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COMMITTEE ON AQUACULTURE

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REPORT OF THE WORKSHOP ON THE SELECTION OF INDICATORS FOR THE SUSTAINABLE DEVELOPMENT OF AQUACULTURE IN THE MEDITERRANEAN (Draft) Montpellier, France 27-28 November 2008

OPENING OF THE MEETING, ARRANGEMENTS FOR THE WORKSHOP PRESENTATION AND ADOPTION OF THE AGENDA

1. The Workshop on the *Selection of Indicators for the Sustainable Development of Aquaculture in the Mediterranean* was held from 27 to 28 November at the Agropolis International Institute, Montpellier (France) hosted by the IFREMER. The Workshop was organised within the activities of Working Group on Sustainability on Aquaculture (WGSA) of the GFCM Committee on Aquaculture (CAQ).

2. Mr François René was elected chairperson of the workshop. He opened the meeting and after a welcome to the participants, he acted as chair and proceeded with the adoption of the Agenda. The list of participants and the adopted Agenda are included in this report respectively as Appendixes 3 and 1.

3. Mr Spyros Klaudatos, Chair of CAQ, thanked the IFREMER for the kind hospitality. He recalled the relevance of the workshop in providing a significant contribute to the identification of indicators for sustainable aquaculture. He also recalled that the workshop was expected to provide additional steps toward an agreed vision of sustainability, essential condition for the responsible development of marine aquaculture within a framework of Ecosystem Approach for Aquaculture in the GFCM areas. Mr Klaudatos stressed that the workshop was the first step in the implementation of the INDAM project.

CAQ – WORKING GROUPS ACTIVITIES

4. Mr Fabio Massa, GFCM Aquaculture Officer, briefly recalled the function and structure of the GFCM, the role of the CAQ and of its subsidiary bodies, as well as the role of the Working Groups in supporting the CAQ to identify priority issues and in providing advice on aquaculture management.

5. Participants were also informed on the progress made by the projects, "Development of a Strategy for Marketing and Promotion of Mediterranean Aquaculture" and "Developing siting and carrying capacity guidelines for Mediterranean aquaculture within aquaculture appropriate areas", in support of the WGs on Marketing on Aquaculture and on Siting and Carrying Capacity respectively.

6. Information were given on the project "Selection of Indicators for Sustainable Development of Aquaculture and Guideline for their use in the Mediterranean (INDAM)", in support to the activities of the WG on Sustainability on Aquaculture and funded with the contribution of European Community (EC), DG Mare. The first formulation of INDAM was prepared in November 2006 during the first meeting of the CMWG and represents the follow up of the request made by the CAQ during its fifth session (June, 2006). The project proposal was approved during the 31st session of the GFCM (January 2007). Since November 2006, the INDAM project proposal was revised several times. However the main identified programme and activities remain unchanged. The final version of the INDAM programme and the relative agreement between the GFCM Secretariat and EC for the first year of activities were signed from both parties on November 2008. The EC contribution is 50% (about 65.000 euro) of the budget scheduled.

7. The final goal of INDAM is to provide countries with a comprehensive decision support tool for the sustainable development of aquaculture and based on a set of indicators, reference points and guidelines adapted to the Mediterranean region. The last version of the Project proposal was distributed.

8. Participants were also informed on the progress made by the Information System of the Promotion of Aquaculture in the Mediterranean (SIPAM).

PROGRESS MADE BY THE PROGRAMMES TO DEVELOP INDICATORS FOR AQUACULTURE

9. Ms Hélène Rey-Valette from the University of Montpellier, recalled that INDAM was focused on the identification of the indicators through a multidisciplinary and participatory approach where the main stakeholders are involved. She introduced the experience coming from the EVAD project carried out in some Mediterranean countries (France and Cyprus) and other regions. In the EVAD project, relevant aquaculture stakeholders were involved in the process of screening and selecting indicators based on agreed principles and criteria associated to sustainable aquaculture. She also suggested that in consideration of the wide range of indicators now available at Mediterranean level and on the basis of the results obtained, this collective learning approach could be also useful for the implementation of INDAM. This will result in an acceleration of the indicators identification process.

