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REPORT OF THE FIFTH CAQ COORDINATING MEETING OF THE WORKING GROUPS (CMWG)

- Draft -

OPENING OF THE MEETING

1. The 5th Coordinating Meeting of the Working Groups (CMWG) of the Committee of Aquaculture (CAQ) of the General Fisheries Commission of the Mediterranean was held at the GFCM headquarters in Rome, Italy, from 7 to 9 March 2012. The meeting was attended by the Bureau of the CAQ, the Coordinators of the subsidiary bodies of the CAQ, the Coordinator of the FAO AdriaMed and MedSudMed projects, the GFCM Secretariat and invited experts (the list of participants is available in Appendix B).

2. The Meeting was opened by the Chairperson of the CAQ, Mr Francois René, who welcomed the participants and recalled the importance of the CAQ activities, pointing out that Mediterranean and Black Sea aquaculture is at a turning point and underlined the relevance given to aquaculture development at international level.

3. He also stressed the importance of the meeting in order to provide advice to the CAQ in particular for what concerns the management of aquaculture also in consideration of the forthcoming 36th Session of the Commission in May 2012. The Chairperson stressed that the CMWG is particularly relevant in those years when the CAQ session is not held, in that it generates action proposals and scientific aquaculture management advice for the Commission.

4. Mr Fabio Massa, Technical Secretary of the CAQ of the GFCM Secretariat, welcomed the participants, recalled the importance of the meeting within the organisation of the work of CAQ subsidiary bodies and introduced and explained the main objectives of the CMWG. He also recalled the suggestion made by the GFCM Performance Review who, in relation to the work carried out, clearly stated that the CMWG should concentrate its activities also on emerging issues and priorities for aquaculture that are relevant for the Commission.

5. The Chairperson of the CAQ presented the Agenda of the meeting which was adopted with no change as reported in Appendix A. The list of documents is reported in Appendix C.

REVIEW AND FOLLOW-UP OF THE MAIN ACTIVITIES IMPLEMENTED AND CONCLUSIONS MADE IN 2011 BY THE CAQ WORKING GROUPS, SIPAM AND PROJECTS

6. This point of the Agenda was introduced by the Chairperson who then invited the Coordinators of the CAQ subsidiary bodies to briefly report on the activities, outputs and main achievements obtained in 2011-2012 and requested the CMWG to review the results. He acknowledged that a substantial amount of work was done during this intersessional period including several meetings (in Appendix D). As result of these activities the Chairperson concluded by inviting the participants to focus also on preparing advice for specific management issues to be presented to the General Fisheries Commission for the Mediterranean (GFCM) session for consideration.

Working Group on Sustainability on Aquaculture (WGSA)

7. Mr Pablo Avila, Coordinator of the WGSA, presented the activities of the WGSA implemented in 2011-2012 within the co-funded European Community (EC) Project "*Indicators for Sustainable Development of Aquaculture and Guidelines for their use in the Mediterranean (InDAM)"*. He recalled that WGSA-InDAM addressed the following: (i) assessment of the identified indicators reference system and follow-up on Pilot Studies (Tunisia and Turkey step two) and implement the step one in Morocco and Spain; (ii) preparation of guidelines on application of indicators in the Mediterranean and Black Sea area; (iii) update database hosted in SIPAM website and dissemination of InDAM results; and (iv) strengthen and consolidate cooperation on sustainable aquaculture.

8. Mr Avila recalled also the main results of *WGSA – InDAM Regional workshop on the pilot case studies and guidelines and application of sustainable indicators in aquaculture* which was held in Malaga, Spain from 14-16 November 2011[1]. The workshop aimed at: (i) share experience on indicators for the development of sustainable Mediterranean and Black Sea aquaculture; (ii) discuss relevance and definition of reference points; (iii) identify the different steps (I-III) to be used in future Pilot studies; (iv) provide advice to finalise the guidelines on indicators.

9. The Coordinator of WGSA emphasized two aspects for the 2012 workplan: (i) development of coordinated joint actions among WGs to maximize efforts and synergies; (ii) development of strategies and first step towards the proposal of a certification scheme of sustainable aquaculture within the GFCM Region as a tool at disposal of the GFCM member countries taking advantage on the previous experience, methodology, and achievements made all throughout the InDAM project. This would give the WGSA a stronger and wider scope towards the sustainability of Aquaculture in the GFCM Region.

10. Participants agreed that one of the main achievements of the WGSA is the list of regional indicators for each pillar of sustainability (economic, environmental and social) applicable within the GFCM region (Appendix F). This list was firstly discussed during the WGSA meeting held in 2010 in Malta and that was further revised during the WGSA meeting held in Malaga (2011).

11. The CMWG also agreed that the adoption of the regional indicators should be considered as a tool at disposal of the countries to plan and monitor the development of sustainable aquaculture and to harmonize strategies for its development. The list should also to be considered as a new generation system to guide, monitor and evaluate at regional level the progress of sustainable development of Mediterranean and Black Sea aquaculture.

12. In the discussion that followed, it was agreed that establishment of a system of indicators for sustainable aquaculture should also be adopted and implemented at national level and that additional

[1] See GFCM: CAQ/2012/CMWG-5/Inf.4.

effort should be put by the WGSA in the discussion and preparation of methodological sheets and thresholds for the main identified indicators. The procedural approach will be common. It was also clearly stated that procedures for its application can vary from country to country according to national legislation and agreement among the different stakeholders.

13. Mr Davide Fezzardi from the GFCM Secretariat briefly presented the Guidelines on indicators and highlighted the current status as well as the structure and contents[2]. The Guidelines are divided into five main parts: Part 1 provides the general background, purpose, main target users and inspiring principles of the Guidelines. Part 2 briefly introduces Mediterranean marine aquaculture highlighting features and main issues. This part also addresses the concept of sustainability and its dimensions from an aquaculture perspective. Part 3 provides a definition of indicator and related attributes. In Part 4 the selection and use of indicators is discussed together with the methodology for assessing indicators. Part 5 looks at other uses of indicators within the aquaculture sector. Finally the annexes include a glossary of the main technical terms used in these Guidelines and a minimum set of regional indicators to assess and monitor the sustainable development of aquaculture in the GFCM area.

14. Participants congratulated for the work done and pointed out that the draft prepared reflects the main expectations. It still needs some revision to be more user friendly and become an attractive document also for the Commission. Technical suggestions were made to improve the guidelines.

Working Group on Site Selection and Carrying Capacity (WGSC)

15. Mr Ioannis Karakassis, Coordinator of the WGSC, presented the activities carried out during 2011-2012 under the Project "*Developing site selection and carrying capacity for Mediterranean aquaculture within aquaculture appropriate areas"* (SHoCMed) funded with the contribution of the European Community (EC). Mr Karakassis briefly recalled the objective of SHoCMed and reported that it addressed the following: (i) preparation of guidelines for the establishment of Allocated Zones for Aquaculture (AZA); (ii) preparation of a draft Glossary on Site selection and Carrying capacity; (iii) Delphi exercise on Environmental Quality Standards (EQS); (iv) and the preparation of a review on the Allowable Zone of Effect (AZE). The Coordinator of the WGCS provided details about AZA, AZE and EQS and highlighted key issues which need to be addressed by the WGSC.

16. He informed participants that during the *WGSC – SHoCMed Workshop on the definition and environmental monitoring within AZE,* held in Malaga (November 2011) [3] the results of the second round of Delphi were discussed[4]. The regional experts appraised a number of EQS parameters for environmental monitoring including their critical and safe thresholds. The Panel also reviewed and agreed on the definition of AZE related terms and boundaries of impact of aquaculture activities, including guidelines, and recommended for its applications.

