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COMMITTEE ON FISHERIES

SUB-COMMITTEE ON AQUACULTURE

Tenth Session

Trondheim, Norway, 23–27 August 2019

DRAFT REPORT OF THE EXPERT CONSULTATION ON THE DEVELOPMENT OF SUSTAINABLE AQUACULTURE GUIDELINES ROME, ITALY, 17–20 JUNE 2019

This information document contains the advance version of the Report of the Expert Consultation on the Development of the Sustainable Aquaculture Guidelines held in Rome, Italy from 17 to 20 June 2019.

This advance version is made available for the purpose of providing supporting information to Agenda Item 9: Special Event on Better Management Practices and Guidelines for Sustainable Aquaculture Development (COFI:AQ/X/2019/8).

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Introduction

1. The FAO Expert Consultation on the Development of Sustainable Aquaculture Guidelines (SAG) was held in FAO Headquarters, Rome, Italy from 17 to 20 June 2019. It was attended by 15 experts, one resource person and FAO staff. The list of participants is given in Appendix 1. Participants were provided with background documentation for each session (Appendix 4).

Objective

2. The objective of the Expert Consultation was to come out with a proposal for developing the SAG, to be presented in August 2019 at the tenth session of the Sub-Committee on Aquaculture of the COFI (COFI-SCA). The SAG is proposed to be developed by convening several expert meetings, at global and regional levels. The specific objectives of this Expert Consultation were:

- a. To propose criteria for selecting case studies aimed at providing lessons learned for SAG development;
- b. To propose a methodology for documenting the case studies;
- c. To propose a methodology for analysing the case studies to identify the lessons learned;
- d. To propose a methodology for developing the SAG by also making use of existing guidelines.

3. This paper serves as Information Paper (COFI:AQ/X/2019/Inf.8) in support of the Working Document COFI:AQ/X/2019/8.¹

Deliverables

4. As listed in paragraph 25 of the Working Document COFI:AQ/X/2019/8 submitted to COFI-SCA, the deliverables from the Expert Consultation will be submitted to COFI-SCA and will include the following:

- 25(i) A proposed methodology for identifying and selecting the lessons learned from strategies and experiences of aquaculture development worldwide;
- 25(ii) A methodology for documenting and analysing the lessons learned;
- 25(iii) A list of thematic modules;
- 25(iv) A gap analysis between existing guidelines and needs for new ones;
- 25(v) An updated roadmap.

Preparation of the report

5. The report was prepared by the Secretariat and adopted by the Experts during the last session.

Opening

6. On behalf of the Fisheries and Aquaculture Department and of the Director-General, Mr José Graziano da Silva, Mr Árni M. Mathiesen, Assistant Director-General of the Fisheries and Aquaculture Department, and Mr Matthias Halwart, Head of the Aquaculture Branch, welcomed all participants to the consultation. They recalled the context and the demand expressed by the Sub-Committee on

¹ http://www.fao.org/fi/static-media/MeetingDocuments/COFI_AQ/2019/8e.pdf

Aquaculture of the FAO Committee on Fisheries (COFI-SCA) during its ninth session held in Rome, Italy in October 2017, that FAO develop Sustainable Aquaculture Guidelines (SAG). The full text of the opening statements is contained in Appendix 2 and 3.

Adoption of the agenda

7. The agenda adopted by the participants is attached (see Appendix 4).

Election of chairperson and vice-chairperson

8. Mr Yngve Torgersen and Ms Beatrice Nyandat were unanimously elected as Chairperson and Vice-Chairperson, respectively.

Session 1: Scene setting

9. The Secretariat introduced the agenda item 1 “Scene setting” on the objectives, context and deliverables of the Expert Consultation, after which all Experts 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 development of the SAG, in order to help decision-making by COFI-SCA by providing options, recommendations and advice.

Session 2: Methodology and roadmap for the development of the SAG

Plenary discussion

10. The Secretariat introduced agenda item 2 presenting the SAG, the inputs to be used for its development, the proposed methodology and roadmap, and the Expert Consultation methodology.

11. The first round of comments focussed on the target groups of the envisaged SAG. Besides government authorities and policy makers, it should also include the aquaculture industry and private sector. Different users (e.g. small-holder producers, commercial farmers) and languages other than English should also be considered. It was highlighted that the SAG be supported by IT technologies, such as a dedicated website, in order to provide a comprehensive reference framework of digital documents on policies, environmental requirements etc.

12. The roadmap towards the development of the SAG was discussed and concerns expressed about the anticipated duration of the process. The Experts expressed the hope that the SAG could be completed and published as fast as possible. It was also mentioned that the Sub-Committee might change their advice by, for example:

- Limiting the scope of the SAG process;
- Requesting more research and partnering with research institutions;
- According the process a high priority, requesting additional funding to hold an FAO Technical Consultation.

13. In addition, the group noted the upcoming Global Conference on Aquaculture 2020, to be held in Shanghai, P.R. China from 26 to 30 October 2020, affording additional opportunities for multi-stakeholder participatory development and sharing of SAG elements.

14. The Expert Consultation accepted the timetable for development and implementation of the SAG but strongly advised that the COFI-SCA explore means to accelerate the process. It was proposed that Experts focus first on identifying the priority thematic areas and documents for immediate work. The need to consider efforts to meet the 2030 Agenda targets, and that the SAG should therefore have a long-term perspective, was also raised.

15. The Experts started a discussion on the possible structure and content of the SAG. Experts were reminded that COFI-SCA requested advice on (i) better implementation of the CCRF and (ii) development of aquaculture to help countries meet the 2030 Agenda targets. An example of the sort of document structure that might eventually be produced was FAO (2018)², covering thematic modules, key references, including toolkits and guidelines, and case studies, underpinned by a number of more substantive documents, including case studies.

16. Discussion on existing guidelines suggested that there are opportunities to include additional recent guidance documents, especially from non-FAO sources. Outputs of many relevant national, regional or international initiatives (meetings, projects, etc.) could also be channelled to the development of the SAG. It was proposed that the documents could be prioritized using a scoring system.

Deliverables³

Deliverable 25(i): A proposed methodology for identifying and selecting the lessons learned from strategies and experiences of aquaculture development worldwide

- Major issues discussed included target audience, wealth of guidance already available (albeit largely from FAO, some of it possibly outdated) as well as the lack of guidance in some areas (e.g. gender and human rights);
- The Expert Consultation recognized that there are opportunities for selecting, prioritizing and ranking thematic modules, case studies, existing guidance and pathways;
- Clarity was obtained on the tasks required to deliver a proposed methodology;
- It was also accepted that further clarity would emerge from forthcoming focused group work reported in plenary.

Deliverable 25(v): An updated roadmap

- The Expert Consultation accepted the proposed roadmap and timetable for development of the SAG with reservation, and asked the COFI-SCA to consider any means of accelerating the process to deliver these much-needed guidelines;
- To assist this process, the Expert Consultation agreed to put forward to the COFI-SCA any ideas that emerged during the course of the week's deliberations.

² FAO 2018. Transforming Food and Agriculture to achieve the SDGs - 20 interconnected actions to guide decision-makers. Rome, FAO. 2018. 71 p. This is FAO's guidance document on mainstreaming food and agriculture with the 2030 Agenda and the SDGs to assist member countries and concerned stakeholders.

³ Listed in paragraph 25 of COFI:AQ/X/2019/8

Session 3: Methodology and criteria for selecting strategies and experiences of aquaculture development worldwide to be documented through case studies, and for identifying the lessons learned from them

Group discussions

17. Four groups met to independently discuss the methodology and criteria for selecting strategies and experiences of aquaculture developments worldwide to be documented through case studies and for identifying the lessons learned. Three and a half hours were allocated for this exercise. All groups managed to address the brief that they were given. Suggestions for rephrasing or rewording document SAG/3.1 were made and the proposed changes were incorporated into the Session Background Document of the forthcoming Special Event on SAG. The templates provided were used to report back to plenary.

Plenary discussion

18. Following presentations by each group, the following topics were raised for discussion in plenary:

- Use of the responses to the aquaculture CCRF biennial survey questionnaire in order to select case studies. It was pointed out, however, that this might necessitate a formal agreement by countries to allow their data to be used for this purpose, a potentially lengthy process with uncertain outcome. Moreover, doubts were raised regarding whether the data are appropriate for this purpose.
- Concerns with regards to the number, length and complexity of case study documents were raised, while acknowledging the comprehensiveness of the proposed case study template (paper SAG/3.1, see Appendix 4). It was proposed that the number of documents be driven primarily by need, which would best be determined following scrutiny of the thematic modules. There was a view that a template for development of case studies might be useful as long as it avoids being overly prescriptive.
- It was proposed that the case studies should be representative of the aquaculture sector in terms of geography, species, farming systems etc. and that they should cover at least 80 percent of the global aquaculture production. However, it was also argued that the request from the COFI was to represent the uniqueness of some experiences that could be shared with other countries.
- It was recommended including case studies which had resulted in failure but where valuable lessons had been learned that could be shared with other countries to avoid repetition.
- It was suggested making the link between case study impact pathways and SDGs clearer so that their contribution to the various goals and trade-offs are highlighted.
- Gathering of case studies from a variety of sources including governments, private sector, national reports and countries willing to offer the CCRF responses was recommended. In particular, the role of aquaculture networks and regional fisheries bodies in identifying and elaborating case studies was stressed.
- The purpose of the case studies is to highlight the success stories, challenges and lessons learned that would be used in support of the guidelines.
- It was suggested that the target audience for the guidelines are all countries, reflecting the fact that there are many growth trajectories in terms of aquaculture sectoral development.
- The final compilation and review of the selected case studies should be done by FAO.

Deliverables

Deliverable 25(ii): A methodology for documenting and analysing the lessons learned

- The proposed case study template and methodology were accepted but their use was recommended to be flexible and adaptive, commensurate with complexity of the case study and lessons to be derived;
- The target group for the SAG should include all countries.

