategies.

#### Chapter 6. Water management

1. Zonation and carrying capacity studies.
2. Uses, tenure systems and permits
3. Production systems
4. Institutional structures and linkages

Regional strength: large water bodies/systems, existing guidelines on permits and the presence of institutions and CSOs involved in training, research, and expansion of existing technologies were highlighted as a good example of their water management practices.

Regional challenge: inadequate information on carrying capacity of water bodies, frequent land and water litigation, inappropriate technical know-how, and weak enforcement.

#### Chapter 7. Biosecurity and aquatic animal health and welfare

1. Safety and quality control
2. Aquatic and health management
3. Diseases /pathogen management
4. Aquaculture inputs management



Regional strength: limited number of fish diseases or occurrences, existing guidelines, clean aquatic environments, and legislations.

Regional challenge: lack of/limited control of fish movement, capacity, laboratories and quarantine facilities, feed and seed certification.

#### Chapter 8. Specific farming systems

1. Site selection
2. Production facilities
3. Appropriate species
4. Innovative technologies

Regional strength: availability of suitable land and water bodies, existence of basic production technologies and diverse fish species available for aquaculture.

Regional challenge: inadequate land use planning, limited know-how of appropriate technologies, and limited research and development of other indigenous species.

#### Chapter 9. Aquaculture value chains, consumers, markets and trade

1. Production of quality fish feed and seed.
2. Breeding-quality seeds and brood stock
3. Processing and value addition
4. Packaging and labelling of product

Regional strength: availability of technology, resources and capacity, existing regional policies and strategies such as “East African Community Sanitary Measures for Fish and Fisheries Products 2014”.

Regional challenge: lack of investment in aquaculture value chain, lack of transportation facilities, limited market information, and high cost of fish and fishery products.

#### Chapter 10. Aquaculture statistics and information

1. Aquaculture data availability
2. Information communication and outreach
3. Legal aspect on data sharing

Regional strength: existence of extension officers and farmers’ associations, ICT technology systems, national legislations, and RFMOs/RFBs.

Regional challenge: entire system/technical deficiencies due to difficulties in information collection, recording and maintenance, limited use of electronic systems, and inconsistent data collection.

#### Session conclusions

The list of 72 thematic modules that was developed by the experts (June, 2019) was used as a reference point to undertake a gap analysis to indicate areas that they felt needed additional guidance. The main strengths and challenges for aquaculture development in Africa that can be used to further refine the list of thematic modules were identified. The associated themes and listed priority case studies were prioritized. The regions highest priority areas in the GSA were highlighted as “Governance and planning for aquaculture development and “Sustainable Aquaculture and Agenda 2030”.

## **Session 4: Case study concepts**

An overview of case study selection criteria from the expert consultation, including recommendations for GSA development was presented. The purpose of GSA is to build on lessons learned, and therefore, the proposed methodology in its development is to use case studies and existing guidelines that will include pathways and practical thematic modules. GSA will propose a series of pathways, aimed at assisting member states to plan and implement a sustainable aquaculture development route, regardless of their status and specific conditions. The lessons learned from the case studies showing best practices fitting to those thematic modules will help develop these pathways for sustainable aquaculture.

The composition of the two groups remained the same during Session 4, where concepts of case study were discussed. The result of the group discussion results are in Annex 5 while the proposed case studies prepared by the secretariat for use during group discussions are in Annex 6.

### Group discussions

The exercise aimed to develop a list of regional priority case studies and to link them to the priority thematic modules that were recommended in Session 3. Group B recognized that most of the proposed case study concepts provided from the expert consultations are relevant except for case study no. 31 “EMFF Subsidies for the conservation and sustainable intensification of pond aquaculture” proposed in SCA Trondheim (August 2019) and no. 33 “AMR, biosecurity, animal welfare” proposed in SCA Trondheim (August 2019).

Delegates made the following recommendations for the case study concepts:

- “Public-Private Partnership initiatives in Africa” with case studies found in Bénin, Guinée, and Cameroun. This case is linked to Chapter 2. Governance and planning of aquaculture development; with supported thematic modules being; aquaculture planning and policy, and the favorable environment. The possible lesson learnt is the non-compliance with commitments, especially by the private individuals.
- “Gender equality in seaweed farming” case study in Zanzibar, the possible lesson learnt is enhanced participation, economic empowerment and employment of women in aquaculture.
- “Acadja system for tilapia in West Africa” is related to Chapter 8. Specific aquaculture systems, with case studies found in Benin, Togo, Guinée and Cote d’Ivoire. The possible lessons learnt

include; Natural recruitment of fish; Congestion and siltation; Deforestation; Destruction of mangroves; and conflicts

- “Lessons on how progressive African aquaculture countries have tackled their unique challenges to improve sustainable aquaculture development and growth.” is linked to Chapter 1. Sustainable aquaculture and the 2030 Agenda; and supported under thematic modules; capacity building, financing. Countries with cases include; Benin, Guinée and Cameroun. Possible lessons learnt include; reduction of extension costs through farmer to farmer approach, increased number of skilled fish farmers (through training), facilitating emergence of individual innovations, and enhancing tutoring systems.
- “Alternative formulation based on local ingredients (global, Hasan, FAO)” is linked to Chapter 5. Sustainable animal nutrition; and supported under the following thematic module – Nutrition and animal feed (formulation of natural products, of agricultural and commercial origin). All the countries are possible candidates for the case study. Cost savings and feed availability are possible lessons learned.
- “Biosecurity concerns due to introductions of exotic species.” is link to Chapter 7. Biosecurity, aquatic animal health and animal wellbeing; supporting thematic module Diseases/pathogen management. An example is the case of introduction of GIFT tilapia in Ghana with possible lessons learned being; improved enforcement of regulations, convening of aquaculture stakeholder consultations, total destruction of imported brood stock, the increased demand for locally improved tilapia strains, temporary bans on moving fish from one catchment to another (e.g. Lake Volta to the hinterland), and mass vaccination of fish against ISKNV.
- “Import Regulations" can be linked with Chapter 2. Governance and Planning Aquaculture Development, supporting the thematic module on Legislation- External trade regulation, and border management. Two countries, Ghana and Burkina Faso have good examples on the enforcement of legislation: e.g. ban of tilapia importation into Ghana. A possible lesson learned was the need for harmonization of cross-border trade legislation.
- Other case studies presented included amongst others; “Increase efficiency by using fish by products (using fish skin (tilapia) to treat burns)”; “Improvement of shellfish production for small scale producers” (examples of case studies available from South Africa, Madagascar, Zanzibar); “Ecosystem health and integrity are promoted as good practices for a healthy business” (e.g. mangrove restoration, the case of Kenya under the Blue Growth Initiative (BGI)); “Capacity support of Aquaculture Center of Excellence” the case of ARAC in Nigeria, where there has been significant contribution to critical mass of aquaculture professionals in the region).