17. The WGSC Coordinator concluded by recalling that during the intersessional period the following technical documents were prepared (at present in draft version): (i) draft "Guidelines for establishment of Allocated Zones for Aquaculture in the Mediterranean countries" [5], (ii) "Environmental Quality Standards for Mediterranean Marine finfish farming: a Delphi approach", and (iii) "Allowable Zone of Effect for Mediterranean marine aquaculture"[6]. He also stressed for a prompt publication of the work carried out within the SHoCMed project.

18. Participants congratulated for the work done and a discussion over AZA, AZE and EQS followed. Regarding AZA Mr Massa recalled that the Commission adopted the concept of AZA and

[2] See GFCM: CAQ/2012/CMWG-5/Inf.8.
[3] See GFCM: CAQ/2012/CMWG-5/Inf.5.
[4] See GFCM: CAQ/2012/CMWG-5/Inf.10.
[5] See GFCM: CAQ/2012/CMWG-5/Inf.9.
[6] See GFCM: CAQ/2012/CMWG-5/Inf.11.

that currently Turkey is working at developing a proposal of a recommendation to establish AZA, to be shared with GFCM countries.

19. On the AZA Mr René pointed out that in order to avoid any sort of arbitration on the use of coastal areas, any guideline on establishing AZA should be approved at the highest level of decision-makers.

20. The CMWG agreed that at this stage the list of selected EQS indicators to be used in an environmental monitoring programme could be presented to the Commission without providing critical and safe thresholds for each selected parameter. This is because there still need to be a calibration work to be done through a participatory and procedural approach with relevant stakeholders in order to generate consensus for the adoption of any environmental monitoring programme. There is also a need to get data from farmers and assess the number of them that could pass the test of monitoring programme.

21. With reference to the publication, Mr Massa took the opportunity to inform participants that between GFCM and ASFA there are on-going discussions on establishing a 'GFCM *Occasional Papers'* series under which guidelines and other papers and documents produced by GFCM could be classified and quoted as such.

22. Mr Avila briefly presented the AZA guidelines for the establishment of AZA and highlighted structure and contents. He also informed that the present draft results from a reduction of a more extensive draft document keeping the same basic content and taking into consideration the recommendations given by participants during the meeting in Malaga (2011).

23. Participants congratulated for the excellent work done and proposed a series of technical recommendations in order to improve the draft to make it more users friendly and attractive also for target users.

24. It was concluded that a revised draft taking into considerations comments would be circulated among experts for feedback. It was also requested that both guidelines on Indicators and AZA should use the same format if possible.

25. With reference to "site selection and site monitoring", Mr Massa informed that Morocco as well as the WG on the Black Sea requested to receive training on Environmental Monitoring and on the Allocation Zones for Aquaculture. A discussion on the possibility to have either country or regional trainings to transfer results from SHoCMed was raised. Such trainings could be organized within the communication strategy of SHoCMed and of InDAM as well to disseminate results. Site selection is a long process and therefore training should provide only the principles and the main steps which need to be undertaken to evaluate carrying capacity and select suitable sites for aquaculture.

Information system for the promotion of aquaculture in the Mediterranean Sea (SIPAM)

26. The Coordinator of SIPAM, Mr Mohammed Salem Hadj Ali, presented the activities carried out by SIPAM in 2011-2012, that were reviewed during the Thirteenth Session of SIPAM held in Salerno (Italy), from 1-3 February 2012[7]. He informed that improvements were made to the IT components of the SIPAM Information System addressing the Production Statistics and data submission following the requirements of Recommendation GFCM/35/2011/6 and referred to: *Statistical Area; National Summaries and Tailor-Made reports; PDF receipt Submission system*; *and Capture Based Aquaculture*. Participants were also informed that SIPAM Production Centres data entry was released.

[7] See GFCM: CAQ/2012/CMWG-5/Inf.7.

27. Mr Hadj Ali added other SIPAM implemented activities including: a review of the Production Statistics data prior to 2008 hosted in SIPAM being carried out; "The Quick Start Guide for National Coordinators" updated and composed by two *ad hoc* sections on Production Statistics and on Production Centres data submission process; a GFCM SIPAM Aquaculture bulletin designed to present the main information related to aquaculture production; the improved SIPAM portal on GFCM aquaculture with the release of new thematic pages dedicated to the coastal lagoons.

28. Mr Hadj Ali remarked that since the adoption of the Rec. GFCM/33/2009/4 fifteen countries[8] submitted 267 records for the 2008 Production Statistics. As of 2009, 277 records from fourteen countries[9] were submitted and a total of 233 records from fourteen countries for 2010[10].

29. In support of SIPAM presentation, Ms Simona Sirago from the GFCM Secretariat delivered a short presentation on the general structure of the GFCM-SIPAM Aquaculture Bulletin, which aims at providing the main information related to the aquaculture production of each GFCM member country, as well as an overview of the Mediterranean and Black Sea aquaculture.

30. Mr Roberto Emma, GFCM IT System Analyst/Developer, presented details about the tools developed in SIPAM and in support to the activities carried out in the framework of the Working Groups of CAQ including: the adoption of the Delphi method, a Data Meta-Analysis tool to manipulate production statistics, the SIPAM Online Workplace and data exchange between the National Coordinators and the GFCM Secretariat.

31. The CMWG congratulated the SIPAM team for this important project and acknowledged the impressive progress made during the last two years in the development, web page layout, tools and functionalities of SIPAM within the framework of the GFCM.

32. Participants recognized that tools in SIPAM are still not well known and used by Member countries and the CMWG concluded that there should be a specific recommendation to suggest the use of SIPAM IT tools.

Mediterranean coastal lagoons management: interactions between aquaculture and capture fisheries (LaMed-2)

33. Ms Donatella Crosetti, visiting expert from the GFCM Secretariat, presented the activities of the project *Mediterranean coastal lagoons management: Interactions between aquaculture and capture fisheries* (LaMed-2). This project started in September 2010 and is one of the two components of the larger project LaMed "Strengthening cooperation on fisheries and aquaculture management in the Mediterranean and the Black sea" prepared by the GFCM secretariat and funded by the Directorate General for Fisheries and Aquaculture of the Italian Ministry for Agriculture and Forestry Policies.

34. Ms Crosetti informed that a network of Mediterranean experts on coastal lagoons from different countries was established to: (a) compile profiles for all the country's coastal lagoons, (b) prepare fact sheets for selected coastal lagoons, and (c) write a country report on coastal lagoons.

35. She reported that the meeting on "*Mediterranean coastal lagoons management: interaction between aquaculture and capture fisheries" w*hich was held in Cagliari, Italy, from 28-30 June 2011[11], was attended by experts from Albania, Algeria, Egypt, France, Greece, Italy, Montenegro, Morocco, Spain, Tunisia and Turkey. The meeting discussed and focussed in particular on, *inter alia*:

[8] 2008: Albania, Algeria, Croatia, Cyprus, Egypt, France, Greece, Italy, Malta, Montenegro, Morocco, Slovenia, Spain, Tunisia, Turkey
[9] 2009: Albania, Algeria, Croatia, Cyprus, Egypt, France, Italy, Malta, Montenegro, Morocco, Slovenia, Spain, Tunisia, Turkey
[10] 2010: Albania, Algeria, Bulgaria, Croatia, Cyprus, Egypt, Malta, Montenegro, Morocco, Romania, Slovenia, Spain, Tunisia, Turkey
[11] See GFCM: CAQ/2012/CMWG-5/Inf.3.

biodiversity and conservation, stock enhancement, nursery areas, eel management, and environmental and economic issues. The meeting identified critical points and suggested priorities for a sustainable management of coastal lagoons, and urged the preparation of an integrated plan of action for the sustainable development of aquaculture and capture fisheries in coastal lagoons in the GFCM area. She concluded her presentation informing that the first draft technical document "*Mediterranean coastal lagoons: sustainable management and interaction among aquaculture, capture fisheries and environment"* was prepared within the LaMed-2 first phase and was circulated among participants[12].