Session 4: Thematic modules of the SAG and gap analysis between existing guidelines and needs for new ones

Group discussions

19. Four groups of Experts met independently to discuss the thematic modules of the SAG and carry out a gap analysis between existing guidelines and the need for new ones. Three and a half hours were allocated for this exercise. All groups managed to address the brief that they were given. All groups worked to consolidate chapter headings and rationalize thematic modules, adding guidance documents that they were aware of or that they identified on the web. Proposals were made for consolidation of chapters and underlying thematic modules as well as identification of gaps. The groups identified priority areas for revision, as well as case studies needed to generate lessons learned. The proposed changes were consolidated and incorporated into the Session Background Document of the forthcoming Special Event on SAG⁴.

Plenary discussion

20. Following presentations by each group, the following topics were raised for discussion in plenary:

- The availability of an as-light-as-necessary document to meet the needs of the end-users was discussed. The Experts agreed that the primary target are governments. There was a call to write a two-page summary of each thematic module, complete with all internet references and relevant links to technical documents and guidelines, case studies and SDGs, using FAO (2018; see footnote 1) as a model.
- The preliminary list of thematic modules, guidelines and technical documents (reports, articles, papers etc.) that was provided was judged sufficiently comprehensive and informative to facilitate the assigned tasks of identifying chapters, thematic modules and case studies.
- It was pointed out that a number of technical guidelines were more than ten years old and as a result, were likely to provide less relevant or even wrong guidance and thus should be revised.
- There was a debate as to whether what was wanted was a comprehensive and fully up-to-date set of guidelines or the initiation of a continuous process of compilation and updating of guidance operated via the COFI-SCA. The consensus of the Experts was that the COFI-SCA should consider the SAG not as a finished product but as a live document, in which new and relevant knowledge could be readily accommodated. In a manner similar to evaluating progress on implementation of the CCRF, the Expert Consultation recommended that the COFI-SCA

⁴ COFI:AQ/X/2019/SBD.2

should scrutinize development and use of the SAG and recommend new modules and revision of existing modules during intersessional periods.

- There was a consensus among Experts that policy makers from member countries would not necessarily need to consult the entire guidance document but rather specific sections, determined by a range of factors including the level of development of their aquaculture sector. It was suggested that incorporation of decision trees and pathways could be helpful in guiding users to the appropriate modules and chapters. The development of the SAG as an electronic database, thereby facilitating access and updating, was also proposed.

Deliverables

Deliverable 25(iii): A list of thematic modules

- The list of thematic modules was revised and the consolidated revised draft is presented in consolidated document 4.1 (Appendix 4).
- New modules and updates could emerge upon the regular scrutiny of the SAG by the COFI-SCA.

Deliverable 25(iv): A gap analysis between existing guidelines and needs for new ones

- The gap analysis has been performed and gaps identified. The outcome is reported in consolidated document 4.1 (Appendix 4).

Session 5: Identification of specific challenges (including regional specificities, capacity development etc.)

Group discussions

21. Four groups of Experts met independently to discuss the pathways towards Sustainable Aquaculture and recommendations to COFI-SCA. One and three quarter hours were allocated for this exercise.

Plenary discussion

22. Following the presentations by groups, a discussion opened on the following topics:

- The specificity of pathways for countries: although Experts proposed pathways linking the SAG approach to FAO (2018, see footnote 1), it was agreed that no one-size-fits-all pathway is appropriate. Instead, the pathway should be determined mainly by the state of development of the aquaculture sector and the vision for the sector, especially vis-à-vis its contribution to meeting the SDGs. The pathway should also take into account specific national enabling or disabling factors.
- Effective implementation will be subject to there being strong political will, adequate finances and capacity, and regular monitoring and evaluation of progress on SAG implementation at national level.
- The proposed Expert meetings at regional level could be used to help build the capacity of countries to convene the necessary multi-stakeholders consultations to develop pathways towards the development of sustainable aquaculture.

- The group of Experts highlighted that implementation of the SAG should not increase the reporting burden of the Member countries. However, the members should use the opportunity afforded by COFI-SCA meeting to share experiences on implementation of the SAG, and identify capacity building needs.

Session 6: Adoption of the report

Plenary discussion

23. The report was adopted by the Expert Consultation at 16:05 on 20 June 2019.

Appendix 1: List of participants

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Appendix 2: Opening address by Árni Mathiesen, Assistant Director-General Fisheries and Aquaculture Department, FAO

Ladies and Gentlemen, Good Afternoon!

I would like to welcome all of you to Rome and FAO. Great thanks to you for having kindly accepted to provide your expertise to this expert consultation on the development of “Sustainable Aquaculture Guidelines”.

Please allow me first to thank the Government of the Kingdom of Norway for their kind support provided for the first steps of scoping and development work of the Sustainable Aquaculture Guidelines. 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 sustainable aquaculture guidelines starting with this expert consultation here at FAO HQ.

As you are aware, aquaculture’s continued growth worldwide has provided not only excellent protein quality for human consumption, but also created job opportunities and wealth, and has supported many livelihoods as well as 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 direct 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.

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 expert 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 consultation as a very important fundamental first stepping stone and expect that, at the end of the three days, we will 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 development of the Sustainable Aquaculture Guidelines.

However, we will also need strong partnerships because the work really starts after this consultation, as we will be presenting these findings at the upcoming Sub-Committee on Aquaculture to be held in Trondheim, Norway in August 2019, to the participating 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 the consultation on the map for the benefit and growth of a truly sustainable aquaculture for all, without exceptions, and all world regions.

Appendix 3: Opening address by Matthias Halwart, Head, Aquaculture Branch, Fisheries and Aquaculture Department, FAO

Dear Experts, colleagues, Ladies and gentlemen,

Good afternoon. I am very pleased and delighted to see all of you here in Rome and would like to welcome you here at the FAO HQ. Delighted because most of you are well known to us, and some of you have worked with us very closely in the past, and of course we also know many of you from your attendance to the FAO Committee on Fisheries and its Sub-Committee on Aquaculture.

This week you are not here as government representatives but to provide your expert views on a very important subject: the development of Sustainable Aquaculture Guidelines. Let me briefly recall the origin of this going back to the request made at COFI/SCA: “The SCA recognized that there is a growing need for implementation of best practices in aquaculture in many countries and regions, and recommended that FAO should develop global guidelines for sustainable aquaculture development.”

We are all aware that there are many guidelines out there already, some of them older and going back to the Code of Conduct for Responsible Fisheries for which we will soon celebrate the 25th anniversary, some newer; some at global and some at regional or national level, some on general aquaculture development and some on more specific topics ... so an important part of your discussion will be: where are the gaps and where do we need updates of existing guidelines? But also how can we use information that is periodically provided to FAO, as in the reporting on the Code of Conduct for Responsible Fisheries, in the best possible way?

In the next 3.5 days, this will be our challenge. Your consolidated advice given here will provide critical input for deliberations of Members at the 10th Session of the COFI/SCA to be held in Trondheim, Norway, from 23 to 27 August.

I would like to add my appreciation together with Assistant Director-General Árni M. Mathiesen by thanking Norway and the Republic of Korea for their excellent and timely support in the process, and to you all for coming here to provide your expert advice.

I wish you a productive meeting.

Thank you.

Appendix 4: Approved agenda

DAY 1 : MONDAY 17 JUNE 2019			
Time	Venue	Activity	Documents
09:00-11:00	FAO Gate	Arrival and registration, DSA disbursement (D202)	
14:00-15:00	Mexico room (D211)	<p>Session 1 - Setting up the scene</p> <p>Welcoming remarks</p> <p>Self-introduction of the participants and secretariat</p> <p>Presentation and discussion of the objectives, context and deliverables of the expert consultation</p>	<p>1.1 List of participants</p> <p>1.2 Agenda</p> <p>1.3 Objectives, context, deliverables</p> <p>1.4 Transforming food and agriculture to achieve SDGs</p> <p>See also 4.2 and 4.3</p>
15:00-15:30	Mexico room (D211)	Photo session and coffee break	
15:30-17:00	Mexico room (D211)	<p>Session 2 – Methodology and roadmap for the development of the SAG – Deliverables 25(i) and 25(v)</p> <p>Presentation and discussion of the scope, objectives, roadmap and approach for SAG development</p> <p>Brainstorming on the :</p> <p>Proposed methodology for developing the guidelines - Deliverable 25(i)</p> <p>Proposed roadmap - Deliverable 25(v)</p>	<p>2.1 Methodology for the development of SAG</p> <p>2.2 Roadmap for the development of SAG</p> <p>2.3 COFI:AQ/X/2019/8⁵</p> <p>2.4 COFI:AQ/X/2019/SBD.2¹</p>
19:30	Donegal 2.0	Reception	

⁵ <http://www.fao.org/about/meetings/cofi-sub-committee-on-aquaculture/cofi-aq10-documents/en/>

DAY 2 : TUESDAY 18 JUNE 2019			
Time	Venue	Activity	Documents
9:00-9:15	Mexico room (D211)	<i>Session 3 - Methodology and criterias for selecting strategies and experiences of aquaculture developments worldwide to be documented through case studies, and for identifying the lessons learned from them</i>	3.1 Selecting case studies and identifying the lessons learned from them 3.2 CCRF questionnaire (Countries) 3.3 COFI:AQ/X/2019/3 ¹ 3.4 COFI:AQ/X/2019/SBD.1 ¹
9:15-9:45	Mexico room (D211)	Coffee break	
9:45-12:30	Mexico room (D211) Nigeria room (C283) Espace Gabon (A024)	<i>Group work on methodology and criterias for selecting strategies and experiences of aquaculture developments worldwide to be documented through case studies, and for identifying the lessons learned from them</i>	
12:30-14:00	FAO restaurant C877, 8 th floor	Lunch break	
14:00-15:00	Mexico room (D211) Nigeria room (C283) Espace Gabon (A024)	<i>Group work on methodology and criterias for selecting strategies and experiences of aquaculture developments worldwide to be documented through case studies, and for identifying the lessons learned from them (cont.)</i>	
15:00-15:30	Mexico room (D211)	Coffee break	
15:30-17:00	Mexico room (D211)	<i>Plenary session on the methodology and criterias for selecting strategies and experiences of aquaculture developments worldwide to be documented through case studies, and for identifying the lessons learned from them – Deliverable 25(ii)</i>	