### Session conclusions

In this session, the focus was on development of a list of regional priority case studies that were linked to the priority thematic modules previously developed by the experts. These were acknowledged to be relevant, albeit for two case studies namely; No. 31 “EMFF Subsidies for the conservation and sustainable intensification of pond aquaculture” and No. 33 “AMR, biosecurity, animal welfare”, both proposed in SCA Trondheim (August 2019). A list of regional priority case study concepts that were linked to the priority thematic modules were developed. It is anticipated that the lessons learned (positive and negative) from the case studies will assist in shaping the draft of GSA. The development

of the case studies was not possible at this stage as the criteria/guidelines for their development would be undertaken at a later stage. It was recognized that the pathway for guidelines for sustainable aquaculture will not be the same for all countries, rather, the objective was to give recommendations on the steps to be followed in different conditions. It was suggested that the format should be the same or similar to that of ‘Transforming Food and Agriculture to achieve the SDGS’.

## **Session 5: Summary of conclusions**

### Plenary discussion

The Chairperson provided a summary of the overall discussions and outcome of the meeting, while highlighting the important issues that should be addressed in the future for the development and implementation of GSA for the Africa region. The Chairperson further discussed the pathways for GSA after this meeting, indicating what remains to be done regionally and globally.

### Conclusion of the regional consultation

Delegates:

1. Welcomed the development of the GSA, highlighting that, despite the modest production from aquaculture in Africa, aquaculture is recognized as an important production system throughout the region and for the countries. It is generally accepted that the potential for the significant growth of aquaculture in the countries and in the region exists. Labor is available and still reasonably cheap, while the demand for fish is high and often unsatisfied. In many areas, land and water resources are readily available and frequently under-utilized.
2. Identified the following additional topics relevant to the region for inclusion in the GSA:
  - Certification requirements/guidelines for service providers (feed, seed, fish farm)
  - Guidelines to manage aquaculture farms
  - Access to water and land
  - Carrying capacity in cage aquaculture and water usage, including conflict management
  - Best management practices along the aquaculture value chain
  - Genetic management of strains; usage of supplements
  - Regulation on trade issues
  - Economic and environmental management; building resilience on aquaculture
  - Building resilience on aquaculture
3. Identified the highest priority areas in GSA as being (1) “Aquaculture governance and development planning and (2) “Sustainable Aquaculture and Agenda 2030”, with respective associated themes and case studies.

4. Emphasized, on several occasions during the meeting, the need for sufficient financial support as well as the country's strong political will to ensure the successful implementation of the existing governance instruments and the forthcoming GSA.
5. Highlighted that the region is vulnerable to natural disasters such as drought, flooding, and underlined the need for best management practices in aquaculture with climate smart aquaculture practices, good husbandry practices and compliance with legislation. Biosecurity concerns were also raised due to introductions of exotic species, the need for genetic improvement of indigenous species and a harmonization of cross-border trade legislation and standards as a part of aquaculture governance.
6. Emphasized that, while being one of the most valuable sources of information for sustainable aquaculture development, the GSA should be voluntary. As SCA stressed, it will be distributed in the form of a guidance manual and a live document that can be updated as more information comes in. Its format will be the same or similar to that of the "Transforming Food and Agriculture to achieve the SDGS".

## **Session 6: The way forward and closing session**

The FAO GSA team will continue with the organization of regional consultations as part of the series of regional meetings on development of GSA. To do that, the following activities will be undertaken in the future.

### Timeline for the development and implementation of GSA

- **Regional meetings in Asia, Latin America, SIDS (2020–2021) and drafting of the GSA**
- COFI 34 is informed of the GSAs process (Feb 2021)
- GSAs is submitted to COFI SCA for review and adoption (2021)
- GSA is submitted to COFI 35 for endorsement (2022)
- GSA and its learning materials are published (2022/2023)
- Implementation (capacity building etc.) (from 2023)

### Closing remarks

Chairperson: Aquaculture is dynamic and therefore the GSA should be a living document that can be reviewed every 5 years or as agreed during the consultations. There is a need to review the days for the consultations (increase to at least 3 days) to adequately tap the information from the delegates).

Delegate from Malawi: On behalf of the delegates and all member countries, acknowledged the importance of GSA. Thanked the facilitators for all the logistics and relevant documents, and excellent interpretation. Thanked Mali for their hospitality during their 5 days stay in Bamako.

## **Acknowledgements**

The organization of this Consultation would have been difficult without the financial support of the Korea Maritime Institute of the Republic of Korea. The warm hospitality of the Government of the Republic of Mali is also gratefully acknowledged.

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## **Annex 2: Opening statements**

### **Opening address by FAO**

Ladies and Gentlemen, Good Morning!

I would like to welcome all of you to Bamako, Mali. Great thanks to you for participating in this regional Africa meeting towards the development of “Guidelines for Sustainable Aquaculture”. Please allow me first to thank the Government of the Republic of Mali for hosting us at this beautiful city of Bamako with their hospitality. FAO would also thank the Government of the Kingdom of Norway for their kind support provided for the first steps of scoping and development work of the Guidelines for Sustainable Aquaculture. We also thank the Government of the Republic of Korea and its Korea Maritime Institute for the support of the envisaged global and regional consultations that should help developing the regional Africa Guidelines for Sustainable Aquaculture.

As you are aware, aquaculture continued growth worldwide has provided not only quality protein for human consumption, but also created jobs and has supported many livelihoods. Aquaculture also plays an important role in food security and nutrition worldwide, since it can be developed in a wide variety of locations and systems. Today, aquaculture producers contribute more than half of all fish and fish products for human consumption. Our expectations are that soon aquaculture will be the mainstay of production, supply and trade of fish and fish products, worldwide.

Accordingly, the Sub-Committee on Aquaculture of the FAO Committee on Fisheries (COFI) during its ninth session held in Rome in October 2017, underlined the vital contribution of aquaculture to food security and nutrition as well as the importance of market access and post-harvest issues, and emphasized the need to support small-scale producers. The Sub-Committee recognized the growing global significance of sustainable aquaculture development and its potential contributions to both global food security and nutrition, as well as to the achievement of a wide range of SDG targets, while recognizing that there is a growing need for implementation of best practices in aquaculture in many countries and regions.

With that in mind, let us not forget that over the past decade Africa has experience significant growth in aquaculture growth with production in rising from 399,000 tons in 2000 to 1.49 million tons in 2011, accounting for 2.2% of the global production; and the fastest growing continent (11.7%). But in order to achieve is projected expansion, by at least 61 per cent by 2030, we need to focus to ensure early on that this growth is sustainable and does not adversely affect dependent freshwater and marine ecosystems.