36. Participants congratulated GFCM Secretariat and network of experts on LaMed about the work done in lagoons. It was suggested to take advantage from methodologies and lessons learnt from other projects such as InDAM, in particular as far as indicators are concerned.

Working Group on Marketing on Aquaculture (WGMA)

37. Mr Ferit Rad, Coordinator of the WGMA, presented the activities which were implemented in transversal way in 2011 with WGSA and SIPAM, in particular the participation in Pilot Actions and work related to Economic Indicators: identification of methodology; data collection for performance assessment; preparation of methodology sheets for economic indicators; and participation in the identification of regional economic indicators. Mr Rad added also the update of the Market Section within the SIPAM portal and Market data reporting which are part of the follow up of the MedAquaMarket Project.

38. Mr Rad pointed out that the issues on Producers' Organizations (POs) should be further considered by the CAQ. He stressed that even though there is a clear trend in favor of large-scale marine cage operations in Greece, Turkey and Spain, Mediterranean and Black Sea aquaculture is made of small to medium-scale farms who are in need to be supported by the POs on a range of issues including marketing and market promotion. Specifically, 469 out of 575 (82%) farmers producing sea bass and sea bream reported in MedAquaMarket are considered small-scale in that they produce maximum 500 tonnes/year each[13]. The CMWG agreed to add this to the Agenda as a point of discussion which could generate specific issues to be addressed.

39. Furthermore two proposals as follow-up of MedAquaMarket project[14] recommendations were presented:

- **Proposal I**: Strengthening the role of aquaculture producer organizations in regulating and promoting markets (APO-Med). *Objective*: To gain a clear understanding of the status and structure of producer organizations in the Mediterranean and to provide insights into establishing proper legal framework to strengthen the organizational capacities of producer organizations for regulating and promoting markets (all GFCM area).
- **Proposal II**: Capacity Building for Market Access (Cap-Med). *Objective*: Facilitate access of small- to medium-scale aquaculture producers into modern marketing chains by capacity building for marketing and meeting market-requirements (in Turkey).

40. The CMWG appreciated the proposals and requested Mr Rad to develop draft Terms of Reference to organize the Workshop on "Organizational capacity and strengthening the role of aquaculture producers' organizations and farmers in marketing and market promotion" at GFCM level in 2013 (Appendix E).

[12] See GFCM: CAQ/2012/CMWG-5/Inf.12.
[13] Barazi-Yeroulanos, L. 2010. Synthesis of Mediterranean marine finfish aquaculture – a marketing and promotion strategy. Studies and Reviews. General Fisheries Commission for the Mediterranean. No. 88 Rome, FAO.2010: 198p.
[14] See GFCM: CAQ/2012/CMWG-5/Inf.13.

Working Group on the Black Sea

41. Mr Massa informed participants about the "*First meeting of the* ad hoc *Working Group on the Black Sea (WGBS)"* which was held in Constanta, Romania, from 16-18 January 2012[15]. He reported that during the meeting the WGBS made a general overview of the current situation of fisheries and aquaculture in the Black Sea region. Specifically, the WGBS focussed on the importance of the aquaculture sector in the Black Sea countries and agreed on its potential role in increasing fisheries production in the area. Discussions covered also the potential development of both brackish water and marine aquaculture given the availability of water resources and suitable environmental characteristics.

42. Mr Massa also reported that the WGBS identified the main priority needs for developing brackish water and marine aquaculture in the Black Sea countries. Finally Mr Massa stated that the first meeting of the WGBS addressed difficulties and constraints to reach an appropriate level of development of aquaculture allowing the improvement of farming technologies and increase of production capacity.

PRIORITY ISSUES FOR REGIONAL AQUACULTURE DEVELOPMENT

43. The Chairperson introduced this point of the agenda highlighting the need to address the following emerging issues on the basis of the working notes prepared by the GFCM Secretariat: (1) farmers and Producers' Organizations (POs), (2) certification and traceability in aquaculture, (3) aquatic animal pathologies within regional biosecurity, and (4) genetics in aquaculture. The Chairperson invited Mr Fezzardi to present the four documents and participants to contribute to the discussion.

44. ***Farmers and Producers' Organizations (POs)***. The importance of POs (*latu sensu*) as institutionalized support to aquaculture farmers and a means to access knowledge, build or improve technical/managerial capabilities and to promote awareness and commitments with respect to sustainable and responsible food production, was stressed. POs would contribute to the development of a market-focused, consumer-responsive, competitive and sustainable aquaculture industry and there is a need to strengthen their role in regulating and promoting markets. Still there are scarce information on POs, farmers' and other similar organizations within the GFCM area. A survey of POs and farmers' organizations was proposed.

45. Participants welcomed the initiative and stressed that a survey of Mediterranean and Black Sea POs and farmers would be a good starting point and data from farms is also needed. POs could also be instrumental in help addressing the unreported aquaculture issues. The CMWG concluded that in consideration of the important role played by the farmers and POs at different level in regulating market, GFCM should address priorities and promote sustainable development such best practice issues. GFCM should also support the POs and farmers by promoting cooperation among countries. CMWG considered that this initiatives will be included within the activities of WGMA.

46. ***Certification and traceability in aquaculture***. The main aspect related to certification and traceability were presented and the increasing importance that certification and traceability play for the aquaculture industry, especially in relation to food safety and security, and market access, was also highlighted. It was reported that FAO prepared guidelines for the development, organization and implementation of credible aquaculture certification schemes which were approved by the 29th Committee on Fisheries (COFI - Rome, 31 Jan–4 Feb 2011). There is now a need to provide assistance for building the capacity and enhancing the ability of stakeholders to participate in developing and complying with aquaculture certification schemes consistent with such guidelines. Finally the participants emphasized the importance of traceability for (1) food safety, (2) transparency with

[15] See GFCM: CAQ/2012/CMWG-5/Inf.6.

consumers, and (3) sustainability, as well as (4) for accessing international markets e.g. the EU but also domestic markets in a foreseeable future.

47. The CMWG acknowledged the increasing importance played by certification and traceability in aquaculture as well as the FAO guidelines in response to trade barrier issues related to certification. CMWG concluded that GFCM should support member countries in dealing with certification and aquaculture. It was also proposed that the initiatives on POs and farmers and certification-traceability could be linked in that POs and farmers' organizations could play a key role in promoting aquaculture certification. CMWG considered that this initiatives will be included within the activities of WGSA.

48. ***Aquatic animal health and biosecurity***. The main issues related to aquaculture and aquatic animal health and biosecurity were presented. The 29th Committee on Fisheries underlined the necessity for improving biosecurity in aquaculture, with particular regard to aquatic animal diseases and the risk of spreading pathogens from aquaculture into the wild. Sanitary and biosecurity measures have been extensively treated and reviewed in the region under the national health legislations at different level, however a regional situation for implementing legislation or regulation about these subjects in the Mediterranean and Black sea countries it is not yet clear. The CMWG stressed that aquatic animal health programmes and biosecurity measures should be considered and harmonized at regional level to minimize the risks of pathogen spreads and newly emerging disease which will continue to threaten sustainability of aquaculture sector and biodiversity.

49. Ms Giovanna Marino from ISPRA (National Italian Institute for Environmental Protection and Research) recalled that for the case of EU countries health legislations had been addressed and in particular by the Directive 2006/88. It was recalled the importance of aquatic animal diseases and it was stressed the increasing occurrence of epizootic diseases at Mediterranean level (e.g. Nodavirus) in both cultured and wild stock, as in many countries over the world. The primary objective of biosecurity arrangements is to prevent the spread of exotic pathogens mainly associated to the introduction of exotic species (trans-boundary aquatic animal diseases - TAADs), or for the appearance of new diseases.