DAY 3 : WEDNESDAY 19 JUNE 2019			
Time	Venue	Activity	Documents
9:00-9:15	Mexico room(D211)	Session 4 - Thematic modules of the SAG and gap analysis between existing guidelines and needs for new ones Presentation of: the work on the thematic modules to be included in the SAG the gap analysis methodology	4.1 List of thematic modules and existing guidelines 4.2 COFI:AQ/X/2019/3 ¹ 4.3 COFI:AQ/X/2019/ SBD.1 ¹
9:15-9:45	Mexico room (D211)	Coffee break	
9:45-12:30	Mexico room (D211) Nigeria room (C283) FI -meeting room (F313) Espace Gabon (A024)	Group work on the thematic modules of the SAG and gap analysis between existing guidelines and needs for new ones	
12:30-14:00	FAO restaurant C877, 8 th floor	Lunch break	
14:00-15:30	Mexico room (D211) Nigeria room (C283) FI -meeting room (F313) Espace Gabon (A024)	Group work on the thematic modules of the SAG and gap analysis between existing guidelines and needs for new ones (cont.)	
15:30-16:00	Mexico room (D211)	Coffee break	
16:00-17:00	Mexico room (D211)	Plenary session on the thematic modules of the SAG and gap analysis between existing guidelines and needs for new ones – Deliverables 25(iii) and 25(iv)	

DAY 4 : THURSDAY 20 JUNE			
Time	Venue	Activity	Documents
9:00-9:15	Philippines room (C277)	Session 5 – Identification of specific challenges (including regional specificities, capacity development etc.) Presentation of the : methodology for developing the pathways Challenges and consolidation of the work the way forward	5.1 Methodology for developing pathways
9:15-9:45	Philippines room	Coffee break	
9:45-11:30	Philippines room (C277) Nigeria room (C283) Espace Gabon (A024)	Group work on the identification of specific challenges (including regional specificities, capacity development etc.)	
11:30-12:30	Philippines room (C277)	Plenary session on the identification of specific challenges (including regional specificities, capacity development etc.) Groups' presentations Discussion	
12:30-14:00	FAO restaurant C877, 8 th floor	Lunch break	
14:00-15:30	Philippines room (C277)	Session 6 – Recommendations, way forward and closing session Discussion and synthesis of the Expert Consultation	6.1 Draft Report
15:30-16:00	Philippines room (C277)	Coffee break	
16:00-17:00	Philippines room (C277)	Adoption of the report Closing remarks	

Appendix 5: Selecting case studies and identifying the lessons learned from them

Defining case studies from which lessons can be learned

1. The Sustainable Aquaculture Guidelines (SAG) will be developed by making use of the lessons learned from various case studies.
2. In this process, a case study can be defined as an “*in-depth description (that includes adequate information) of an aquaculture-related process, strategy and/or experience*”. This could include, for example:
 - The development of aquaculture in a country or in a regional perspective (e.g. “The successful development of aquaculture in [country] between 1990 and 2000” or “The management of the difficulties faced by aquaculture development in [country] since 2010” etc.)
 - The development of a specific sub-sector of aquaculture (e.g. “The development of organic aquaculture in [country/region]”; “The development of ornamental aquaculture in [country/region]”; “The development of catfish (or tilapia etc.) aquaculture in [country/region]”; “The development of integrated agriculture-aquaculture in [country/region]” etc.)
 - A sectoral strategy (e.g. “The role of research/innovation in aquaculture development in [country/region]” or “The role of public policies in aquaculture development in [country/region]” etc.)
 - A cross-sectoral strategy (e.g. “Aquaculture contributing to gender balance in [country/region]”; “Aquaculture contributing to climate-resilience of local farming systems in [country/region]” etc.)
 - An environmental biosecurity strategy (e.g. “How to ensure that development of the aquaculture industry takes place with an acceptable environmental footprint” etc.)
 - Etc.
3. Both successful and unsuccessful cases should be considered if they produced relevant lessons for other countries.
4. The lessons learned from the case studies will be used to illustrate the different thematic modules of the SAG. The documented case studies will also be used to develop recommended pathways towards implementation of sustainable aquaculture.

Selecting case studies from which lessons can be learned

5. The Sub-Committee on Aquaculture recommended that the responses provided by the countries, Regional Fisheries Bodies and Aquaculture Networks to the biennial CCRF survey about their current efforts of implementation of the aquaculture-related provisions of the CCRF be used for selecting case studies from which lessons can be learned.
6. However, this will require that a solution can be found to the issue of the confidentiality of answers. The Experts pointed out, however, that this might necessitate a formal agreement by countries to allow their data to be used for this purpose, a potentially lengthy process with uncertain outcome. Moreover, doubts were raised regarding whether the data are appropriate for this purpose.
7. The CCRF questionnaire is provided in document 3.2 and the COFI-SCA documents presenting the results from the last survey are provided as document 3.3 and 3.4.

8. Other sources of information on possible case studies include the former recommendations of the COFI Committee and Sub-Committee on Aquaculture, the FAO country project reports, experts' own experience and existing publications on interesting case studies.
9. The Expert Consultation identified criteria for selecting case studies from which lessons can be formulated in the various dimensions of sustainable aquaculture development covered by the thematic modules (governance, technologies, environmental friendly practices, social aspects and human rights, value chains, SDGs etc.).
10. The criteria suggested by the Experts were:
 - a. Operational criteria
 - The thematic modules and/or pathways⁶ proposed for the SAG, for which updated information is needed and to which the case study is likely to produce useful inputs through lessons learned
 - The availability of data and/or studies/reports and/or resource persons for documenting the case study
 - The political will and willingness of the concerned government to share their experiences and to provide information, resources and assistance for documenting the case study
 - The success stories that can be verifiable
 - The case studies from countries filling out CCRF regularly and willing to voluntarily share their stories
 - b. Representativeness criteria
 - The regional coverage (international, regional or national cases).
 - The species coverage (fish, crustaceans, algae, molluscs, others).
 - The farming system coverage (Intensive, extensive, RAS, others).
 - The aquaculture scale coverage (Industrial, semi-commercial, rural)
 - All case studies should collectively reflect the diversity of geography, environment, production systems, technology, level of organisation of the industry, Level of integration with other agricultural and developmental activities, Governance, etc. <Not just success stories – but lessons learned from unsuccessful cases?>
 - The coverage of different aquaculture stages (Hatchery, broodstock management, grow-out, market access, value adding, others).
 - c. Impact criteria
 - The aquaculture production and production trend during the last years
 - The improved governance towards aquaculture development.
 - The links to global challenges (SDG).
 - The drivers and origin of the success of aquaculture (private sector, government, etc).
 - The regional socioeconomic development.
 - The economic impact on the social development
 - The achievement of the three pillars of sustainability; economic, social and environmental

⁶ See document 1.3 for the explanation of thematic module

- The acceptability in a local community
- The reduced environmental impact
- d. Originality and usefulness criteria
- The replicability for adoption or scaling up
- The uniqueness/exceptionalism – Specialised production, exceptional growth, cases where production drops and is picked up.

Documenting the selected case studies

11. Among the information to collect will be: (i) the stakeholders involved, their gains and losses during the process; (ii) the historical process and sequence of positive or negative events leading to the accomplishment; (iii) the inputs, outputs, outcomes and direct or indirect impacts; (iv) the difficulties encountered and solutions implemented; (v) the use made of existing guidelines; (vi) the current situation and way forward.
12. The collection and compilation of data should be done ahead of several regional expert meetings following the Expert Consultation and COFI Sub-Committee on Aquaculture. Some field surveys may be required for documenting some case studies.
13. A suggested template and content for the case study report is presented below. The group considers that the template is complete, but should be used with flexibility and if needed, adapted to the case studies.

Identifying the lessons learned from the selected case studies

14. The lessons learned will be identified during the regional expert meetings from the case study reports by considering:
 - The difficulties met during the process described by the case study and how they have been successfully answered (or not);
 - The direct and in-direct impacts that the process described has been producing.

Suggested content of the case study report⁷

Title: Case study: ...

Country: ...

Location: ...

Authors: ...

⁷ Based on Barret D., Blundo-Canto G., Dabat M-H., Devaux-Spatarakis A., Faure G., Hainzelin E., Mathé S., Temple L., Toillier A., Triomphe B., Vall E. (illus.), 2018. ImpresS ex post. Methodological guide to ex post impact evaluation of agricultural research in developing countries. Montpellier, France, CIRAD, 96 p. ISBN: 978-2-87614-736-2. <https://doi.org/10.19182/agritrop/00006> (modified).

Executive summary

15. This section will be drafted after the case study is written.

Presentation of the case study

16. Context

- In a short introductory section, describe the context of the case study documented here and the reasons that initially led to the decision to implement this process.
- List the guidelines that have been used and explain how they contributed to the achievements of the case described. Specify if they were FAO or non FAO guidelines.
- Describe the SAG thematic modules and pathways for which the case study is likely to produce useful lessons learned.
- Then describe the general context at the country or regional level (climate, infrastructure, issues, development challenges, public and private actors concerned), referring to the evolution of this context between the start and the present day. Note that the detailed “public policy” elements are reserved for section on “Evaluation of the impact on public policies” (below).

17. Scope of the case study

Brief presentation of the case study (note that the narrative is covered below):

- What process is/are being studied?
- Which are the projects/activities considered important for the case?
- Start date and (if not an *in itinere* process) end date of the process.
- Geographic space/location.
- First hypothesis of impacts, based on a multifactorial approach: insert here an initial impact pathway as it was foreseen at the beginning of the process.

18. Summary of the methods used for documenting the case study

Ideally, the case study preparation should include the following steps:

- Preparation of the case study
- Dialogue with stakeholders
- Construction of the narrative of the process and of the impact pathway
- Characterisation and measurement of impact
- Validation with stakeholders

Include in this section a summary table with: (1) tools used, and (2) explanations/justifications.