In that order, FAO will continue to provide technical assistance to member countries and to facilitate inter-governmental dialogue on sustainable and responsible aquaculture development, especially in the COFI Sub-Committee on Aquaculture, and as part of its work programme with FAO’s Strategic Programmes and with relevant partners and stakeholders.

This regional consultation constitutes an essential step towards improving our knowledge on sustainable and successful aquaculture developments and towards the identification of possible success factors and pathways that might provide for suitable guidance to ensure its continued sustainable growth in all possible aquaculture sets and stages of development.

We see this as a very important fundamental first stepping-stone and expect that, at the end of the two days, we will have a better view of the scope and contents of the existing and new paths of success and

of what methodologies to use for the development of the Guidelines for Sustainable Aquaculture in Africa.

However, we will also need strong partnerships because the work is only starting after this meeting, as we will be presenting these results to member countries, Regional Fisheries Bodies and Aquaculture Networks, and participating stakeholders from industry, trade and civil society.

Let me close these opening remarks by wishing you all a fruitful meeting that will help put the contribution of this consultation on the map for the benefit and growth of a truly sustainable aquaculture for all, without exceptions, in all Africa.

### **Opening address by Mali Representative**

Ladies and Gentlemen, Good Morning!

On behalf of the government of Mali, I wish you all a convivial welcome. We are going to have a merry and enjoyable time together.

Great thanks to you for your participation in this regional Africa meeting towards the development of “Guidelines for Sustainable Aquaculture”.

Please allow me first to thank FAO through its representative in Mali, as well as, the Regional Office for Africa for having this meeting here in Bamako. And under this capacity, our appreciation to FAO in its continuing endeavour to provide technical assistance to Mali, to all the other African member countries and to facilitate an inter-governmental dialogue on sustainable and responsible aquaculture development. In addition, thanks to FAO’s work programme within its Strategic Programmes and relevant partners and stakeholders.

In spite of the modest production from aquaculture in Africa, aquaculture is recognized as an important production system throughout the region and for our country. It is generally accepted that the potential for significant growth of aquaculture in our country and in the region exists. Labor is available and economical, while the demand for fish is high and often unsatisfied. In many areas, land and water resources are readily available and frequently under-utilized.

Within the last decade we have seen increased production from aquaculture due to use of improved production technologies and management practices by fish farmers.

The estimated total aquaculture production is 3,000 tons, 3% of the total national fish production. The major systems of aquaculture production in Mali are; extensive aquaculture conducted in ponds, shallow water basins and dam embankments, semi-intensive aquaculture conducted as integrated fish farming with irrigation or rice cultivation and avi-pisculture, peri-urban semi-intensive and intensive systems conducted in ponds and impoundments along rivers filled with water using motorised pumps and floating cages in the officially designated areas with water control upstream within dams.

Some of the factors that have influenced the successes achieved so far in aquaculture include amongst others; integration of aquaculture into the national research programs to make innovative technologies available to managers and producers; sufficient production of quality fry; making available high-performance fish foods; the inclusion of fish farming into national agricultural development programs; mastering the technical parameters of production to increase the productivity and yield on farms;

provision of qualified human resources to strengthen technical extension and supervision structures; promotion of public-private partnerships in aquaculture; the availability of a financing system adapted for the sector and the existence of a well-structured and well-equipped marketing channel in the cold chain that accommodates aquaculture produce.

Therefore, this regional meeting is an essential step towards improving our knowledge on sustainable and successful aquaculture developments and towards the identification of possible success factors and pathways that might provide for suitable guidance to ensure its continued sustainable growth in all possible aquaculture types and stages of development.

We look forward to the continuing FAO collaboration with Mali, as well as, with African members in order to provide all of us a better view of the existing and new paths of success and methodologies to use for the development of the Guidelines for Sustainable Aquaculture in Africa.

Let me close these opening remarks by wishing you all a fruitful meeting that will help put the contribution of this consultation on the map for the benefit and growth of a truly sustainable aquaculture for all, without exceptions, in all Africa.

### Annex 3: Agenda

Regional Consultation on the Development of Guidelines for Sustainable Aquaculture		
Time	29 November 2019	30 November 2019
08:45–09.00	Registration	
09.00–09.10	Session 1: Setting the scene	Summary of the first day
	Welcome Address <i>FAO Representative from Mali</i>	Session 4: Case study concepts
09.10–09.20	Opening Remarks <i>Mali Government official</i>	Introduction to session Overview of case study selection criteria, review of the case study concepts presented at the COFI Subcommittee on Aquaculture, and recommendations of case study concepts for development
09.20–09.35	Self-introduction	
09.35–09.55	Overview GSA process, consultation objectives and agenda	Break-out session for group work Each group will brainstorm on case study concepts and map them to the most appropriate thematic modules
09.50–10.15	Group photo & Coffee	
10.15–10.30	Session 2: Existing governance instruments in Africa	
	Introduction to session Review of the existing regionally developed aquaculture governance instruments	
10.30–12.00	Plenary Brainstorm to develop a list of existing information that would be useful in global GSA development	Coffee Reporting back from working groups Report back from the groups about the case studies mapped to thematic modules which could best support for development
12.00–14.00	Lunch / Security briefing from UN-DSS Bamako	Lunch
14.00–14.20	Session 3: Thematic modules	Session 5: Summary
	Introduction to session Explanation of the thematic module prioritization exercise, global examples	Consultation summary
14.20–15.50	Break-out session for group work	Session 6: The way forward
	Each group will develop a list of regional strengths and regional challenges, informed by the list of 72 thematic modules endorsed by COFI-SCA	Expected next steps followed by a group discussion about what format would be most useful for GSA
15.50–16.00	Coffee	Closing remarks
16.00–16.45	Reporting back from working groups Report back from the group about the prioritized list of thematic modules and compiled list of challenge and strength modules	
16.45–17.00	Wrapping up of the day	