50. The CMWG also highlighted that within animal health programmes, risk analysis is an important component and should be addressed and developed at country level, together with emergency response systems (national, regional and international levels), and enforcement of public health services.

51. The CMWG suggested that the following issues should be considered at Mediterranean and Black Sea level: i) collection of information on: aquatic animal programmes; legislation and policy; emergency plans; diagnostic; quarantine and inspection services; disease surveillance; monitoring and reporting; national pathogen lists; in GFCM countries, and: ii) the means to implement them within a planned regional strategy.

52. ***Genetics in aquaculture***. The issues related to genetics in aquaculture and stocking enhancement were presented and discussed. To avoid a loss of genetic diversity, marine aquaculture should consider the lessons learnt in freshwater environments, the more recent sustainable technology applied in aquaculture and the interaction between capture fisheries and aquaculture.

53. One key issue in Mediterranean marine aquaculture is the genetic improvement of cultured species through breeding programmes, which are already been carried out in some countries for some species. Ms Crosetti pointed out that "genetics in aquaculture" is a wide term that includes several different issues, from genetic characterisation to breeding programmes and genetic impact on natural population of escapees from culture facilities and specimens from restocking actions. No genetically modified organisms (GMOs) aquatic animals are allowed to be produced at commercial level, and are only produced for research purposes. The reporting of escapees' events is still not compulsory in all Mediterranean countries and the entity of the problem is largely unknown. Certainly all means should be considered to minimise escapees and to undertake responsible restocking actions.

54. CMWG suggests that the following issues should be timely considered in the Mediterranean and Black Sea region: (i) research activities on the genetic characterisation of the most important cultured species in the Mediterranean region; (ii) genetic traceability of cultured stocks; (iii) guidelines for aquaculture practices that minimise the genetic impact of aquaculture activities (use of local broodstock, use of new technologies to minimize escape events, etc.); (iv) selective breeding programmes to improve culture performances, and (v) dissemination of information to farmers to raise their awareness on the importance of these issues.

RECOMMENDATIONS FOR AQUACULTURE MANAGEMENT

55. The fifth CMWG reviewed, discussed and made a synthesis of the follow-up of the main advice and recommendations of the CAQ subsidiary bodies and projects on Mediterranean aquaculture.

56. In consideration of the discussions made, the main recommendations made are hereunder summarised and are to be put forward for the consideration of the 36th Session of the Commission.

Key aspects related to SUSTAINABILITY OF AQUACULTURE

- Indicators procedural approach and methodology developed by CAQ should be used for the final selection of indicators and their implementation within GFCM Member countries to monitor the sustainable development of aquaculture in their countries.
- Administrations should play an active role in the adoption of the sustainable reference system of indicators. Efforts should be made towards increase capacity of administrators and farmers as end-users of indicators and reference system.

Proposed action for management advice

The regional indicators for sustainable aquaculture identified and selected for the governance and for the different dimensions of sustainability (economic, environmental and social), and reported in Appendix F, should be adopted at regional level and considered as a tool at disposal of GFCM countries for planning and monitoring the development of sustainable aquaculture at Mediterranean and Black Sea level, and should be regularly monitored within a regional harmonized strategy and framework.

Key aspects related to SITE SELECTION AND CARRYING CAPACITY

- The implementation of AZA for marine fish cage culture should be confirmed as a priority for sustainable aquaculture development in the coastal areas of GFCM member countries: AZA is a matter of governance in that it is an expression of the Government commitment to support the industry.

- Setting up AZA should possibly be carried out within an Integrated Coastal Zone Management framework to assure full consistency and compliance with existing and future uses of coastal area. AZA should also be considered an area where all administrative procedures are shortened and the farming license is given in a relatively short time.

- After setting up an AZA, specific indicators of pressure should be developed: e.g. eutrophication of marine waters and indicators for the impact of coastal activities. Within a monitoring scheme, there is a need to measure the cumulative effect of other human activities.

Proposed action for management advice for marine fish cages aquaculture

For marine fish cages aquaculture Environmental Monitoring Programmes should be included in the national legislation and should be implemented in the areas surrounding the fish farms or in the immediate vicinity of the farms called "allowable zone of effect"*;*

The selected EQS variables for an environmental monitoring programme should at least include the following:

(a) Total Organic Matter in Sediments (%);
(b)Total Nitrogen in Sediments (%);
(c) Redox Potential Eh (mV);
(d) Percentage of Capitellid polychaetes over macrofaunal biomass (%);
(e) Gas bubbles;
(f) Dissolved Oxygen (mg/l);
(g) Turbidity (m);
(h) Percentage of silt/clay in sediments (%);
(i) Litter surrounding area.

The above variable should be monitored according to the specification given in Appendix G.

Key aspects related to COASTAL LAGOON MANAGEMENT

- The degradation that occurred in many coastal lagoons was determined by the lack of or inadequate management plans, including a no clear legal regulatory framework. The lack of management determined also a negative impact on fishing communities and consequent loss of traditional knowledge, and on biodiversity.
- The management approach for coastal lagoons should be in line with the main principles of the Code of Conduct of Responsible Fisheries (CCRF) and in particular with the provisions articles referring to: aquatic ecosystems, fisheries habitats, multiple uses of the coastal zone and integrated coastal zone management, participation of fishworkers, environmental and other interested organizations, the role of artisanal fisheries and aquaculture including culture based aquaculture, in accordance with the international law.
- The management approach of coastal lagoons should also be based on the principles stated in international conventions and declarations on the protection of coastal lagoons areas. More specifically it should address the protection of sensitive habitats and conservation of biodiversity and particular emphasis should be given to the role played on conservation issues by local communities in coastal areas.
- The activities of traditional aquaculture and artisanal capture fisheries should be considered a priority within the management plans of Mediterranean coastal lagoons considering the ecological and economic services provided by these traditional activities.
- The traditional local knowledge in the management of coastal lagoons and the contribution of capture fisheries and aquaculture should be considered as an element of common interests for Mediterranean and Black Sea communities which should be shared and capitalized among coastal countries. Furthermore its positive impact of the lagoon management should be assessed and upgraded.

- A common Mediterranean strategy for the sustainable management of aquaculture and capture fisheries in coastal lagoons areas should be agreed upon.
- A Mediterranean management plan for coastal lagoon areas should be implemented taking into consideration the different dimensions of sustainability (Economic, Environment and Social dimensions also taking into consideration Governance) and within Integrated Coastal Zone Management. In addition the participatory and consensual approach among the different users should be considered.

Proposed action for management advice

GFCM should propose guidelines for a management plan for Mediterranean coastal lagoons which should reflect the priorities, conclusions and recommendations given by the GFCM-CAQ-LaMed Meeting on the interaction between aquaculture and capture fisheries in Mediterranean coastal lagoons (Cagliari, 28-30 June 2011 – GFCM). These guidelines should address the conservation of traditional aquaculture and artisanal capture fisheries including traditional local knowledge, the prevention of any further degradation of coastal lagoons and restoration of the environment. The management plan for coastal lagoon areas should be considered as a priority in the agenda of the Mediterranean countries and by the GFCM at the most appropriate level.

Key aspects related to the reporting on aquaculture data collection and to the SIPAM in the Mediterranean and Black Sea area

- Information on aquaculture production should be accessible. Production Statistics aquaculture data – which are guaranteed by the SIPAM National Coordinator, do not offer any particular concern in terms of sensitivity. Therefore such information could also be accessible by third parties such as farmers or any other interested stakeholder upon registration to the SIPAM system.

Proposed action for management advice

All aquaculture data of GFCM Countries stored in the SIPAM system should be accessible to all NCs irrespective of their nationality. Such data sharing would foster and increase the cooperation among Countries and would contribute to perform more accurate analyses when assessing aquaculture production at different levels.

The Commission should identify specific policy and/or procedures on aquaculture data confidentiality and data access which at present is limited to the GFCM Secretariat and to the National Coordinators.