- Study conducted over which period?
- Who did what? Role of the different members of the case team.
- What data and information collection tools (grey literature; participatory workshops, specify the type of participating actors; interviews, specify the categories of actors interviewed; focus groups, specify the categories of actors who participated in the different focus groups; surveys, specify the type of actors surveyed, etc.) were mobilized to document what (narrative of the innovation, learning situations, impacts, etc.)? Specify the type of actors (refer to the appendix

on the reports, list of people interviewed, met or who participated in the workshops focus groups).

- Comments keep it short; a simple document that people can/will use, and will create an interest that they can find out more if wanted

The narrative of the process described

19. Chronological narrative of the process

- First, present the process of constructing the narrative: from the first narrative drafted during the preparatory phase to the final narrative validated by the actors;
- Write the final narrative of the process;
- Map the stakeholders:
 - present the mapping of the stakeholders: diagrams + explanations/justifications of the choices made;
 - explain the role of the process' major, influential and impacted stakeholders

Stakeholder	Category (major, influential, impacted)	Type (organization, department, individual etc.)	Contribution to the process	Connections with other stakeholders

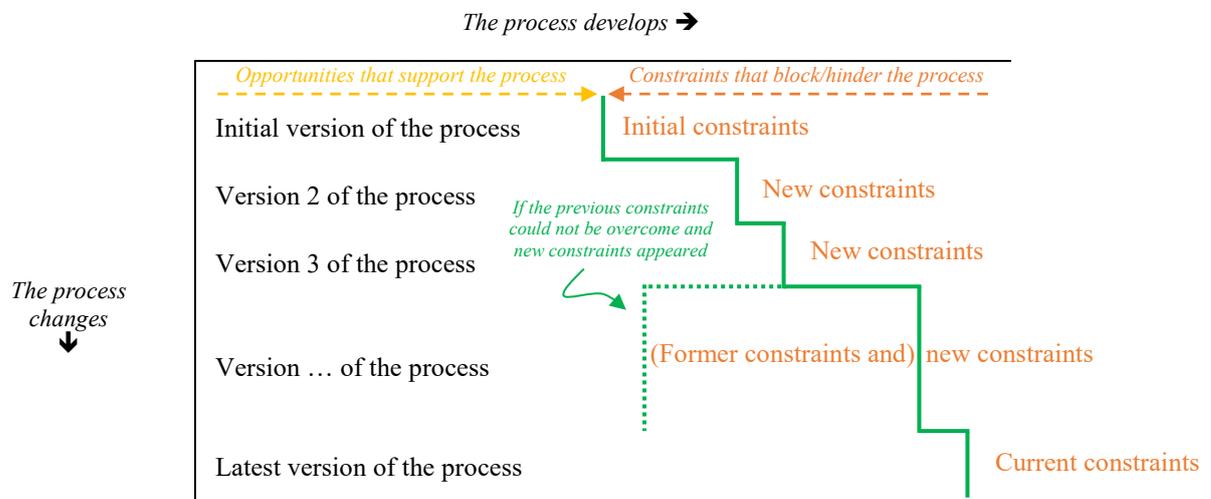
20. Map the chronology, using a socio-technical graph⁸ (graphical representation of the narrative and legend highlighting the difficulties met and how they have been answered or not, as well as the opportunities encountered and how they have shaped the future of the process).

People in charge of development process tend to present their achievements like a linear sequence of logical steps, but the reality shows that in fact, the process is generally a succession of foreseen and unforeseen adjustments made to avail of new opportunities and/or to cope with constraints that block the process. This can have direct and indirect consequences on outputs, outcomes, impacts and lessons learned, and thus need to be well identified and understood.

- present on one line the process as it was at the beginning, the opportunities on which development was based and the constraints that emerged at a certain time and required adjustment(s) for development to continue.
- list as next line the different changes made in the process to solve the constraints and/or to avail of new opportunities. Highlight the progress by drawing the green line representing development progress towards the right.
- if some constraints cannot be overcome and new constraints appear or opportunities disappear (for example, if aquaculture feed are expensive (existing constraint) and a project that was subsidizing farmers in the past comes to an end (new constraint/lost

⁸ Latour, B., Mauguin, P., Teil, G. 1992. A Note on Socio-Technical Graphs. Social Studies of Science Vol.22 pp. 33-58 and 91-94. <http://www.bruno-latour.fr/node/261>

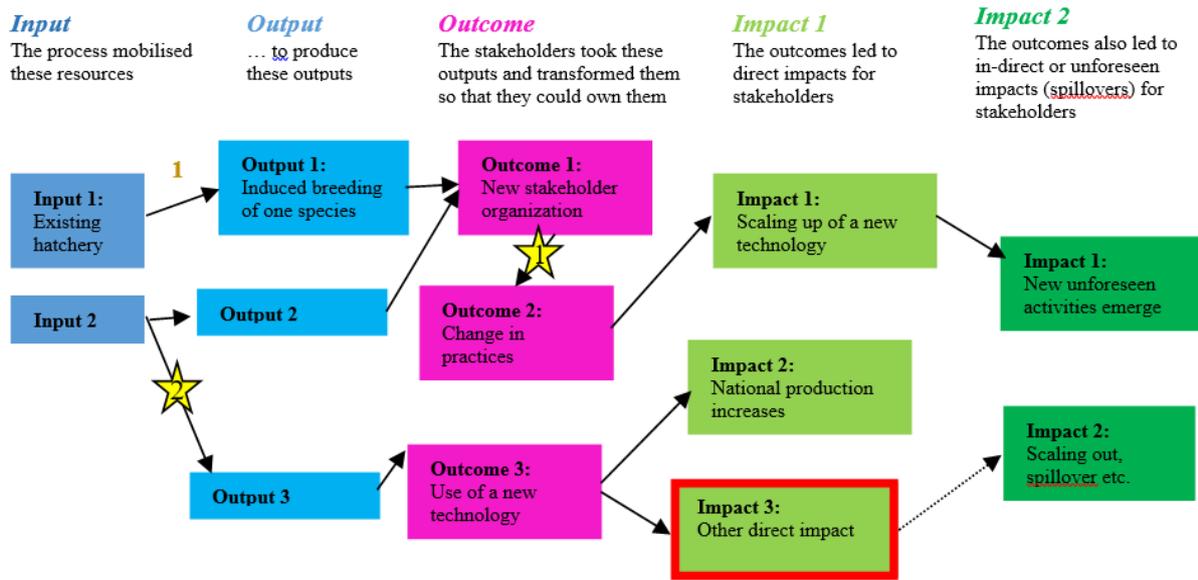
opportunity), leading several aquaculturists to stop their activities), highlight it by drawing the green line representing development progress back towards the left.



Generic description of a socio-technical graph (from Latour et al., 1992, modified)

21. Impact pathway

- First, introduce the process of constructing the impact pathway (starting from the initial hypothesis, how did you proceed to collect Inputs-Outputs-Outcomes-Impacts elements, how did you analyze them and draw up the impact pathway and establish causal links; mention the difficulties encountered and share any doubts that remain). It is allowed to include zoomed-in views of some parts of the impact pathway. At this point, who has validated this impact pathway?
- For *in itinere* cases, distinguish what is already in the past from what is expected or forecast.
- Insert the diagram of the impact pathway and different zoomed-in views of the impact pathway, if you think necessary.
- Write a text explaining the content of the diagrams (in particular, possible differences between or specificities of points of view of the various actors).



Arrow	Explanation of the causal links of the impact pathway
1	Input 1 to Output 1: The hatchery was used for implementing the research which output was the successful induced breeding of a new species.



Learning situation



Negative or undesirable impact

Generic description of an impact pathway, with examples (from Barret et al., 2018, modified)

22. Listing inputs

Existing inputs can be key for explaining the outputs, outcomes and impacts of the case study, even if they are not explicit or where not considered at the beginning of the process. They must thus be thoroughly identified and listed.

Name of input	Input category	Stakeholders involved	Date of emergence/ period concerned	How was the input identified

23. Going from outputs to outcomes

Description of outputs (the direct results from the process, e.g. production of fish, pond building etc.) and outcomes (achievements resulting from outputs, e.g. higher accessibility of fish on local markets, lower price etc.).

Insert the table of outputs and outcomes.

Name of output	Output category	Stakeholders involved	Date of emergence/ period concerned	How was the output identified

Name of outcome	Outcome category	Stakeholders involved	Geographical extent	How was the outcome identified

24. Going from outcomes to impacts (1st and 2nd levels)

Present the hypotheses for the transition from outcomes to 1st level impacts, and from 1st level impacts to 2nd level impacts (the measurement of impacts is presented below). A same impact can be both a 1st and 2nd level impact (e.g. Income increase can occur for targeted stakeholder, but also for other people through spillover).

Impact	1st level	Stakeholders impacted	2nd level	Stakeholders impacted

Name of the 1st level impact	Impact domain	Stakeholders impacted	Date/period of emergence	Geographical extent	How was the impact identified

Name of the 2nd level impact	Impact domain	Type of 2nd level impact	Stakeholders impacted	Date/period of emergence	Geographical extent	How was the impact identified

Specify the process contribution (in relation/contrast to the other identified contributors) in the transition from the outcomes to the impacts (estimate the importance of external elements or other projects in comparison with the importance of the research contribution).

For *in itinere* cases, mention here the expected impacts.

Capacity building

25. Capacity building can be considered the “backbone” of the impact pathway. It is only because individuals, communities and organizations acquire or develop new capacities and skills that

change can occur. The evaluation of capacity building requires the analysis of learning situations⁹ considered as key by the stakeholders.

26. Presentation of identified learning situations

Define and characterize them.

Insert a table characterizing the learning situations.

Situation	Characteristics (when, where, who, what)	Role of the process	Phase of the impact pathway	Main actors who learn	Capacities acquired and used	Changes (activities, practices, etc.) arising from capacities acquired

Impact pathway of the capacity building: Report the learning situations on the impact pathway

Measurement of impacts

27. Summary table of identified impacts, indicators and sources used to inform them. If you have made a hierarchy of impacts amongst themselves, you can include it in the introduction.