#### Annex 4. Existing governance instruments in Africa region

Title of the existing regionally developed aquaculture governance instruments	Category (Policy, guidelines, legislation, strategic planning etc.)	Area (Country, Sub-region, Region, Sub-regional body)	Remarks
Guidelines for the SADC region	Guidelines	SADC	
SADC Protocol on fisheries	protocol	SADC	
Guidelines on Aquaculture	Guidelines	ECOWAS	
2 SADC Regional aquatic biosecurity strategy	strategy	SADC	
East Africa Cage Culture Guidelines Fisheries	Guidelines	EAC	
Fisheries and Aquaculture Policy	Policy	EAC	
Loi sur la pêche et l'aquaculture 2016	Legislation	Cote d'Ivoire	
Document de politique sur la pêche et l'aquaculture	Policy	Cote d'Ivoire	
Loi portant code forestier	Legislation	Burkina Faso	
Code de sure L'environnement	Legislation	Burkina Faso	
Code Foncier	Policy	Burkina Faso	
Loi sur la pêche et L'aquaculture 2016	Legislation	Burkina Faso	
Fisheries Act	Legislation	Burkina Faso	
Legislation for marine fisheries and aquaculture 2016	Legislation	Sudan	
Fisheries and aquaculture act 2018			
Aquaculture and Inland Fisheries Act 2002	Legislation	Sierra Leone	
Fisheries conservation and management	Legislation	Namibia	
Stratégie de Développement de l'Aquaculture	Strategy	ECOWAS	
Aquaculture Strategy	Strategy	Continental level	Developed by AU IBAR
Loi spécifique a la pêche continentale 2015			
Fisheries Act 1999	Legislation	Guinea	
Loi portant sur la pêche et l'Aquaculture 2017	Legislation	Burundi	
Loi-cadre sur la pêche et l'aquaculture 2014	Legislation	Benin	

<b>Title of the existing regionally developed aquaculture governance instruments</b>	<b>Category (Policy, guidelines, legislation, strategic planning etc.)</b>	<b>Area (Country, Sub-region, Region, Sub-regional body)</b>	<b>Remarks</b>
Loi 2014 la pêche et l'aquaculture	Legislation	Mali	



## Annex 5. Working group results

### I. Session 3. Thematic modules

#### Group A

Chapter	Thematic module	Regional strength	Regional challenges
Chapter 1: Sustainable aquaculture and the 2030 Agenda	<ol style="list-style-type: none"> <li>1. Capacity building</li> <li>2. Financing</li> <li>3. Gender in aquaculture</li> <li>4. Fair and inclusive development</li> <li>5. Implementation of CCPR</li> <li>6. Dealing with the compromises between the various SDGs in aquaculture</li> <li>7. Sustainable livelihoods, social protection and safety nets in aquaculture</li> <li>8. Improved food security, nutrition and diets</li> </ol>	<ul style="list-style-type: none"> <li>- Favorable physical environment;</li> <li>- Existence of a young workforce;</li> </ul>	<ul style="list-style-type: none"> <li>- Financing</li> <li>- Insufficient skilled labor</li> </ul>
Chapter 2: Governance and planning of aquaculture development	<ol style="list-style-type: none"> <li>1. Favorable environment: Infrastructures and equipment, funding, search extension and training, capacity building, networks, education, access to land and water, market access</li> <li>2. FAO Blue Growth Initiative</li> <li>3. Aquaculture planning and policy</li> <li>4. Public-private partnerships in aquaculture</li> <li>5. Governance / collective management of common resources</li> <li>6. Natural disaster management</li> <li>7. Added Value Ecosystem approach to aquaculture</li> <li>8. Aquaculture in integrated coastal zone management</li> <li>9. Aquaculture in watershed management plans or land use planning</li> </ol>	<ul style="list-style-type: none"> <li>- sustainable aquaculture strategy and WAEMU directives 3 and 4 specific to fisheries and aquaculture;</li> <li>- Regional investment program for agriculture, food and nutritional security in West and Central Africa;</li> <li>- Existence in certain countries of laws and strategic plans dedicated to aquaculture;</li> </ul>	<ul style="list-style-type: none"> <li>- Drafting / revision of texts of laws specific to aquaculture;</li> <li>- The application of legal texts;</li> <li>- Harmonization of legal texts;</li> <li>- Strengthening of research</li> </ul>

Chapter	Thematic module	Regional strength	Regional challenges
	7. Aquaculture in community development planning 8. Agroecology in aquaculture 9. Smart aquaculture in the face of climate change 10. Access rights to land and water bodies 11. Local community 12. Conflict resolution systems 13. Theft prevention 14. Precautionary principle / Precautionary approach 15. Stakeholder participation 16. Territory Development 17. Zoning 18. Resource sharing and international / cross-border cooperation 19. Emergency situations and early warning systems- 20. Aid schemes 21. Resilience in aquaculture 22. Climate change and aquaculture		
Chapter 3: Biodiversity and Genetic Resources	1. Management, development and conservation of genetic resources 2. Biodiversity, habitat, ecosystem functions and aquaculture 3. Introduction and transfer of species for aquaculture purposes 4. Use of GMOs in aquaculture	- Richness of endogenous specific diversity;	- aquaculture management plans; - identification and promotion of other species of aquaculture interest
Chapter 4: Best management practices in aquaculture	1. Construction, engineering, maintenance or rehabilitation of systems 2. Best management practices and codes of practice 3. Storage and inventory management (food, inputs, equipment, etc.)		- Produce according to standards

Chapter	Thematic module	Regional strength	Regional challenges
	4. Efficient use of resources and reduction of losses and waste 5. Human and labor rights, decent work and acceptable working conditions 6. Business management 7. Risk management and insurance 8. Corporate social responsibility, including social license and public acceptability 9. Collaboration of aquaculturists, clusters and professional associations 10. Environmental integrity 11. Population density, poly culture, fertilization, environmental capacity and limits to growth 12. Control of the management of predators and undesirable organisms (plants, fish, etc.) in aquaculture		
Chapter 5: Sustainable feed	1. Use of fish oil and fishmeal in aquaculture feed, Use of alternative food ingredients to oil and fishmeal, e.g. algae, insect meal, single-cell proteins, vegetable proteins, etc. 2. Nutrition, animal feed <del>and food</del> (formulation of natural products, of agricultural and commercial origin)	- Availability of agricultural by-products in certain countries	- Search for quality feed at affordable cost; - Find substitute ingredients / raw materials; - Promote artisanal feed mills;
Chapter 6: Water management	1. Efficient use of energy and alternative / renewable energy sources in aquaculture (e.g. solar, wind) 2. Wastewater and water quality management / water pollution from various sources (pesticides, mining, etc.)	- Existence of river basin management organizations	- Management of shared water resources

Chapter	Thematic module	Regional strength	Regional challenges
	3. Water withdrawal and conservation 4. Effluent management, waste management / elimination and use of wastewater		
Chapter 7: Biosecurity, Health and Welfare of Aquatic Animals	1. Biosecurity and aquatic health management 2. Microbiological control 3. Animal welfare	- Existence of laboratories specializing in water analysis in certain countries;	- Insufficient expertise in analysis;
Chapter 8: Specific aquaculture systems	1. Promotion of aquaculture innovation and adoption of technologies to users, including BMPs. 2. Integrated aquaculture systems 3. Capture-based aquaculture and culture-based fishing 4. Aquaculture in special environments 5. Cultivation of other aquatic products	- Diversity of water bodies	- restocking of water bodies
Chapter 9: Aquaculture value chains, consumers, markets and trade	1. Fair and productive aquaculture value chains 2. Marketing of aquaculture products 3. Nutritional value, quality and safety of aquaculture products 4. Quality certification and voluntary systems 5. Public perception and acceptability 6. Compliance with international standards	- Existence of market - Promotion of the value chain of the fish sector in certain countries; - Existence of traditional / endogenous knowledge;	
Chapter 10: Statistics and information on aquaculture	1. Collection, Monitoring, processing and management of databases and dissemination of information	- Existence of national structures in charge of statistics	- Capacity building through the use of new technologies