The date of 30 September was deemed appropriate as new deadline for submitting aquaculture data to GFCM. The current different deadlines on aquaculture data submission for the different institutions (30 June for GFCM; 31 August for FISHSTAT; and 31 December for EUROSTAT) can generate an excessive overload for some SIPAM NCs with consequences on data accuracy.

Although aquaculture data collection improved considerably in the last years, underestimation, lack of accuracy and un-reporting still occur especially in those areas affected by notable misreporting. The issues of unreported aquaculture need to be properly addressed.

The Terms of Reference for the SIPAM NCs should be updated according to the rules required by the aquaculture data submission (GFCM: CAQ/2012/CMWG-5/Inf.7).

Additional formal effort should be put to finalize the registration of all SIPAM NCs and ensure the timely data submission to the GFCM through SIPAM also according to the technical requirements specified in the Rec. GFCM/35/2011/6.

Compliance issue of aquaculture data and information need to be strengthened and further considered by the Compliance Committee (CoC).

PRELIMINARY WORKPLANS FOR 2012-2013 OF THE WORKING GROUPS AND SIPAM

57. This point of the agenda was introduced by the Chairperson who invited the Coordinators to present the workplan of activities. It was recalled that the SHoCMed and InDAM projects are funded on a yearly basis and therefore some of the activities will also be carried out in 2013.

58. The Coordinators and GFCM Secretariat presented the workplans of the CAQ subsidiary bodies and projects that are hereunder reported:

Workplan of the Working on Sustainability on Aquaculture (WGSA)

- Implement new pilot studies step I according to the agreed methodology for the selection and use of indicators on marine and land-based coastal aquaculture.
- Develop an efficient and effective communication and dissemination strategy as well as training built around the results of INDAM and the application of indicators for sustainable aquaculture.
- Implement communication and dissemination strategy as Step III in Turkey. Based on the final output containing the following items:
    a. InDAM Guidelines.
        i. Methodology Sheets.
        ii. Reference System.
        iii. Traffic Light Approach
- Identify reference points and standards for the selected indicators (Economic and Environment and Social dimensions also taking into consideration Governance). To be included within the methodological sheets.
- Test the indicators reference system at local level: follow-up of the pilot studies with: step II Morocco and Spain, step III Tunisia.
- Identify strategy for involvement of concerning parties in the use of indicators as appropriate.

Workplan of the Working Group on Site Selection and Carrying Capacity (WGSC)

- Organize regional trainings on site selection and site management to upgrade the capability of technicians and other key aquaculture development stakeholders.
- Organize regional workshop on the definition of *reference points* for EQS and monitoring the aquaculture activities within allowable zone of effect of aquaculture.
- Design and implement programme of dissemination of the technical results and outcomes of SHoCMed activities.
- Establish an IT forum platform on Site Selection and Carrying Capacity aiming at strengthening the existing network of WGSC experts by facilitating data and knowledge sharing activities.

- Carry out an EQS calibration exercise involving various countries and setting up of a database hosted by the SIPAM portal.
- Prepare a harmonized monitoring scheme for Mediterranean and Black Sea.

Workplan of Information System for the Promotion of Aquaculture in the Mediterranean (SIPAM)

- Consider a "testing period" of one year for the assessment of data submission on Production Centers.
- Finalize the new portal for Market Data submission according to Rec. GFCM/35/2011/6.
- Activate the SIPAM online workspace for discussion among expert, and focus on the Production Centre data submissions.
- Release the GFCM SIPAM Aquaculture Bulletin on yearly basis.
- Integrate SIPAM activities on aquaculture data statistics and information systems with the new established GFCM Working Group on Black Sea.
- Reactivate the "Research and Development Programmes" databank.
- Update the available information on aquaculture legal and regulation aspects and make them available online.

Workplan on Lagoon management and interaction between aquaculture and capture fisheries

- Improve the cooperation among experts identified as target group for Mediterranean coastal lagoons.
- Identify indicators for the sustainable development of aquaculture and capture fisheries activities within coastal lagoons.
- Finalize the database on the coastal lagoons based on the country report and data sheets prepared during the first phase of the project.
- Finalize and publish the review on Mediterranean coastal lagoons.

Workplan of the Working Group on Marketing of Aquaculture Products (WGMA)

- Work with WGSA on the Indicators for sustainable aquaculture related to economic and marketing issues.
- Work with SIPAM for aquaculture marketing data and issues related to the data surveys on economic aspects.
- Carry out a regional survey and preparation of a review of legislation and present status of producers' organizations (POs) in GFCM member countries.
- Organize a workshop with the POs and farmers on "Organizational capacity and strengthening the role of aquaculture producers' organizations and farmers in marketing and market promotion"

Workplan of the Working Group on Black Sea (WGBS)[16] (aquaculture component)

- Organize a Workshop/Training on classification and zoning for mollusk culture as well as certification protocols (Black Sea).
- Implement regional initiatives to harmonize environmental monitoring programme on aquaculture and on Allocation Zones for Aquaculture.

[16] Workplan on Black Sea initiatives is still to be updated and finalized with the WGBS and has been done according to the first meeting of the *ad hoc* WGBS (Constanta, Romania, 16-18 January 2012).

- Undertake pilot studies for coastal aquaculture projects (including new species for aquaculture and new technologies);
- Set up an inventory of the existing and on-going research and projects on aquaculture in the Black Sea countries.

Meetings and trainings scheduled for 2012-2013

TITLE	PERIOD	PLACE
WGMA Workshop on "Organizational capacity and strengthening the role of aquaculture producers' organizations and farmers in marketing and market promotion in marketing and market promotion"	TBD	TBD
SIPAM – 14th Annual Meeting	November 2012	Hurghada, Egypt
WGSA – WGMA - WGSC – InDAM - SHoCMed Workshops on the identification of *reference points* for economic and environmental indicators on aquaculture	December 2012	TBD
WGSC –SHoCMed Workshop – Training on the site selection, Allocation Zone for Aquaculture and site management for coastal marine aquaculture.	November 2012	Morocco
WGBS-WGSC SHoCMed Workshop Training on the site selection, Allocation Zone for Aquaculture and site management for coastal marine aquaculture (*ad hoc* workshop / training for the Black Sea)	December 2012	TBD
CAQ- Workshop - on "Black Sea aquaculture species diversification"	TBD	Trabzon, Turkey
Eighth Session of the Committee on Aquaculture of GFCM	March 2013	Paris, France

59. This list does not include the meetings of the CAQ-InDAM follow up Pilot Studies in Tunisia, Spain, Morocco and Turkey and the new Pilot projects in Croatia, Italy and Montenegro that will be carried out at local level with the support of the Secretariat, as well as the it does not include the initiatives in cooperation with the Fundación Observatorio Español de Acuicultura (FOESA), AquaMed and other research institutions and projects collaborating with CAQ.

FIRST GFCM FRAMEWORK PROGRAMME

60. Mr Massa presented the first GFCM Framework Programme (FWP) in support of the Task Force activities and follow-up of the Performance Review. He went through the general features, structure and strategy of the FWP which will last five years (2013-2018) and includes seven working programmes. The FWP will be presented at the 36th Session of the Commission for approval and in the meantime the FWP has received a positive feedback from several GFCM Members. The FWP was developed by the GFCM Secretariat and all future activities will need to be nested under the FWP.

REGIONAL CONFERENCE ON SUSTAINABLE AQUACULTURE IN MEDITERRANEAN AND BLACK SEA

61. Mr Massa introduced a draft proposal for the organization of a regional Ministerial Conference for the sustainable development of aquaculture to be organized within the framework of the GFCM. He informed the CMWG that in consideration of the impressive increase of marine aquaculture production over the last decades, the aim of this Conference should be the creation of solid basis for the sustainable development of aquaculture in the region and in establishing a

cooperative governance framework within the GFCM area of competence. He also informed that such proposal for the Conference will be reported to the next Session of the Commission in Marrakesh, Morocco, in May 2012.