Impact	Perception/point of view	Indicators for scoring intensity of impact (-5 to +5)	Indicators for scoring magnitude of impact (0 to +3)	Information source on indicators used to score the impact
Impact 1: Improvement in producer incomes	of farmers	I1: Change in yield I2: Family perception of child well-being improvement	M1: Number of farmers impacted M2: Hectares impacted	I1, M1, M2: statistics I2: focus groups
	of NGOs	Etc.		
Impact 2				

28. For *in itinere* cases, present the exploratory work undertaken on the scenarios envisaged to go from the outcomes (those already observed and those expected) towards the expected impacts and the elements of the context or of other projects that could influence this process.

29. 1st level impacts

Trace the path of the measurement of each impact through the associated indicators and present the results of the data collection. For each impact, mention the sources of data (there may be more than one) and aggregate data for each indicator. Also estimate the reliability that you assign to these data on the basis of the quality of their collection, and their representativeness (according to the geographical zones or the types of actors impacted). It is

⁹ A learning situation is a set of conditions and circumstances that can lead a person, a collective or an organization to build new knowledge and to apply it to solve problems, seize opportunities or improve ways of doing things.

important to assign values to all your indicators as far as possible. If you have been unable to do so via interviews, statistics data, or focus groups, suggest a value (or a value range), clearly indicating that it is an expert estimation (you + the team).

30. 2nd level impacts

The same as for 1st level impacts: describe the 2nd level impacts identified and indicate whether you have been able to collect data to inform them.

Evaluation of the impact on public policies

This is a three-phase approach:

31. appreciating the institutional context in which the process is inserted and which may have an influence on the impacts. This phase requires the identification of public actors and the main public policies, and the determination of how receptive the main public actors are to the process;

Public actor	Receptiveness at the start of the process	Receptiveness at the end of the process	Why the change

32. studying the public actors' interactions with the other actors of the process: when, in what situations and by what means that are available to them can public actors facilitate the process all through its many phases leading right up to the impact;

Interaction	Characteristics	Role of the process	Main public actors	Effects on the process	Effects on policies	Phase of the impact pathways
Establishment of a water management policy	The process facilitates collective building of a new water sharing scheme between fish farmers, other farmers and local authority	Organizer of the consultation	Farmers Local authority Local government	New quotas New investment (dams etc.)	New water management rules	Outcome: new water management rules Impact: building up capacity of the local community and authority
Etc.						

33. studying the impacts of these interactions on the capacity of public actors and on public policies.

Other themes possibly studied during this study

34. Explain the approach and present the results.

Lessons learned

35. Lessons learned from the difficulties encountered and corresponding SDGs/thematic modules
36. Lessons learned from the direct and indirect impacts of the process and corresponding SDGs/thematic modules
37. Other lessons learned
38. Recommendations
 - Recommendations for the continuation of the process described (For *in itinere* cases, these recommendations are obligatory).
 - Recommendations for inclusion in the SAG, for each thematic module.

Lesson learned	Corresponding SDG(s)	Corresponding thematic module(s)	Recommendations

Bibliography

39. List of the main documents and sources used for this case study.

Annexes

40. Include here any information useful for understanding the case study, including pictures, raw data, etc.
41. Do not forget to include the reports consulted, including administrative reports (grey literature).

Appendix 6: List of thematic modules and guidelines

The initial list of “thematic modules” and corresponding available or needed guidance documents has been developed by considering:

- 1) the 45 questions of the aquaculture-specific CCRF survey questionnaire (3.2 CCRF questionnaire (Countries) and Table 4 in 4.3 COFI-SCA Session Background Document);
- 2) the gap analysis between requirements for guidance on responsible aquaculture development and available guidance (FAO Technical Guidelines for Responsible Fisheries – Aquaculture Development), made by Barg (2013¹⁰, paragraph 9 of the 4.2 COFI-SCA Working Document);
- 3) the gap analysis between 2030 Agenda’s SDG and existing guidance, published by FAO (Hambrey, 2017¹¹, paragraph 12 of the working document);
- 4) the inputs of Experts during the Expert Consultation.

The following table consists of five columns. The first column lists the topics to be included in SAG that have been identified and grouped into “Thematic modules”.

- 1) The list include the thematic modules initially proposed by the Secretariat and cleared by the Experts
- 2) It also includes the new thematic modules and the new organization of the thematic modules per “chapter” suggested by the Experts.

The second column “FAO guidelines” includes the documents produced by FAO (e.g. Table 1 in 4.3 COFI-SCA Session Background Document (SBD), FAO technical papers etc.), by FAO and its partners (e.g. FAO and World Bank etc.) or recommended in official FAO documents (e.g. OIE). References in square brackets correspond to documents listed in Tables in the SBD, in particular Table 1 [TG number] or Table 2 [number].

- 3) The list includes the list of documents proposed by the Secretariat and cleared by Experts, as well as the references added by Experts.

Other useful resources/references are listed in the third column.

- 4) The list include the list of documents proposed by the Secretariat and cleared by Experts, as well as the references added by Experts.

The fourth column lists comments, in particular on the up-to-datedness, coverage, appropriateness, etc. of the existing guidance materials. The existing comments are based on Barg (2013) (comments starting by [CCRF]) or Hambrey (2017) (comments identified by [SDG]). Comments identified by [Update] refers to changes occurred after the publication of the two previous documents.

- 5) The column includes the comments made by Experts

The fifth column is just a line numbering to make easier the reference to a specific thematic module during the groups and plenary discussions.

All references/resources listed can be found in footnote, Annex 1 (all Technical Guidelines for Responsible Fisheries covering aquaculture development issues) and Annex 2 (all other guidance materials).

¹⁰ Barg, U., 2013. Appraisal of existing FAO CCRF guidelines on aquaculture. A synthesis. FAO, Rome: 49 p. (unpublished)

¹¹ Hambrey, J. 2017. The 2030 Agenda and the Sustainable Development Goals: The challenge for aquaculture development and management. FAO Fisheries And Aquaculture Circular FIAA/C1141 <http://www.fao.org/3/a-i7808e.pdf>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Chapter 1: Sustainable aquaculture and the 2030 Agenda				1
Dealing with trade-offs between different SDGs in aquaculture	[31] Transforming food and agriculture to achieve the SDGs	[61] Guidelines for aquaculture management in the SADC region [63] Best Practices for Aquaculture development [64] Sustainable Development indicators in aquaculture [65] Sustainable development of Mediterranean aquaculture-Environment	Keep higher level to avoid overlapping with contents of other modules Guidelines on how to compromise or address the trade-offs are needed.	2
Implementing the CCRF	[TG 5.4] Ecosystem approach to aquaculture and all other [TG 5.x]	[61] Guidelines for aquaculture management in the SADC region [63] Best Practices for Aquaculture development [64] Sustainable development indicators in aquaculture [65] Sustainable development of Mediterranean aquaculture-Environment	Oldest TGs should be reviewed	3
Equitable and inclusive development	[TG 5.9] Development of aquatic genetic resources [TG 7] Responsible fish utilization [58] Guidance for responsible agricultural supply chains [59] UN guiding principles on business and human rights Technical Guidelines on aquaculture certification	A diagnostic framework for equitable mariculture development in the Western Indian Ocean (2018) ¹	[SDG] Not covered by existing guidelines This module should also include guidelines on youth employment It may be related to aquaculture as a business too (attracting new, young entrepreneurs in aquaculture)	4

¹ <http://hdl.handle.net/20.500.12348/3203>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Gender in aquaculture	FAO. Mainstreaming gender in fisheries and aquaculture. A Stock-taking and Planning Exercise (2013) ²	<p>Good practice policies to eliminate gender inequalities in fish value chains (2013)³</p> <p>Women in fishing communities: guidelines (1988)⁴</p> <p>Socio-Economic and Gender Analysis Programme Field Level Handbook (2001)⁵</p> <p>Socio-Economic and Gender Analysis Programme. Intermediate Level Handbook (2001)⁶</p> <p>Socio-Economic and Gender Analysis Programme. Macro-level handbook (2001)⁷</p> <p>Mainstreaming gender into project cycle management in the fisheries sector. Field manual (2011)⁸</p> <p>Advancing gender in the environment - Gender in fisheries (2019)⁹</p>	[CCRF] Not covered by existing guidelines Guidelines specific to aquaculture are needed	5

² <http://www.fao.org/3/a-i3184e.pdf>

³ <http://www.fao.org/3/i3553e/i3553e.pdf>

⁴ <http://www.fao.org/3/t0155e/t0155e00.htm>

⁵ <http://www.fao.org/3/ak214e/ak214e00.pdf>

⁶ <http://www.fao.org/3/ak213e/ak213e00.pdf>

⁷ <http://www.fao.org/3/ak229e/ak229e00.pdf>

⁸ <http://www.fao.org/3/ba0004e/ba0004e00.htm>

⁹ <https://portals.iucn.org/union/sites/union/files/doc/2019-iucn-usaid-fisheries-web.pdf>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Sustainable livelihoods, social protection and safety nets in aquaculture		Sustainable Livelihoods Guidance sheets (1999) ¹⁰		6
Food security, nutrition and improved diets	[23] Voluntary guidelines on the right to adequate food		[SDG] Not covered by existing guidelines SDG 2 is related to hunger. Food security is better wording than hunger eradication. Aquaculture for the poor. Bring examples from the guidelines that can fit for this process. Aquaculture as a business Should these guidelines address policy goal to contribute to aquaculture Suggestion to add existing literature Know that complimentary papers exist	7
Capacity development	[TG 5] Aquaculture development [TG 5.9] Development of aquatic genetic resources	[27] Introducing Farm Business School [14] Aquaculture planning	Need for guidelines on how to assess needs and develop university courses and degrees for the new generation of aquaculture entrepreneurs Institutional capacity needs to cover 6.1-6.6 in CCRF + capacity to (i) Legislate and (ii) Administrate the sector (e.g. central versus provincial levels) etc.	8
Chapter 2: Governing and planning aquaculture development				9
Ecosystem Approach to Aquaculture	[TG 5.4] Ecosystem approach to aquaculture [1] [2] [3] [4] Aquaculture zoning, site selection and area management	[13] The Ecosystem Approach to Aquaculture ten years on [52] Aquaculture-fisheries interaction and EAA		10
Aquaculture in integrated coastal management	[TG 3] Integration of fisheries into coastal area management [33] GESAMP (2001) [1] [2] [3] [4] Aquaculture zoning, site selection and area management	Guidelines for the sustainable management of coastal lagoons in the Mediterranean and the Black Sea ¹¹		11