Chapter	Thematic module	Regional strength	Regional challenges
		<ul style="list-style-type: none"> <li>- Existence of sub-regional database (UEMOA);</li> <li>- Existence of FAO statistics</li> </ul>	

## Group B

Chapter	Thematic module	Regional strength	Regional challenges
Chapter 1: Sustainable Aquaculture and the 2030 Agenda:	<ol style="list-style-type: none"> <li>1. Climate smart aquaculture</li> <li>2. Youth in aquaculture</li> <li>3. Gender in aquaculture</li> <li>4. Food and nutrition security</li> </ol>	<ol style="list-style-type: none"> <li>1. Existence of water retention and resilient rural communities</li> <li>2. A youthful population available in the region</li> <li>3.a Both men and women participate in the aquaculture value chain</li> <li>b. Increased availability of financial support targeting women</li> <li>4. a. Existence of food and nutrition policies e.g. ECOWAP</li> <li>b. High Aquaculture potential in the region</li> </ol>	<ol style="list-style-type: none"> <li>1 Limited capacity and support for climate smart interventions</li> <li>2 a. Limited skills and knowledge and support for youth</li> <li>2 b. Aquaculture sector is unattractive for the youth</li> <li>3. Gender limitations i.e. land ownership due to culture</li> <li>4. a. Limited implementation of policies</li> </ol>
Chapter 2. Governance in Aquaculture	<ol style="list-style-type: none"> <li>1. Legislation</li> <li>2. Operating procedures Standards – inputs, products and services</li> <li>3. Spatial planning and zoning (EAA)</li> <li>4. Water use regulation</li> <li>5. Standards – inputs, products and services</li> </ol>	<p>Available regional protocols, strategies and policies:</p> <ul style="list-style-type: none"> <li>SADC Protocol on Fisheries</li> <li>SADC Regional Aquaculture Strategy and action plan</li> <li>SADC Regional Aquatic Biosecurity</li> <li>SADC Aquaculture Guidelines</li> <li>EAC Fisheries and Aquaculture Guidelines</li> </ul>	<ol style="list-style-type: none"> <li>1. Few countries have aquaculture specific legislation</li> <li>2. There are inadequate operating protocols/certification e.g. Hatchery operating procedures, sex reversal procedures</li> <li>3. No uniform standards for the region</li> <li>4. Spatial planning and zoning of Aquaculture and</li> </ol>

Chapter	Thematic module	Regional strength	Regional challenges
	6. Internal and External trade regulation – border points control	EAC Cage Culture guidelines 2018 Harmonized Fisheries and Aquaculture border inspection manual for East Africa AU PRSFA	Environment not well coordinated 5. Water resource use conflict 6. Inadequate border control units to regulate imports of exotic species, diseases 7. Limited implementation of governance documents.
Chapter 3. Biodiversity and genetic resources.	1. Genetic characterization and conservation of indigenous species. 2. Genetic improvement of indigenous species. 3. Environmental risk analysis guidelines for exotic species.	1 Available local capacity to conduct genetic characterization 2. Diverse fish genetic resources available in the region 3. Available expertise to conduct risk analysis	1 Limited work on characterization of indigenous species 2. Limited work on genetic improvement 3. Non availability of risk analysis guidelines
Chapter 4. Best management practices in aquaculture.	1. Climate smart aquaculture practices. 2. Good husbandry practices. 3. Compliance to legislation.	1 Basic capacity established 2. Aquaculture farms with basic standards 3. Legislation in place	1 Natural calamities e.g. Drought, flooding etc. 2. Un-harmonized documentation on standards on good husbandry practices. 3. Limited coordination between countries. 4. Enforcement is inadequate.
Chapter 5. Sustainable feed	1. Quality and availability of feed 2. Feed Formulation i.e. on farm 3. Alternative feed ingredients 4. Feeding regimes	1. Feed companies that produce certified feed e.g. RSA, Zambia, Ghana, Nigeria 2. Technical expertise available on feed formulation 3. Availability of raw materials. 4 Adequate technical know- how	1. High costs and limited availability of commercial feeds 2. Competitive use for raw materials for fish feed 3. Lack of technological know-how to culture aquatic organisms as feed ingredients. 4. Limited awareness of cost saving feeding strategies

<b>Chapter</b>	<b>Thematic module</b>	<b>Regional strength</b>	<b>Regional challenges</b>
Chapter 6. Water management	<ol style="list-style-type: none"> <li>1. Zonation and carrying capacity studies.</li> <li>2. Uses, tenure systems and permits</li> <li>3. Production systems</li> <li>4. Institutional structures and linkages</li> </ol>	<ol style="list-style-type: none"> <li>1. Large tracks of water bodies</li> <li>2. existing guidelines on permitting</li> <li>3. Existing technologies</li> <li>4. Number of institutions and CSOs involve in aquaculture training, research, and extension</li> </ol>	<ol style="list-style-type: none"> <li>1. Inadequate information on carrying capacity of water bodies</li> <li>2. Land and water litigation</li> <li>3. Inadequate technological Know-how.</li> <li>4. Weak enforcement.</li> </ol>
Chapter 7. Biosecurity and aquatic animal health and welfare	<ol style="list-style-type: none"> <li>1. Safety and quality control</li> <li>2. Aquatic and health management.</li> <li>3. Diseases/ pathogen management.</li> <li>4. Aquaculture inputs management.</li> </ol>	<ol style="list-style-type: none"> <li>1. Less Fish diseases</li> <li>2. Existing guidelines</li> <li>3. Clean aquatic environments and laws</li> </ol>	<ol style="list-style-type: none"> <li>1. Lack of control on the movement of fish.</li> <li>2. Lack of capacity</li> <li>3. Lack of laboratories and quarantines.</li> <li>4. Lack of certification of feed and seed.</li> </ol>
Chapter 8. Specific farming systems	<ol style="list-style-type: none"> <li>1. Site selection</li> <li>2. Production facilities</li> <li>3. Appropriate species</li> <li>4. Innovative technologies</li> </ol>	<ol style="list-style-type: none"> <li>1. Suitable land and water bodies</li> <li>Existence of basic production technologies</li> <li>2. Diverse fish species available for aquaculture</li> </ol>	<p>Inadequate land use plans</p> <p>Limited know how of appropriate technologies</p> <p>Limited research and development of other indigenous species</p>
Chapter 9. Aquaculture value chains, consumers, markets and trade	<ol style="list-style-type: none"> <li>1. Production of quality fish feed and seed.</li> <li>2. Breeding-quality seed and brood stock.</li> <li>3. Processing and value addition.</li> <li>4. Packaging and labelling of product.</li> </ol>	<ol style="list-style-type: none"> <li>1. Available technology</li> <li>2. Availability of resources</li> <li>3. Availability of capacity</li> <li>4. Policy and strategies e.g. East African Community Sanitary Measures for Fish and Fisheries Products 2014</li> </ol>	<ol style="list-style-type: none"> <li>1. Limited investment in aquaculture value chain.</li> <li>2. Limited transportation facility.</li> <li>3. Limited market information.</li> <li>4. High cost of fish and fishery products.</li> </ol>