62. The CMWG welcomed the proposal in particular for the relevance that such initiative can play in support of the aquaculture sector and for the establishment of a harmonized strategy in consideration of the emerging issues on marine aquaculture and in order to establish a new clear national commitment for aquaculture development. The CMWG considered that some additional effort should be made in the finalization of the proposal and expressed its full availability for the improvement.

COOPERATION OF THE CAQ AND ITS SUBSIDIARY BODIES WITH RELEVANT INSTITUTIONAL PARTNERS AND AQUACULTURE RESEARCH INSTITUTES

63. The Chairperson introduced this point of the agenda and recalled that with reference to the cooperation SIPAM, as GFCM portal on aquaculture, could to be used also as portal for strengthening the cooperation and that in many occasion can be considered as a tools to insert information from other projects useful for the relevant stakeholders. SIPAM can also be used to share information and databases with other projects focussing on sustainable aquaculture within the Mediterranean and Black Sea.

64. More specifically Mr René referred to some on-going projects, particularly to the AquaMed project[17] that was presented by Ms Marino. AquaMed is a EU funded concerted action among 12 countries aimed at identifying research needs in aquaculture and at building a strategic agenda for Mediterranean countries for sustainable aquaculture development. A database on Mediterranean research institutions and projects was developed within the project, and a questionnaire survey was performed to identify similarities and difference between countries, with reference to their state of (i) aquaculture development, and (ii) research in aquaculture, and to identify research needs in aquaculture in order to make recommendations for a Mediterranean research agenda.

65. Mr René informed about the idea that the AquaMed database could be hosted in the long term on the SIPAM portal with the support of EU. It was also pointed out that there would be a need to check compatibility between SIPAM and AquaMed IT platform as a prerequisite for hosting it.

66. Ms Marino suggested that the Delphi approach will be used to address research needs and gaps within the Italian platform, and Delphi will be proposed to the other AquaMed partners in the next AquaMed meeting. Participants concurred that having a common methodology as well as a dynamic tool as Delphi, would be key to proceed with the research agenda for Mediterranean aquaculture. Additional cooperation should be strengthened among research institutions and CAQ for the application of this innovative approach.

67. The CMWG discussed also on the positive results achieved by the cooperation between the WGSA and the Fundación Observatorio Español de Acuicultura (FOESA) and with the Andalusian Aquaculture Technology Centre (Cetaqua) foundation from Spain and suggested that such fruitful cooperation should continue.

68. Mr Rad presented a systematic approach for policy development for the economic dimension of sustainable aquaculture using the principles, criteria and indicators (PCI method) identified within the InDAM project. Taking into consideration that sustainability is the main policy framework for aquaculture development, the identified principles and criteria within InDAM project were translated to strategies (principle) and action plans (criteria) to reach policy goals. Indicators selected for criteria

[17] http://www.aquamedproject.net

could also be used to monitor the trend in reaching the objectives for action plans. He further underlined that this systematic approach could also be used for other dimensions of sustainability to come up with a framework strategy.

69. The CMWG congratulated for the approach identified and stressed the usefulness of this vision when working on sustainability issues related to aquaculture development. The CMWG recalled also that during 2011 no WGMA meetings were carried out, however it proposed that Mr Ferit Rad be reconfirmed as WGMA Coordinator.

ADOPTION OF THE REPORT

70. The report was adopted by the participants on 9 March 2012.

Appendix A

AGENDA

1. **Opening of the meeting**
2. **Adoption of the agenda and meeting arrangements**
3. **Review and follow-up of the main activities implemented and conclusions made in 2011 by the CAQ Working Groups, SIPAM and projects**
4. **Priority issues for regional aquaculture development**
5. **Recommendations for aquaculture management**
6. **Preliminary workplans of the Working Groups and SIPAM for 2012-2013**
7. **First GFCM Framework Programme 2013-2018**
8. **Regional Ministerial Conference on Sustainable Aquaculture in the Mediterranean and Black Sea**
9. **Cooperation of the CAQ and its Subsidiary Bodies with relevant institutional partners and aquaculture research institutes in the Mediterranean and Black Sea, networks and projects**
10. **Adoption of the report**

Appendix B

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Appendix C

List of documents

GFCM: CAQ/2012/CMWG-5/1	Provisional Agenda
GFCM: CAQ/2012/CMWG-5/2	Extensive summary of the intersession activities of CAQ 2011-2012 and proposed workplan for 2012-2013
GFCM: CAQ/2012/CMWG-5/Inf.1	Provisional list of documents
GFCM: CAQ/2012/CMWG-5/Inf.2	Provisional list of Participants
GFCM: CAQ/2012/CMWG-5/Inf.3	Report of the meeting on Mediterranean coastal lagoons management: interaction between aquaculture and capture fisheries (Cagliari, Italy, 28-30 June 2011)
GFCM: CAQ/2012/CMWG-5/Inf.4	Report of the WGSA - InDAM Regional Workshop in the pilot case studies and guidelines and application of sustainable indicators in aquaculture (Malaga, Spain, 14-16 November 2011)
GFCM: CAQ/2012/CMWG-5/Inf.5	Report of the WGSC – SHoCMed Workshop on the definition and environmental monitoring within Allowable Zone of Effect (AZE) of aquaculture activities within the Mediterranean countries (Malaga, Spain, 16-18 November 2011)
GFCM: CAQ/2012/CMWG-5/Inf.6	Report of the First meeting of the *ad hoc* Working Group on the Black Sea (Constanta, Romania, 16-18 January 2012)
GFCM: CAQ/2012/CMWG-5/Inf.7	Report of the 13th session of the Information System for the Promotion of Aquaculture in the Mediterranean (SIPAM) (Salerno, Italy, 1-3 February 2012)
GFCM: CAQ/2012/CMWG-5/Inf.8	Guidelines on the application of indicators for sustainable aquaculture in Mediterranean and Black sea countries (Draft)
GFCM: CAQ/2012/CMWG-5/Inf.9	Guidelines for establishment of Allocated Zones for Aquaculture (AZA) in the Mediterranean (Draft)
GFCM: CAQ/2012/CMWG-5/Inf.10	Environmental Quality Standards for Mediterranean marine finfish farming based on the response of experts to a Delphi questionnaire (Draft)
GFCM: CAQ/2012/CMWG-5/Inf.11	Allowable Zones of Effect for Mediterranean marine Aquaculture (AZE) (Draft)
GFCM: CAQ/2012/CMWG-5/Inf.12	Mediterranean coastal lagoon: sustainable management and interactions between aquaculture, capture fisheries and environment (Draft)
GFCM: CAQ/2012/CMWG-5/Inf.13	Farmers and Producers Organisations
GFCM: CAQ/2012/CMWG-5/Inf.14	Aquaculture certification and traceability
GFCM: CAQ/2012/CMWG-5/Inf.15	Aquatic animal diseases within Regional biosecurity
GFCM: CAQ/2012/CMWG-5/Inf.16	Genetics and conservation in Mediterranean aquaculture
GFCM: CAQ/2012/CMWG-5/Inf.17	GFCM Framework Programme (2013-2018)
GFCM: CAQ/2012/CMWG-5/Inf.18	Proposal for an Aquaculture Ministerial conference (Draft)

Appendix D

List of the meetings of CAQ convened in 2011-2012

- WGSA-DAP-FOESA InDAM Pilot Project in Spain on the identification of indicators for sustainable aquaculture (Puerta Santa Maria, 23-25 May 2011);
- LaMed-2 – Meeting on the Interaction between aquaculture and capture fisheries in Mediterranean coastal lagoons in Italy (Cagliari, 28-30 June 2011);
- WGSA-INRH-InDAM Pilot Project in Turkey (second step) for the assessment of selected indicators for sustainable aquaculture (Muğla, 21-25 September 2011);
- WGSA-INRH-InDAM Pilot Project in Tunisia (second step) assessment of selected indicators for Sustainable aquaculture (11 June 2011; 28 September 2011; 11 October-3 November 2011);
- WGSA-INRH-InDAM Pilot Project in Morocco on the identification of indicators for sustainable aquaculture (M'diq, 26-27 October 2011);
- WGSA – InDAM Regional workshop on the pilot case studies and guidelines and application of sustainable indicators in aquaculture in Spain (Malaga, 14-16 November 2011);
- WGSC – SHoCMed Workshop on the definition and environmental monitoring within Allowable Zone of Effect (AZE) of aquaculture activities within the Mediterranean countries in Spain (Malaga, 16-18 November 2011);
- Thirteenth Session of SIPAM in Italy (Salerno, 1-3 February 2012);
- The "First meeting of the *ad hoc* Working Group on the Black Sea (WGBS)" in Romania (Constanta, 16-18 January 2012).