¹⁰ <https://www.ennonline.net/dfidsustainableliving>

¹¹ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Aquaculture in watershed management or land use development plans	[TG 5.4] Ecosystem approach to aquaculture [1] [2] [3] [4] Aquaculture zoning, site selection and area management			12
Aquaculture in community development planning	[TG 5.4] Ecosystem approach to aquaculture			13
FAO Blue Growth Initiative		[13] The Ecosystem Approach to Aquaculture ten years on [30] The FAO Blue Growth Initiative in Eastern Africa		14
Agroecology in aquaculture		Agroecology in aquaculture (2019) ¹²		15
Climate-smart aquaculture		Impacts of climate change on fisheries and aquaculture: synthesis of current knowledge, adaptation and mitigation options ¹³ Climate-smart fisheries and aquaculture (2017) ¹⁴		16
Access rights to land and water bodies	[TG 5] Aquaculture development [20] Voluntary guidelines on the responsible tenure of land, fisheries and forests	[41] Land and water – the rights interface [33] GESAMP (2001) Integrated management of coastal zones (1992) ¹⁵ Guidelines for the streamlining of aquaculture authorization and leasing processes ¹⁶		17

¹² FAN 60 available on <http://www.fao.org/fishery/publications/fan/>

¹³ <http://www.fao.org/3/i9705en/i9705en.pdf>

¹⁴ <http://www.fao.org/climate-smart-agriculture-sourcebook/production-resources/module-b4-fisheries/b4-overview/en/>

¹⁵ <http://www.fao.org/3/T0708E/T0708E00.htm>

¹⁶ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Local communities and livelihoods	[TG 4] Fisheries management (socio-economic dimensions) [TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture	Sustainable Livelihoods Guidance sheets (1999) ¹⁰		18
Collective management of common resources	[TG 4] Fisheries management (socio-economic dimensions) [TG 5] Aquaculture development [TG 5.6] Use of wild resources for capture-based aquaculture	[33] GESAMP (2001) FAO Integrated management of coastal zones (1992) ¹⁵		19
Conflict resolution schemes	[TG 5.4] Ecosystem approach to aquaculture		Conflicts about what? Land/space, water, small vs large producers...	20
Theft prevention		Design of monitoring and controlling system for aquaculture based on wireless-embedded technology ¹⁷	Issue may be considered in future updating of guidelines	21
Precautionary principle/ Precautionary approach	[TG 2] Precautionary approach to capture fisheries and species introductions [TG 5.3] Genetic resource management [TG 5.5] Use of wild fish as feed in aquaculture [TG 5.9] Development of aquatic genetic resources	Genetics and fish breeding (1993) ¹⁸ Genetics in aquaculture (1993) ¹⁹ Selective breeding in fish and conservation of genetic resources for aquaculture (2012) ²⁰	[CCRF] Not covered by existing guidelines	22

¹⁷ <https://www.scientific.net/AMM.278-280.719>

¹⁸ <https://www.springer.com/gp/book/9780412330407>

¹⁹ <https://www.sciencedirect.com/book/9780444815279/genetics-in-aquaculture>

²⁰ <https://www.ncbi.nlm.nih.gov/pubmed/22827379>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Governance	[TG 5] Aquaculture development [TG 5.7] Aquaculture governance and sector development [TG 5.9] Development of aquatic genetic resources [31] Transforming food and agriculture to achieve the SDGs	[53] Establishing legal, institutional and regulatory framework for aquaculture development and management [33] GESAMP (2001) [14] Aquaculture planning Mapping the institutional architecture of global marine fisheries and aquaculture governance (2017) ²¹		23
Stakeholder participation	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture [TG 5.7] Aquaculture governance and sector development [TG 5.9] Development of aquatic genetic resources [31] Transforming food and agriculture to achieve the SDGs Involving stakeholders in aquaculture policy-making, planning and management (2001) ²²	[14] Aquaculture planning Stakeholder approaches to planning participatory research by multi-institution groups (1999) ²³	[SDG] Not covered by guidelines [Update] Publication of [TG 5.7]	24

²¹ https://www.researchgate.net/publication/320403873_Mapping_the_Institutional_Architecture_of_Global_Marine_Fisheries_and_Aquaculture_Governance

²² <http://www.fao.org/3/ab412e/ab412e32.htm>

²³ http://www.fao.org/docs/eims/upload/agrotech/2037/Agren_91.pdf

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Aquaculture planning and policy	<p>[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture [TG 5.6] Use of wild resources for capture-based aquaculture [TG 5.7] Aquaculture governance and sector development [14] Aquaculture planning</p> <p>Policy and governance in aquaculture. Lessons learned and way forward (2014)²⁴</p> <p>The role of aquaculture in rural development (2003)²⁵</p>	<p>Plan nacional para el desarrollo de la acuicultura sostenible en Colombia (2014)²⁶</p> <p>Governance of marine aquaculture: Pitfalls, potential, and pathways forward (2019)²⁷</p>	[SDG] Adaptive planning not covered by existing guidelines	25

²⁴ <http://www.fao.org/3/a-i3156e.pdf>

²⁵ <http://www.fao.org/3/y4490e/y4490e04.pdf> This is a chapter of The Review of the state of world aquaculture <http://www.fao.org/3/a-y4490e.pdf>

²⁶ http://www.racua.net/uploads/media/Plan_Nac_Desar_Acuic_Sost_CO.pdf

²⁷ <https://doi.org/10.1016/j.marpol.2019.02.054>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Spatial planning	[TG 5.4] Ecosystem approach to aquaculture [1] [2] [3] [4] Aquaculture zoning, site selection and area management Marine spatial planning for enhanced fisheries and aquaculture sustainability Its application in the Near East (2016) ²⁸	[49] Atlas of aquaculture potential in coastal Kenya Zonificación de la Acuicultura Nacional (2013) ²⁹ Mapping the institutional architecture of global marine fisheries and aquaculture governance (2017) ³⁰ Marine spatial planning for enhanced fisheries and aquaculture sustainability Its application in the Near East (2016) ²⁸	Some EU projects have developed models and spatial planning tools and guidance (e.g. carrying capacity etc.)	26
Zoning	[1] [2] [3] [4] Aquaculture zoning, site selection and area management			27
Public-private partnerships in aquaculture		Contract farming and public-private partnerships in aquaculture. Lessons learned from East African countries (2018) ³¹		28

²⁸ <http://www.fao.org/3/a-i6043e.pdf>

²⁹ <https://www.aunap.gov.co/wp-content/uploads/2016/05/Zonificaci%e3%b3n-de-la-Acuicultura-en-Colombia.pdf>

³⁰ https://www.researchgate.net/publication/281268741_Mapping_the_Institutional_Architecture_of_Global_Climate_Change_Governance

³¹ <http://www.fao.org/3/CA0134EN/ca0134en.pdf>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
<p>Enabling environment:</p> <ul style="list-style-type: none"> ✓ Infrastructures and facilities ✓ Equipment ✓ Financing ✓ Research ✓ Extension and training ✓ Capacity development ✓ Networks ✓ Education ✓ Access to land and water ✓ Market access ✓ Value adding 	<p>[TG 4] Fisheries management (research)</p> <p>[TG 5] Aquaculture development</p> <p>[TG 5.2] Health management for responsible movement of live aquatic animals (research)</p> <p>[TG 5.4] Ecosystem approach to aquaculture</p> <p>[TG 5.7] Aquaculture governance and sector development (research)</p> <p>[TG 5.9] Development of aquatic genetic resources</p> <p>[TG 7] Responsible fish utilization (research)</p> <p>[TG 12] Information and knowledge sharing</p> <p>[16] Responsible investment in agriculture and food systems</p>	<p>[27] Introducing Farm Business School</p> <p>Mapping the research on aquaculture. A bibliometric analysis of aquaculture literature (2011)³²</p> <p>Fisheries and aquaculture extension services (1997)³³</p> <p>Extension approach for an effective fisheries and aquaculture extension service in India (2012)³⁴</p> <p>Programa nacional de extensionismo en acuicultura de Colombia (2016)³⁵</p> <p>Inland Aquaculture Engineering (1984)³⁶</p>	<p>[SDG] Capacity development of institutions not covered by existing guidelines</p>	29
<p>Resource sharing and international/transboundary cooperation</p>	<p>[TG 5] Aquaculture development</p> <p>[TG 7] Responsible fish utilization</p> <p>[TG 11] Responsible fish trade</p> <p>[TG 12] Information and knowledge sharing</p>	<p>[60] OIE aquatic animal health code</p> <p>MRC-NACA. Code of practice for transboundary movement of aquatic organisms (2015)³⁷</p>		30

³² <https://link.springer.com/article/10.1007/s11192-011-0562-z>

³³ <http://www.fao.org/3/AC804E/ac804e06.htm>

³⁴ <https://www.tandfonline.com/doi/abs/10.1080/1389224X.2012.670442>

³⁵ <http://extwprlegs1.fao.org/docs/pdf/coll73291.pdf>

³⁶ <http://www.fao.org/3/x5744e/x5744e00.htm>

³⁷ <https://enaca.org/enclosure.php?id=38>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Emergencies and early warning systems	[1] [2] [3] [4] Aquaculture zoning, site selection and area management [11] Damage and needs assessment [12] Disaster response and preparedness [15] Emergency response guidance	[55] Disaster response and risk management	[CCRF] Not covered by existing guidelines	31
Natural disasters management	[12] Disaster response and preparedness	[55] Disaster response and risk management		32
Assistance schemes				33
Resilience in aquaculture			[SDG] Not covered by existing guidelines	34
Climate change and aquaculture	Impacts of climate change on fisheries and aquaculture. Synthesis of current knowledge, adaptation and mitigation options (2018) ³⁸	FAO Draft National Adaptation Plans – guidance specific to fisheries and aquaculture in draft form. [prepared by Cecile Brugere, not yet published]		35
Chapter 3: Biodiversity and genetic resources				36
Biodiversity, habitat, ecosystems functions and aquaculture	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture	[19] Valuing coastal ecosystems [48] Habitat rehabilitation for inland fisheries [65] Sustainable development of Mediterranean aquaculture-Environment		37