Chapter	Thematic module	Regional strength	Regional challenges
Chapter 10. Aquaculture statics and information	1 Aquaculture data availability. 2 Information communication and outreach. 3. Legal aspect on data sharing.	1.Existence of extension officers and farmers' associations 2. Existence of ICT technology systems 3. Existence of national laws and RFMOs/RFBs	1. Lack of data and information collection recording and record keeping. 2. Limited electronic systems usage. 3. Limited and un-harmonized data collection systems.

## II. Session 4. Case study concepts

### Group A

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
Abalone farming - the effluent is used to grow seaweed, which is then harvested and used as food for the abalone (integrated aquaculture) (Republic of South Africa)			
Public-private partnership initiatives in Africa	Chapter 2: Governance and planning of aquaculture development (1) - Aquaculture planning and policy (3) - Favorable environment / funding	Bénin Guinée Cameroun	- Non-compliance with commitments, especially by private individuals;
Gender equality in seaweed farming (Zanzibar)			
Seaweed Culture in Zanzibar	Chapter 5: Sustainable animal nutrition (4) - Use of fish, oil and fishmeal in - aquaculture feed, use of alternative food ingredients to oil and	Zanzibar	



Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
	fishmeal, e.g. algae, insect meal, single-cell proteins, vegetable proteins, etc. (1)		
- Acadja system for tilapia in West Africa	Chapter 8: Specific aquaculture systems (8) - Aquaculture in special environments (4) - Capture-based aquaculture and culture-based fishing(3)	Benin Togo Guinée Cote d'ivoire	- Natural recruitment of fish; - Congestion and siltation; - Deforestation; - Destruction of mangroves; -Conflicts
Guinea offers a case study on agroecology and IMTA in Guinea. (integrated culture)	Chapter 8: Specific aquaculture systems (8) - Integrated aquaculture	Guinée Mali Burkina Central Africa Republic Burundi Niger	- Improved yields; - Production without the use of chemicals (or very little use); - Multi-user of water services (reuse of aquaculture water for plant production)
Given the great geographic diversity, natural resources, socio-economic and political landscape of Africa, the impacts of the adoption of the African fisheries and aquaculture reform policy framework and related directives by the African Union member states and by the Regional Economic Communities on: -Harmonization of sustainable aquaculture development approaches and their alignment with	Chapter 2: Governance and planning of aquaculture development (1)  Chapter 1: Sustainable aquaculture and the 2030 Agenda (2) - Fair and inclusive development (4) - Gender in aquaculture (3)	Cote d'ivoire Burkina Sénégal Benin	- Stabilization of young migrants; - Self-employment of young graduates and fight against the rural exodus; - Land ownership problem

<b>Title of the case study concept</b>	<b>Thematic module supported</b>	<b>Country of the case study</b>	<b>Possible lesson learned</b>
<p>international best practices and standards</p> <ul style="list-style-type: none"> <li>- A Voice on key issues affecting the development of sustainable aquaculture in Africa (including the OIE, COFI, genetics of aquatic animals, gender and youth)</li> <li>- Promotion and strengthening of gender parity and participation of young people and networks for sharing information on aquaculture in the public and private sectors.</li> </ul>			
<p>A sustainable aquaculture development initiative. At CEMAC level with NEPAD, there are two platforms for state and non-state actors to facilitate the participation of the private sector and NGOs.</p>			
<p>Lessons on how progressive African aquaculture countries have tackled their unique challenge to improve sustainable aquaculture development and growth.</p>	<p>Chapter 1: Sustainable aquaculture and the 2030 Agenda (2)</p> <ul style="list-style-type: none"> <li>- Capacity building (1)</li> <li>- Financing (2)</li> </ul>	<p>Benin Cameroun Guinée</p>	<ul style="list-style-type: none"> <li>- Reduction of extension costs by the farmer to farmer approach;</li> <li>- Increase in the number of trained fish farmers;</li> <li>- Facilitation of the emergence of individual innovations;</li> <li>- Tutoring systems</li> </ul>

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
Increase efficiency by using fish byproducts (using fish skin (tilapia) to treat burns)			
Cultivation of seaweed and seaweed (for agar extraction; organic fertilizer; residues used as fish granules (to be added above)			
Use of alternatives to antimicrobials - Biological control, eg use of plant extracts			
Gene bank, stock improvement and broodstock management cases, breeding program	Chapter 3: Biodiversity and Genetic Resources (10) - Management, development and conservation of genetic resources (1)	Burkina Faso Cote d'ivoire	- Creation and management of the gene bank; - Creation of specific endogenous strain (Bouaké strain); - Better management of inbreeding;
Social inclusion of populations in the development of rural (global) aquaculture	Chapter 2: Governance and planning of aquaculture development (1) - Fair and inclusive development (4) Food security, nutrition improved food and diets	Guinée Burkina Faso	- Social cohesion factor; - Better contribution to food and nutritional security at local level; Management problem, accountability, and sustainability;
Alternative formulation based on local ingredients (global, Hasan, FAO)	Chapter 5: Sustainable animal nutrition (4) - Nutrition, animal feed and food (formulation of natural products, of agricultural and commercial origin) (2)	All countries	- Reduction of costs; - Feed availability;

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
Efficient use of natural resources (global management, live feed)			
Improvement of shellfish production for small producers (global)			
How has aquaculture contributed to poverty reduction, gender equality, youth, etc.	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- Governance / collective management of common resources (5)</li> <li>- Stakeholder participation</li> <li>- FAO Blue Growth Initiative (2)</li> </ul>		
Environmental problems, regional planning, waste management	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- FAO Blue Growth Initiative (2)</li> <li>- Natural disaster management (6)</li> <li>- Territory Development</li> <li>- Zoning</li> <li>-</li> </ul> <p>Chapter 6: Water management (7)</p> <ul style="list-style-type: none"> <li>- Wastewater and water quality management / pollution of water from various sources (pesticides, (2)</li> <li>- Water withdrawal and conservation (3)</li> </ul>	Niger Basin Authority, Volta, LCBC	