Appendix E

CAQ-WORKING GROUP ON MARKETING OF AQUACULTURE PRODUCTS

PROPOSED WORKSHOP FOR 2013

Workshop on "Organizational capacity and strengthening the role of aquaculture producers' organizations and farmers in marketing and market promotion"

Objectives: To gain a clear understanding of status and structure of producers' organizations in the Mediterranean and to promote organizational capacities of fish farmers' organizations for marketing and promotional activities.

Scope:

- Discuss and analyze the present status and structure of fish farmers' organizations (Cooperatives, associations or producers' organizations) in GFCM convention area including legal aspects with stakeholders;
- Get feedback on a range of issues which have an impact on organizational capabilities and functioning of fish farmers' organizations with regard to collective marketing and promotional activities; and
- Generate recommendations for strengthening the organizational capacities of fish farmers' organization for collective marketing and promotional activities.

Appendix F

LIST OF REGIONAL INDICATORS

ECONOMIC DIMENSION				
PRINCIPLE	**CRITERIA**	**N°**	**INDICATORS**	**Ref. Values**
Strengthen financial management of enterprises	Level of profitability	1	Production Value Index (PVI)*	- See trend in value, ±
Strengthen consumer responsive and market oriented aquaculture	Use of branding or quality assurance schemes/labels	2	Use of quality certification schemes by independent bodies for target markets*	- See trend in percentage of enterprises having quality certification scheme/s
Strengthen risk assessment and crisis management capabilities	Level of diversification	3	Number of products*	- See trend in no. of cultured species, size categories and other differentiated or value added products, ±
Strengthen risk assessment and crisis management capabilities	Level of collective marketing and actions	4	Existence of collective actions (collective marketing, market promotion) by Producers Organizations**	- See trend in: - Number of promotional activities and/or -Volume of products marketed through collective marketing; ±
Strengthen financial management of enterprises	Level of profitability	5	Input/output Price parity*	- See trend in parity, ±

Note: * = Methodology sheet prepared
** = Methodology sheet still to be prepared

ENVIRONMENTAL DIMENSION				
PRINCIPLE	**CRITERIA**	**N°**	**INDICATORS**	**Ref. Values**
Minimize the global impact of aquaculture	Needs of natural resource for food production (pelagic fish and plants)	1	FCR Feed Conversion Ratio (kg food/kg fish)*	Sea Bass (350-400 gr): > 2.2/2.2-1.8/< 1.8 Sea Bream (300-350 gr): >2.1/2.1-1.6/< 1.6
Maintain the ecological service of ecosystems	Reduction of benthic environmental impact	2	Existence of criteria for the depth (m) of cage applied to site selection. Related to density. Ratio of depth and density (Depth (m)/ Density (kg/m3)	< 1.5 / 1.5 –2 / >2**
Minimize local impact on environmental conditions and biodiversity	Use of chemical products	3	Existence of a national monitoring programme to monitor antibiotics and other chemical residues	Yes/No
	Impact on benthic habitats and communities	4	Implementation of a monitoring system for the evaluation of the level of impact on benthos	Yes/No
	Biological impact on communities	5	Reporting of escapees (number of escape events)	Number of escape events

Note: * = The FCR Ref. Values varies according to the farmed species
** = Higher fish density results in increased organic matter sedimentation, and higher depth would increase the dispersion

SOCIAL DIMENSION				
PRINCIPLE	**CRITERIA**	**No**	**INDICATORS**	**Comments**
Contribute to food security and food safety	Importance of fish availability and supply. Contribution to food security.	1	Relevance of fish produced for domestic markets	Consumption of national products (kg per capita) related to consumption of foreign products (kg per capita)
	Transparency of production process Transparency of production and trading process (*from Farm to the table*)	2	Existence of mechanisms for information with regard to the aquaculture production process and its compliance to regulations available and accessible to the public.	Existence and implementation of Labels according to Food Safety and traceability regulations.
Strengthen the role of the Producer Organizations (POs) and NGO's to improve image of aquaculture, social awareness and responsibilities	Importance of fish farmer organizations	3	Existence of strategies or initiatives developed by producers organizations towards the improvement of aquaculture image	% of the total budget of the POs, dedicated to aquaculture promotion and image building.
Strengthen corporate social responsibility	Quality of labour conditions	4	Existence of national legislation on employees' welfare fully applied by the aquaculture sector	Yes/No

GOVERNANCE				
PRINCIPLE	**CRITERIA**	**N°**	**INDICATORS**	**Ref. Values**
Strengthen integration of aquaculture in local development	Importance of development initiatives	1	Existence of Allocated Zones for Aquaculture (AZA) – (%) (number of farms in AZA/total number of farms *100)	0-25% Red; 25-75% Yellow; 75-100 Green
Promote participatory in decision making process	Level of stakeholders' participation	2	Existence of participatory mechanism in decision making processes	Yes/No
Strengthen research, information systems and extension service	Importance of research and training in aquaculture	3	Existence of funded research and development (R&D) programme and training on aquaculture development	Yes/No
Strengthen institutional capacities	Level of recognition of sustainable development	4	Existence of specific legislation governing aquaculture development in line with the principles of the CCRF	Yes/No
Aquaculture monitoring and reporting mechanism	Capacity of monitoring and reporting on aquaculture development	5	Existence of data collection and dissemination system	Yes/No

Appendix G

SELECTED EQS PARAMETERS

Total Organic Matter in Sediments (%)		
1	**Definition**	This variable provides an estimate of the organic content in the sediments beneath the aquaculture installation. For coastal aquaculture, major concerns are on discharge of wastes in the form of uneaten food and fish excretions which will especially have an effect on the benthos and species that are particularly sensitive to an increase in input of organic matter. Organic matter input is closely dependent on species, production, culture method, hydrography, feed type and management (Wu, 1995). The Organic Material (or loss on ignition, LOI) is determined as the weight loss of the dried sample after combustion for 6 h at 500°C (Kristensen & Andersen, 1987), regarding the units, 1% is equal to 10 mg/g sediment.
	Comments	Useful as general characteristic of site and cheap to do, it is considered clearly important because it correlates well with benthic results. There are no generally established safe limits and these will be context dependent. The interpretation of the data depends on the natural background levels. In a depository environment, the % OM will naturally be higher than in an area with strong currents. Measure should be taken at multiple distances from the farm and comparison should be made between several reference and farm sites.