³⁸ <http://www.fao.org/3/i9705en/i9705en.pdf>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Genetic resource management, development and conservation	[TG 5] Aquaculture development [TG 5.3] Genetic resource management [TG 5.9] Development of aquatic genetic resources [TG 2] Precautionary approach to capture fisheries and species introductions [TG 5.4] Ecosystem approach to aquaculture		[SDG] Not covered by existing guidelines [Update] Publication of [TG 5.9] The module should also include: <ul style="list-style-type: none"> • Domestication and endangered species • Broodstock management and genetic improvement for aquaculture • Polyploidy, hybridization, sex reversal and other genetic approaches (e.g.: YY) • Gene banks for the preservation of aquatic genetic resources (live gene bank, stem cells, cryopreservation, DNA and tissue bank) • Escapes 	38

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Species introduction and transfers for aquaculture purposes	[TG 2] Precautionary approach to capture fisheries and species introductions [TG 5] Aquaculture development [TG 5.2] Health management for responsible movement of live aquatic animals [TG 5.3] Genetic resource management [TG 5.9] Development of aquatic genetic resources [5] Risk analysis for live aquatic animal movements [6] Quarantine [7] Responsible use of alien species [8] Responsible use of alien species [21] Responsible use of alien and GMO aquatic species in Africa [22] Control and responsible use of alien species [63] OIE aquatic animal health code	[18] Tilapia as alien aquatics MRC-NACA. Code of practice for transboundary movement of aquatic organisms (2015) ³⁹ Guidelines on use of alien species in aquaculture ⁴⁰	[CCRF] Not covered by existing guidelines	39
Use of GMOs in aquaculture	[TG 5] Aquaculture development [TG 5.3] Genetic resource management [TG 5.9] Development of aquatic genetic resources [21] Responsible use of alien and GMO aquatic species in Africa [TG 5.3] Genetic resource management [TG 5.9] Development of aquatic genetic resources			40

³⁹ <https://enaca.org/enclosure.php?id=38>

⁴⁰ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Chapter 4: Better Management Practices in Aquaculture				41
Business management	[TG 5] Aquaculture development [12] Doing aquaculture as a business for small- and medium-scale farmers	[27] Introducing Farm Business School (training) [28] Doing aquaculture as a business (training) [40] Commercial aquaculture (training) [68] Microfinance in fisheries and aquaculture Guidelines for the streamlining of aquaculture authorization and leasing processes ⁴¹		42
Risk management and insurance	[TG 5] Aquaculture development [TG 5.3] Genetic resource management [10] Risk analysis in aquaculture	[29] Aquaculture insurance in China [50] Aquaculture insurance [67] HACCP in aquafarms		43

⁴¹ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Human and labour rights, decent work and acceptable working conditions	[TG 5.1] Good aquaculture feed manufacturing practice [42] Protocol to the Forced Labour Convention [43] Fundamental principles and rights at work [44] Guide to International labour standard [45] Introduction to International labour standard [46] Multinational enterprises and social policy [57] Guidelines for multinational enterprises [59] UN guiding principles on business and human rights UN Declaration of Human rights	Eliminating child labour in fisheries and aquaculture - Promoting decent work and sustainable fish value chains (2018) ⁴²	[CCRF] Not covered by existing guidelines [SDG] Not covered by existing guidelines	44
Corporate social responsibility, including social licence and public acceptability		The role of corporate social responsibility in creating a Seussian world of seafood sustainability (2018) ⁴³ Guidelines in support of social acceptability for aquaculture development ⁴⁴	[CCRF] Not covered by existing guidelines	45
Farmers' collaboration, clusters and professional associations	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture	[27] Introducing Farm Business School [47] Aquaculture farmers organizations and cluster management		46

⁴² <http://www.fao.org/3/CA0177EN/ca0177en.pdf>

⁴³ <https://onlinelibrary.wiley.com/doi/pdf/10.1111/faf.12289>

⁴⁴ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Environmental integrity	[TG 5] Aquaculture development [TG 5.1] Good aquaculture feed manufacturing practice [TG 5.4] Ecosystem approach to aquaculture [24] EIA and monitoring in aquaculture Developing an environmental monitoring system to strengthen fisheries and aquaculture resilience and improve early warning in the Lower Mekong basin (2017) ⁴⁵	[56] EIA and monitoring in salmon aquaculture [65] Sustainable development of Mediterranean aquaculture-Environment Environmental, Health, and Safety Guidelines for Aquaculture (2007) ⁴⁶ Guidelines on a harmonized environmental monitoring programme (EMP) for marine finfish cage farming in the Mediterranean and the Black Sea ⁴⁷	[SDG] Not covered by existing guidelines Site selection	47
System construction, engineering, maintenance or rehabilitation	[TG 5.1] Good aquaculture feed manufacturing practice			48
Storage and stock management (feeds, inputs, equipment etc.)	[TG 5.1] Good aquaculture feed manufacturing practice			49
Better Management Practices and codes of practices	[TG 5.4] Ecosystem approach to aquaculture [25] Technical guidelines on aquaculture certification	[66] Sustainable development of Mediterranean aquaculture-Responsible practices and certification [54] Private standards and certification in fisheries and aquaculture	The following is included in the module: - water quality monitoring and management - feeding and fertilisation - stocking and harvesting All good aquaculture practices guides out there – species-specific – should be included here, e.g. 2006 FAO/WB/WWF shrimp guide, NACA BMP guides etc.	50
Resource use efficiency and reducing losses and wastes	[TG 5] Aquaculture development		[SDG] Resource use efficiency and waste not covered by existing guidelines	51

⁴⁵ <http://www.fao.org/3/a-i6641e.pdf>

⁴⁶ <http://documents.worldbank.org/curated/en/808221481257432145/pdf/110870-WP-English-Aquaculture-guidelines-PUBLIC.pdf>

⁴⁷ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Stocking density, polyculture, fertilization, environmental capacity and limits to growth	[TG 5.4] Ecosystem approach to aquaculture [9] Carrying capacity models [TG 5] Aquaculture development Carrying capacities and site selection within the ecosystem approach to aquaculture (2013) ⁴⁸ Site selection and carrying capacities for inland and coastal aquaculture (2013) ⁴⁹ Aquaculture site selection and carrying capacity management in the People's Republic of China (2013) ⁵⁰	[39] Feeds and fertilizers for sustainable aquaculture	[SDG] Not covered by existing guidelines	52
Wild and farmed seeds	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture		[SDG] Resource use efficiency and waste not covered by existing guidelines	53
Predator and unwanted organisms (plants, fish etc.) management control in aquaculture	[TG 5] Aquaculture development			54
Chapter 5: Sustainable feed				55
Nutrition, feed and feeding (formulation of natural, farm-made and commercial)	[TG 5.4] Ecosystem approach to aquaculture [36] On-farm feeding and feed management	[38] Improving FCR [39] Feeds and fertilizers for sustainable aquaculture	[SDG] Resource use efficiency and waste not covered by existing guidelines	56

⁴⁸ https://www.researchgate.net/publication/281197026_Carrying_capacities_and_site_selection_within_the_ecosystem_approach_to_aquaculture

⁴⁹ <http://www.fao.org/3/a-i3322e.pdf>

⁵⁰ <http://www.fao.org/tempref/FI/CDrom/P21/root/14.pdf>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Use of fish, fish oil and fishmeal in aquaculture feed, Use of alternative feed ingredients to fish oil and fishmeal i.e. algae, insect meal, single cell protein, plant protein, etc	[TG 5.4] Ecosystem approach to aquaculture [TG 5.5] Use of wild fish as feed in aquaculture [TG 7] Responsible fish utilization (bycatch)		[CCRF] Locally developed feeds not covered [SDG] Resource use efficiency and waste not covered by existing guidelines Use of novel feed ingredients is an emerging field → keep an eye on new developments in this regard.	57
Live feed				58
Chapter 6: Water management				59
Water abstraction and conservation			[SDG] Resource use efficiency and waste not covered by existing guidelines Overlaps with conflicts (line 23)	60
Waste water and water quality management	[TG 5.4] Ecosystem approach to aquaculture	Design of monitoring and controlling system for aquaculture based on wireless-embedded technology (2013) ⁵¹	We suggest merging 58 and 60	61
Effluent, wastes management/disposal and wastewater use	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture [TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture [61] Wastewater and excreta use in aquaculture	[34] Monitoring the ecological effects of coastal aquaculture wastes Design of monitoring and controlling system for aquaculture based on wireless-embedded technology (2013) ⁵¹	[SDG] Wastes not covered by existing guidelines	62

⁵¹ <https://www.scientific.net/AMM.278-280.719>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Efficient energy use and alternative/renewable energy sources of energy in aquaculture (e.g.: solar, wind)	Energy-smart food at FAO: An overview (2012) ⁵²	The potential for renewable energy usage in aquaculture (2002) ⁵³ Application of renewable energy in aquaculture (2019) ⁵⁴ Aquaculture perspective of multi-use sites in the open ocean. the untapped potential for marine resources in the Anthropocene (2017) ⁵⁵	[SDG] Resource use efficiency and waste not covered by existing guidelines	63
Chapter 7: Biosecurity, aquatic animal health and animal well-being				64
Biosecurity and aquatic health management	[TG 5] Aquaculture development [TG 5.4] Ecosystem approach to aquaculture [60] OIE aquatic animal health code		[CCRF] Not completely covered by existing guidelines Including hormones, AMR etc. This module should include biosecurity, controlled use of drugs and chemicals to promote prophylactic treatments (probiotics, organic acids, vaccinations), nucleus centre free of diseases or SPFs, aquatic health management and welfare should be a standalone area/block/section just like genetics etc.	65
Microbiome control				66