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
	<ul style="list-style-type: none"> <li>- Effluent management, waste management / elimination and use of wastewater (4)</li> </ul>		
Diversification of species,	<p>Chapter 3: Biodiversity and Genetic Resources (10)</p> <ul style="list-style-type: none"> <li>- Management, development and conservation of genetic resources (1)</li> </ul> <p>Introduction and transfer of species for aquaculture purposes (3)</p>		
Seed improvement; genetics, breeding hybrids, fugitives	<p>Chapter 3: Biodiversity and Genetic Resources (10)</p> <ul style="list-style-type: none"> <li>- Biodiversity, habitat, ecosystem functions and aquaculture (2)</li> <li>- Management, development and conservation of genetic resources (1)</li> <li>- Introduction and transfer of species for aquaculture purposes (3)</li> </ul>	Sénégal	Destruction of areas of aquatic flora
Improved diet; fishmeal substitute	<p>Chapter 4: Best management practices in aquaculture (3)</p> <ul style="list-style-type: none"> <li>- Storage and inventory management (food, inputs, equipment, etc.) (3)</li> <li>- Efficient use of resources and reduction of losses and waste (4)</li> </ul> <p>Chapter 5: Sustainable animal nutrition (4)</p>		

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
	<ul style="list-style-type: none"> <li>- Nutrition, animal feed and food (formulation of natural products, of agricultural and commercial origin) (2)</li> <li>- Use of fish, oil and fishmeal in aquaculture feed, Use of alternative food ingredients to oil and fishmeal, e.g. algae, insect meal, single-cell proteins, vegetable proteins, etc. (1)</li> </ul>		
Disease prevention, diagnosis and biosecurity	<p>Chapter 7: Biosecurity, aquatic animal health and animal wellbeing. (6)</p> <ul style="list-style-type: none"> <li>- Biosecurity and aquatic health management (1)</li> <li>- Microbiological control (2)</li> </ul>		
Adaptation to climate change	<p>Chapter 1: Sustainable aquaculture and the 2030 Agenda (2)</p> <ul style="list-style-type: none"> <li>- Implementation of CCPR (5)</li> <li>- Capacity building (1)</li> <li>-</li> </ul> <p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- Resilience in aquaculture</li> <li>- Climate change and aquaculture</li> <li>- Natural disaster management (6)</li> <li>- FAO Blue Growth Initiative (2)</li> </ul>		

Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
	Smart aquaculture in the face of climate change		
Role of extension and education in aquaculture development	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- Enabling environment: (1) / education and capacity building</li> </ul> <p>Chapter 1: Sustainable aquaculture and the 2030 Agenda (2)</p> <ul style="list-style-type: none"> <li>- Implementation of CCPR (5)</li> <li>- Capacity building (1)</li> </ul>	Benin Cameroun	- Farmer to farmer approach
R & D connection with stakeholders / industry / producers	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- Favorable environment: (1) / research and capacity building</li> </ul> <p>Chapter 1: Sustainable aquaculture and the 2030 Agenda (2)</p> <ul style="list-style-type: none"> <li>- Capacity building (1)</li> </ul>	Burkina Faso -	Development of a specific improved strain
Examples of government support; importance of policy / policies. Policy is needed to create a sustainable aquaculture industry	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- FAO Blue Growth Initiative (2)</li> <li>- Favorable environment: (1)</li> <li>- Aquaculture planning and policy (3)</li> </ul>		

<b>Title of the case study concept</b>	<b>Thematic module supported</b>	<b>Country of the case study</b>	<b>Possible lesson learned</b>
Conflict resolution	Chapter 2: Governance and planning of aquaculture development (1) - Conflict resolution systems - Favorable environment: (1) / access to land and water	Guinée	Knowledge of the root causes of conflicts
Positive and negative impacts of intensification and further expansion of pond, reservoir and cage production systems	Governance and planning of aquaculture development (1) - Aquaculture planning and policy (3)  - FAO Blue Growth Initiative (2)  - Agroecology in aquaculture  Chapter 4: Best management practices in aquaculture (3) - Construction, engineering, maintenance or rehabilitation of systems (1) - Best management practices and codes of practice (2) - Population density, polyculture, fertilization, environmental capacity and limits to growth  Chapter 8: Specific aquaculture systems (8)	Benin Mali Togo Cote d'ivoire Cameroun Sénégal	- Valuation of existing water bodies according to their specificities; - Intensification of production; - Diversification of farming systems; - Reduction of costs linked to water in aquaculture production; - Pollution of the ecosystem due to the lack of preliminary studies related to the carrying capacities of water bodies; - Escape of hybrid fish in the wild; - Conflicts between different users



Title of the case study concept	Thematic module supported	Country of the case study	Possible lesson learned
	<ul style="list-style-type: none"> <li>- Promotion of aquaculture innovation and adoption of technologies to users, including BMPs. (1)</li> <li>- Integrated aquaculture systems (2)</li> <li>- Aquaculture in special environments (4)</li> </ul>		
Ecosystem health and integrity are promoted as good practices for healthy business, including biodiversity, biosecurity, One Health, climate change resilience and early warning	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <ul style="list-style-type: none"> <li>- FAO Blue Growth Initiative (2)</li> </ul> <p>Chapter 7: Biosecurity, Health and Welfare of Aquatic Animals (6)</p> <p>Chapter 6: Water management (7)</p> <p>Chapter 3: Biodiversity and Genetic Resources (10)</p>		
EMFF grants for the conservation and sustainable intensification of pond aquaculture	Chapter 2: Governance and planning of aquaculture development (1)		
Sea farming (MR)	<p>Chapter 2: Governance and planning of aquaculture development (1)</p> <p>Chapter 1: Sustainable aquaculture and the 2030 Agenda (2)</p> <p>Chapter 8: Specific aquaculture systems (8)</p>		
RAM, biosecurity,			

<b>Title of the case study concept</b>	<b>Thematic module supported</b>	<b>Country of the case study</b>	<b>Possible lesson learned</b>
(see biosecurity above)			
Traditional fish farming in the floodplains: the case of fish holes			

## Group B

Case study concept title	Thematic module supported	Country of case study	Possible lesson learned
Biosecurity concerns due to introductions of exotic species.	C7. Biosecurity, aquatic animal health and animal wellbeing Diseases/pathogen management.	Ghana (GIFT tilapia)	<p>Improved enforcement of regulations.</p> <p>Convening of aquaculture stakeholder consultations.</p> <p>Total destruction of imported brood stock.</p> <p>Increased demand for local improved tilapia strains.</p> <p>Temporary ban on movement of fish from one catchment to another (e.g. Lake Volta to the hinterland).</p> <p>Mass vaccination of fish against ISKNV.</p>
Genetic improvement of <i>O. niloticus</i> (AKOSOMBO strain)	C3. Biodiversity and genetic resources. Genetic improvement of indigenous species.	Ghana	<p>Local support and implementation of selective breeding of indigenous strain.</p> <p>Improved strain grows 30% faster than wild counterpart. (Generation 11)</p>