Total Nitrogen in Sediments (%)		
2	**Definition**	Total Nitrogen (TN) is defined as the sum of organic nitrogen, nitrate, nitrite, and ammonia. The Nitrogen levels are elevated under fish farms as a result of diagenesis of the organic material settling on the seafloor. Although nitrate and nitrite are not released by the stocked organisms, and are not toxic to most marine organisms, they may help in determining the risk of eutrophication at a given site (GFCM, 2011). Total Nitrogen concentrations are expressed as % of N in sediment. The concentration can be referred to the whole 6 to 10 cm core or to the surface sediment (1 to 1.5 cm). It is measured in sediment samples using a CHN Elemental Analyzer according to the procedure described by Hedges & Stern (1984).
	Comments	Useful especially when used to compute C:N ratio an indicator of carbon quality, is used in Law 14 Feb 1997 for the Andalusian water quality regulation. It is considered pH and salinity dependent and some experts feel that no definite value can be stated for either cautionary or critical condition since baseline values differ between different sites in the same locality and between different localities.

Redox Potential or Eh (mV)		
3	**Definition**	The oxidation-reduction (redox) conditions in the surficial sediment depend on the degree of organic enrichment and therefore the measurement of Eh can be used as a proxy for the calculation of organic loading with the method described by Zobell (1946). The Eh decreases with the depth and with decreasing O2 concentration in the interstitial water. Negative redox-potential values are associated with anoxic conditions, i.e. degradation of the organic matter by anaerobic bacteria, which, in marine sediment, use mainly sulphate as electron acceptor and release hydrogen sulphide. Redox potential is measured by profiling an electrode down a sediment core to as deep as is necessary to detect the redox discontinuity layer (RPD).
	Comments	Experts considered it is as an important variable which is very widely used and there is potential for comparative studies. The main critique is that the Eh measurement is very variable due to sediment heterogeneity and the repeatability is rather low. Simpson *et al.* (2005) consider acceptable Eh error ranges of 20-40 mV.

Percentage of Capitellid polycaetes over macrofaunal biomass (%)		
4	**Definition**	*Capitella capitata* or (more correctly) the *Capitella* sp. complex is the most well known opportunistic organism found in heavily polluted (organically enriched) marine sediments (Pearson & Rosenberg, 1978). Although not all the species of the Capitellidae family are opportunistic, the high percentage of capitellids in a sample is almost certainly due to proliferation of the opportunistic species of this taxon. Capitellids are fairly easy to identify provided of course that the samples have been collected and the specimens have been extracted from the sediment. Therefore the cost for this indicator is higher than weighting the total biomass but considerably lower than that required for Shannon, number of species or AMBI.
	Comments	Most experts thought it as a relevant bioindicator, easy to calculate (for abundance as well). Some experts considered more relevant the situations with dominance of Capitellids or other indicators species (or families) such as the ITI group 4, than the % of Capitellids. Capitellids are usually indicators of high pollution levels that are well past a 'cautionary' stage. It was also suggested to be considered with reference to initial number.

Gas bubbles (outgassing)		
5	**Definition**	Outgassing i.e. the release of gas (H_2S or even CH_4) from the bottom sediments is a clear sign of anaerobic processes in the benthic environment, occasionally found beneath the cages mainly during the warm seasons of the year (Karakassis *et al*., 2002). It is an easy to observe environmental characteristic. The release of H_2S is considered as a risk for the farmed stock due to the toxicity of H_2S to most marine fish. However, it is worth noting that H_2S is rapidly oxidized in the seawater (ca 90% of it is removed from the bubbles after ascending 20m from the sediment surface).
	Comments	This would be a limit and critical situation that should be prevented in advance. If gas bubbles present, the critical conditions are reached. It is therefore too late. A good Environmental Monitoring Programme should prevent this type of situations. If the sediment is outgassing this is a clear indication that it is grossly overloaded with organic material. It can be helpful in some areas but gas bubbles should not be given a high priority in monitoring programmes. Monitoring programmes must exist in any case but the appearance of bubbles is a bad signal. No experts provided values for thresholds in this variable. It is considered as a qualitative indicator that should be recorded in the framework of EMP.

Dissolved Oxygen (mg/l)		
6	**Definition**	The dissolved oxygen (DO) concentration in the cages or, preferably, at the benthic boundary layer, beneath the farm provides a serious indication of the ambient conditions in the farming environment but also an alarm for risks that might endanger the production and/or the health of the farmed stock. According to the ECASA toolbox (www.ecasatoolbox.org.uk), eutrophication effects in an inshore area could result in increased DO consumption in the basin water. This could be caused by increase in organic matter from fish farms. Low DO levels often result in basins with long residence times, and the lowest concentration of oxygen will occur at the end of a stagnation period. The level at that time will therefore also strongly rely on the rate of water exchange and hypsography of the area and climatic variations of the water exchange may be important as well. The minimum oxygen concentration that could occur in the bottom water might change due to changes in the vertical flux of organic matter from the surface water and/or fish farms. The measurement of DO could be straightforward by using a water sampling bottle and a portable oxygen meter, although it would be advisable to calibrate it regularly using the Winkler titration method.
	Comments	The maintenance of high DO levels is a matter of good production practices- it should be obligatory daily evidence registered in the logbook of the farm - participation of the farmer in the monitoring program is also necessary. A large decrease in the oxygen level would be detrimental to the farmed fish themselves and it is therefore very unlikely that values of this variable will be allowed to lower as a result of fish farming activities. Water column needs to be intensively sampled in order to have representative data.

Turbidity (m)		
7	**Definition**	This variable may be easily measured by means of a Secchi disk. The Secchi depth (i.e. the maximum depth at which the Secchi disk is visible from the surface) has significance in deep stratified waters, where the amount of matter resuspended from the bottom sediment is insignificant (see ECASA toolbox at the site: www.ecasatoolbox.org.uk). The significance is less in shallow homogeneous waters where the amount of resuspended matter might be quite large. The Secchi depth can be calibrated to estimate the concentration of particulate organic matter (POM) or equivalently Chl-*a* in the surface layers. After local calibration, it can also account for coloured matter supplied by freshwater runoff in coastal and inshore waters if synoptic vertical profiles of salinity are measured. Secchi depth is obviously of great significance to farmers of filter feeders and to authorities interested in environmental effects of fish farming. If widely used, it might also be of significance to scientists. It does not require any special training. Thereby Secchi depth observations often can replace Chl-*a* measurements at sites where Chl-*a* is used as an indicator of eutrophication. As Chl-*a* fluctuates during the season so does the Secchi depth and measurements needs to be done regularly.
	Comments	No definite value can be stated for either cautionary or critical condition since baseline values differ between different sites in the same locality and between different localities. Water column needs to be intensively sampled in order to have representative data. It is easily accessible for general public.

Percentage of silt/clay in sediments (%)		
8	**Definition**	The silt and clay content of the sediment is an important variable for the characterization of the seabed since it describes in a way rather easy to understand one of the most determining characteristics of the benthic environment. The sediment contains silt and clay from natural sources but also there is an increase due to sedimentation of suspended solids in the vicinity of the sea cages. The technique used is rather straightforward and inexpensive. It involves drying the sediment, weighting, wed sieving over a 63microns sieve, drying the aliquot with the fine particles and weighting again.
	Comments	The structure of sediment should be known for Site Selection. Variations on this structure should be monitored. This variable is useful for interpretation of other variables, it should be measured but it is not suitable as EQS.

Litter in the surrounding area		
9	**Definition**	The presence of litter in the vicinity of the fish farms is probably among the environmental effects the one which is most visible to the public. Although the presence of litter normally would not have any toxic effect on the farmed stock and/or the consumers, it is likely to attract negative publicity and to result in local conflicts with other users of the coastal zone.
	Comments	Litter is a telling indicator of the quality of farm management. If a site is dirty smelly or has lots of litter then you can bet that their staffs is demotivated, management is poor and environmental impacts are greater than they need be. It could be a quick component of a video or diver survey. Important for the evaluation of the environmental management. A useful qualitative indicator. If we monitor the area around the farm, perhaps we need to do the same at reference stations far way. No experts provided values for thresholds in this variable. It is considered as a qualitative indicator that should be recorded in the framework of EMP.