⁵² <http://www.fao.org/3/an913e/an913e.pdf>

⁵³ <http://www.aquacultureinitiative.eu/Renewable%20Energy%20Report.pdf>

⁵⁴ https://www.researchgate.net/publication/331716127_Application_of_Renewable_Energy_in_Aquaculture_Application_of_Renewable_Energy_in_Aquaculture

⁵⁵ <https://www.springer.com/gp/book/9783319511573>

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Animal well-being		CITES guidelines for the non-air transport of live wild animals and plants ⁵⁶ Aquatic animals welfare guidelines ⁵⁷ [60] OIE aquatic animal health code	Animal housing and rearing conditions in aquaculture Live aquatic animal transport Slaughtering	67
Chapter 8: Specific farming systems				68
Promotion of aquaculture innovation and technology adoption among users, including BMPs			This module should include capacity building but not only: behavioural factors, incentives, technology characteristics and socio-economic variables, including gender	69
Integrated aquaculture systems	[51] Small-scale aquaponic food production Integrated agriculture-aquaculture - A primer (2001) ⁵⁸		This module should include aquaponics, integrated agriculture-aquaculture, biofloc, integrated multi-trophic aquaculture	70
Aquaculture in special environments	Aquaculture in desert and arid lands ⁵⁹		This module should include : Aquaculture in altitude, urban aquaculture, arid regions, offshore and high-seas aquaculture, inland mariculture	71
Capture-based aquaculture and culture-based fisheries	[TG 5.6] Use of wild resources for capture-based aquaculture	Guidelines on responsible aquaculture restocking and stock enhancement practices ⁶⁰		72
Farming of other aquatic products			seaweed, mollusc, algae, abalone etc.	73

⁵⁶ <https://www.cites.org/eng/resources/transport/index.php>

⁵⁷ <http://www.frdc.com.au/-/media/Fish-FRDC/Environment/Animal-Health-and-Biosecurity/NAC-Aquatic-Animal-Welfare-Guidelines---Final-Feb-05.ashx?la=en>

⁵⁸ <http://www.fao.org/3/Y1187E/y1187e00.htm>

⁵⁹ <http://www.fao.org/docrep/015/ba0114e/ba0114e.pdf>

⁶⁰ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Chapter 9: Aquaculture value chains, consumers, markets and trade				74
Public perception and acceptability	[TG 5.3] Genetic resource management [TG 5.6] Use of wild resources for capture-based aquaculture [TG 5.9] Development of aquatic genetic resources	Guidelines in support of social acceptability for aquaculture development ⁶¹	[CCRF] Not covered by existing guidelines	75
Nutritional value, quality and safety of aquaculture products	[TG 5] Aquaculture development [TG 5.6] Use of wild resources for capture-based aquaculture [TG 7] Responsible fish utilization [17] Codex alimentarius	[67] HACCP in aquafarms	This module should include traceability, biosafety, fish quality and consumer protection against frauds in aquaculture, on-farm post-harvest processing in aquaculture, labelling of inputs used in aquaculture	76
Marketing of aquaculture products			live, dead, processed	77
Fair and productive aquaculture value chains	[TG 5.4] Ecosystem approach to aquaculture [TG 7] Responsible fish utilization [TG 11] Responsible fish trade [58] Guidance for responsible agricultural supply chains		[SDG] Not covered by existing guidelines	78
Quality certification and voluntary schemes	[TG 5.1] Good aquaculture feed manufacturing practice [TG 5.4] Ecosystem approach to aquaculture [TG 7] Responsible fish utilization [25] Technical guidelines on aquaculture certification	[54] Private standards and certification in fisheries and aquaculture [66] Sustainable development of Mediterranean aquaculture-Responsible practices and certification		79
Compliance with international standards	[TG 7] Responsible fish utilization [TG 11] Responsible fish trade		Global trade requirements and aquaculture, especially for small-scale producers	80

⁶¹ General Fisheries Commission for the Mediterranean (GFCM-FAO) publication available online soon

Thematic module	FAO guidelines	Other useful references	Comments/Needs	Line
Chapter 10: Aquaculture statistics and information				81
Monitoring, data and statistics	<p>[TG 5] Aquaculture development</p> <p>[TG 5.4] Ecosystem approach to aquaculture</p> <p>[TG 5.5] Use of wild fish as feed in aquaculture</p> <p>[TG 5.6] Use of wild resources for capture-based aquaculture</p> <p>[TG 5.7] Aquaculture governance and sector development</p> <p>[TG 5.9] Development of aquatic genetic resources</p> <p>[TG 11] Responsible fish trade</p>	<p>[32] Indicators to monitor sustainable aquaculture in the Mediterranean and Black Sea</p> <p>[35] Indicators for the sustainable development of finfish Mediterranean aquaculture</p> <p>[36] GFCM consultation on the application of art. 9 of the CCRF</p> <p>[64] Sustainable Development indicators in aquaculture</p> <p>Developing an Environmental Monitoring System to Strengthen Fisheries and Aquaculture Resilience and Improve Early Warning in the Lower Mekong Basin (2017)⁶²</p> <p>Gender-sensitive indicators for natural resources management (undated)⁶³</p>	<p>This module should be a priority as it is needed to have guidelines (if not existing yet) on how to design and implement aquaculture data collection systems, and data compilation systems using for example existing sources (from traceability of products).</p> <p>MUST collect gender-disaggregated data for aquaculture.</p> <p><i>Check:</i> Guidelines on the collection of structural aquaculture statistics, supplement to the programme for the World Census Agriculture 2000. FAO Statistical Development Series 5B</p>	82

⁶² <http://www.fao.org/3/a-i6641e.pdf>

⁶³ <http://www.fao.org/tempref/docrep/fao/010/a0521e/a0521e00.pdf>

Annex 1: FAO Technical Guidelines for Responsible Fisheries available in support to Sustainable Aquaculture Development

1. Precautionary approach to capture fisheries and species introductions. FAO Technical Guidelines for Responsible Fisheries No. 2⁶⁴ (1996).
2. Integration of fisheries into coastal area management. FAO Technical Guidelines for Responsible Fisheries. No. 3⁶⁵ (1996).
3. Fisheries management. FAO Technical Guidelines for Responsible Fisheries No. 4⁶⁶ (1997).
4. Aquaculture development. FAO Technical Guidelines for Responsible Fisheries No. 5⁶⁷ (1997).
 - Aquaculture development. 9. Development of aquatic genetic resources: A framework of essential criteria FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 9⁶⁸ (2018).
 - Aquaculture development. 7. Aquaculture governance and sector development FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 7⁶⁹ (2017).
 - Aquaculture development. 6. Use of wild fishery resources for capture-based aquaculture FAO Technical Guidelines for Responsible Fisheries No.5 Suppl. 6⁷⁰ (2011).
 - Aquaculture development. 5. Use of wild fish as feed in aquaculture FAO Technical Guidelines for Responsible Fisheries No.5 Suppl. 5⁷¹ (2011).
 - Aquaculture development. 4. Ecosystem approach to aquaculture FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 4⁷² (2010).
 - Aquaculture development. 3. Genetic resource management FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 3⁷³ (2008).
 - Aquaculture development. 2. Health management for responsible movement of live aquatic animals FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 2⁷⁴ (2007).
 - Aquaculture development. 1. Good aquaculture feed manufacturing practice FAO Technical Guidelines for Responsible Fisheries No. 5 Suppl. 1⁷⁵ (2001).
5. Responsible fish utilization. FAO Technical Guidelines for Responsible Fisheries No. 7⁷⁶ (1998).

⁶⁴ <http://www.fao.org/3/a-w3592e.pdf>

⁶⁵ <http://www.fao.org/docrep/003/W3593E/w3593e00.htm>

⁶⁶ <http://www.fao.org/3/a-w4230e.pdf>

⁶⁷ <http://www.fao.org/tempref/docrep/fao/003/W4493e/W4493e00.pdf>

⁶⁸ <http://www.fao.org/3/ca2296en/CA2296EN.pdf>

⁶⁹ <http://www.fao.org/3/a-i7797e.pdf>

⁷⁰ <http://www.fao.org/docrep/014/ba0059e/ba0059e.pdf>

⁷¹ <http://www.fao.org/3/a-i1917e.pdf>

⁷² <http://www.fao.org/docrep/013/i1750e/i1750e.pdf>

⁷³ <http://www.fao.org/3/a-i0283e.pdf>

⁷⁴ <http://www.fao.org/3/a-a1108e.pdf>

⁷⁵ <http://www.fao.org/3/a-y1453e.pdf>

⁷⁶ <http://www.fao.org/tempref/docrep/fao/003/w9634e/w9634e00.pdf>

6. Responsible fish trade. FAO Technical Guidelines for Responsible Fisheries. No. 11⁷⁷ (2009).
7. Information and knowledge sharing. FAO Technical Guidelines for Responsible Fisheries No. 12⁷⁸ (2009).

⁷⁷ <http://www.fao.org/3/a-i0590e.pdf>

⁷⁸ <http://www.fao.org/tempref/docrep/fao/011/i0587e/i0587e00.pdf>

Annex 2: Examples of some FAO and non-FAO guidelines and tools available in support to Sustainable Aquaculture Development

- [1] Aguilar-Manjarrez, J., Soto, D. & Brummett, R. 2017. Aquaculture zoning, site selection and area management under the ecosystem approach to aquaculture. Full document. Report ACS113536. Rome, FAO, and World Bank Group, Washington, DC. 395 pp⁷⁹.
- [2] Aguilar-Manjarrez, J., Soto, D. & Brummett, R. 2017. Aquaculture zoning, site selection and area management under the ecosystem approach to aquaculture. A handbook. Report ACS18071. Rome, FAO, and World Bank Group, Washington, DC. 62 pp⁸⁰.
- [3] Aguilar-Manjarrez, J., Soto, D. & Brummett, R. 2017. Aquaculture zoning, site selection and area management under the ecosystem approach to aquaculture. Policy Brief. Rome, FAO, and World Bank Group, Washington, DC. 4 pp⁸¹.
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