Case study concept title	Thematic module supported	Country of case study	Possible lesson learned
			High disease resistance of local improved strains.
Capacity support of Aquaculture Center of Excellence (ARAC)	C1. Sustainable Aquaculture (Capacity building)	Nigeria	Local support for the development of aquaculture center of excellence.  Significant contribution to critical mass of aquaculture professionals in the region.
Imports regulations	C2. Governance in Aquaculture Legislation External trade regulation – border points control	Ghana and Burkina Faso. (Enforcement of legislation: ban of tilapia importation into Ghana).	The need for harmonization of cross-border trade legislation
Indiscriminate introduction of fish ( <i>O. niloticus</i> ).	C3. Biodiversity and genetic resources/ Conservation of indigenous species.  C2. Governance in Aquaculture Legislation	Tanzania	Loss of genetic biodiversity.  Introduction of legislation to curb introduction.  Restriction of introduction of non-endemic species from other basins.

**Annex 6. Proposed case studies concepts  
(prepared by secretariat for use during group discussions)**

Number	Case study proposed	Country of case study	Region	Proposed in
1	Farming of Abalone – the effluent is used to grow seaweed which is then harvested and used as feed for the abalone. (integrated aquaculture) (Republic of South Africa)	South Africa	Africa	Expert Consultation (June 2019)
2	Public Private Partnership initiatives in Africa	(Kenya, Uganda, Mozambique)	Africa	Expert Consultation (June 2019)
3	Gender equality in seaweed farming (Zanzibar)	Zanzibar	Africa	Expert Consultation (June 2019)
4	Seaweed farming in Zanzibar	Zanzibar	Africa	Expert Consultation (June 2019)
5	Acadja system for tilapia in Western Africa		Africa	Expert Consultation (June 2019)
6	Guinea proposes a case study on agroecology and IMTA in Guinea.	Guinea.	Africa	SCA Trondheim (August 2019)
7	Given Africa’s vast and diverse geographical, natural resource, socio-economic and political landscape, the impacts of the adoption of the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (PFRS) and its accompanying guidelines by AU Member States and Regional Economic Communities on: <ul style="list-style-type: none"> <li>• Harmonization of sustainable aquaculture development approaches and their alignment to international best practices and norms</li> <li>• One voice on key issues affecting sustainable aquaculture development in Africa (notably OIE, COFI, aquatic animal genetics and gender and youth)</li> <li>• The Promotion and strengthening of gender and youth participation and public and private sector aquaculture information sharing networks</li> </ul>	Kenya	Africa	SCA Trondheim (August 2019)

<b>8</b>	A sustainable aquaculture development initiative. At the level of CEMAC with NEPAD, we have two platforms for state and non-state actors to facilitate the involvement of private sector and NGOs.	Cameroon	Africa	SCA Trondheim (August 2019)
<b>9</b>	Lessons on how progressive African aquaculture countries have overcome their unique challenges to foster sustainable aquaculture development and growth.		Africa	SCA Trondheim (August 2019)
<b>10</b>	Increase efficiency through use of fish by-products (use of fish skin (tilapia) to treat burns)		Any	Expert Consultation (June 2019)
<b>11</b>	Algae and seaweeds culture (for extraction of agar; biological fertilizer; rest used as fish pellet)		Any	Expert Consultation (June 2019)
<b>12</b>	Use of alternatives to Anti-microbials – Biological control e.g use of plant extracts		Any	Expert Consultation (June 2019)
<b>13</b>	Cases in Gene banking, stock enhancement and broodstock management, breeding programme		Any	Expert Consultation (June 2019)
<b>14</b>	Social inclusion of inhabitants in rural aquaculture development (global)		Any	Expert Consultation (June 2019)
<b>15</b>	Alternative feed formulation based in local ingredients (global, Hasan, FAO)		Any	Expert Consultation (June 2019)
<b>16</b>	Efficient use of natural resources (global, live feeds management)		Any	Expert Consultation (June 2019)
<b>17</b>	Improvement in molluscs production for small scale farmers (global)		Any	Expert Consultation (June 2019)
<b>18</b>	How has aquaculture contributed to poverty alleviation, gender equality, youth, etc.?		Any	Expert Consultation (June 2019)
<b>19</b>	Environmental issues, spatial planning, waste management		Any	Expert Consultation (June 2019)
<b>20</b>	Species diversification, alien species		Any	Expert Consultation (June 2019)

<b>21</b>	Seed improvement; genetics, breeding hybrids, escapees		Any	Expert Consultation (June 2019)
<b>22</b>	Feed improvement; fish meal replacement		Any	Expert Consultation (June 2019)
<b>23</b>	Disease prevention, diagnosis and biosecurity		Any	Expert Consultation (June 2019)
<b>24</b>	Adaptation to climate change		Any	Expert Consultation (June 2019)
<b>25</b>	Role of extension and education in developing aquaculture		Any	Expert Consultation (June 2019)
<b>26</b>	Connection of R&D with the stakeholders/industry/producers		Any	Expert Consultation (June 2019)
<b>27</b>	Examples of support from the government; importance of policy/policies. A policy is needed to create a sustainable aquaculture industry		Any	Expert Consultation (June 2019)
<b>28</b>	Conflict resolution and animal welfare		Any	Expert Consultation (June 2019)
<b>29</b>	Positive and negative impacts of greater intensification and expansion of pond, tank and cage production systems		Any	SCA Trondheim (August 2019)
<b>30</b>	Ecosystem health and integrity promoted as best practice for sound business including biodiversity, biosecurity, One Health, climate-change resilience, and early warning		Any	SCA Trondheim (August 2019)
<b>31</b>	EMFF Subsidies for the conservation and sustainable intensification of pond aquaculture		Any	SCA Trondheim (August 2019)
<b>32</b>	Marine ranching (MR)		Any	SCA Trondheim (August 2019)
<b>33</b>	AMR, biosecurity, animal welfare		Any	SCA Trondheim (August 2019)

**The Regional Consultation on the Development of Guidelines for Sustainable Aquaculture (GSA) Regional Consultation was organized by the Food and Agriculture Organization (FAO) of the United Nations with support from and the FAORAF, the KMI and the Government of the Kingdom of Norway.**

**It was attended by government representatives from 28 member countries in the Africa and it is the first of a series of regional consultations to share current policies and practices, review the existing regional sustainable aquaculture instruments, develop a list of priority thematic modules and discuss regional case study concepts.**

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