10. A series of interventions followed on the recent experiences gained from research and cooperation programmes finalized to the identification and development of sustainable indicators at local, national and Mediterranean level.

11. Mr François Simard presented the IUCN approach to sustainability Principles (Economically acceptable, socially equitable and economically viable) and Indicators and informed on the progress made by IUCN on the defining of Indicators and Guidelines for the Sustainable development of Mediterranean Aquaculture. Activities and initiative in cooperation with the Federation of European Aquaculture Producers (FEAP) were also recalled as well as with the CAQ.

12. Mr Alain Bodoy, IFREMER La Rochelle, presented the main issue of the project ECASA (Ecosystem Approach for Sustainable Aquaculture**)**. 16 scientific research institutions are involved and its

general scope is the identification of indicators and application models to evaluate the effects of aquaculture on the ecosystem, and the definition of indicators to describe the main ecosystem change affecting aquaculture.

13. Mr Joël Aubin, INRA, introduced the aquaculture sector from France and presented the activities of multi-stakeholder project IDAqua (Sustainability Indicators for French Aquaculture). The main issues addressed by the project are the diversification of the production, the quality related aspects of the aquaculture products and the overall organisation of the sector. Specific software was developed by IDAqua for the monitoring of the sector. Relation between EVAD and IDAqua were also underlined.

14. Ms Maria Cozzolino, from IREPA, stressed the necessity of harmonizing the terminology, as an essential condition to avoid confusion and generating biais analysis especially when economic indicators are used. She presented the application of indicators within a framework of Integrated Quality and Environmental System which takes place in a South Italian fish farm. She presented also IREPA experience on the application of EU Rule 761/2001 Eco-management and Audit scheme (EMAS) and Green Accounting in intensive Italian aquaculture and guidelines.

15. Ms Lara Barazi, from Kefalonia Fisheries, made a presentation based on the relation among sustainable aquaculture and the reality of the market. The economic viability and sustainability variables and issues influencing the sectors were described. Concentration of production in order to obtain economies of scale, better negotiation power vis a vis the market and to enact marketing and promotion efforts along with cooperation in production planning among fish farmers, were considered strategic for the sector, as well as accurate and updated market information and data availability for use in management strategy adoption. She stressed that technical cooperation and project initiatives like CONSENSUS and others carried out by CAQ, IUCN, including FEAP, are contributing to increase the sustainability of the sector.

16. Mr Pablo Sanchez Jerez, from Universidad de Alicante, presented the Spanish project on 'Selection of Sustainability Indicators and Standard for Spanish aquaculture'. The project aimed to select indicators, determination of standards and measurement for environmental studies in marine aquaculture. It also included statistical validation of indicators parameters and cooperation with stakeholders.

17. Mr Fabio Massa made presentation on interaction between capture fisheries and aquaculture and underlined the necessity to use selected indicators in assessing mutual benefit and progress towards sustainable development of both sectors. Furthermore, a case study on the application of Traffic Light approach in the south Adriatic fisheries was presented as possible method to display indicators values, monitoring the multidisciplinary information available and make this information easy to understand.

18. Mr Jean Paul Blancheton, IFREMER, presented the result of EVAD on the application of the participatory approach in constructing indicators to assess the sustainability of aquaculture production systems for cage fish culture in Cyprus and France. Results of criteria and sustainability analysis were also presented.

19. Ms Yucel Guzel Gier and Mr Hayri Deniz, respectively from Dokuz Eylül Universitesi of Ismir (Turkey) and Turkey Ministry of Agriculture and Rural Affairs (MARA), described the progress made on the Technical Cooperation Project MARA-FAO (TCP/TUR-3101) "Developing a Roadmap for Turkish Marine Aquaculture Site Selection and Zoning, using an Ecosystem Approach to Management". The project aimed at defining a strategy for site selection for marine aquaculture and at identifying actions for placing marine fish farms. The issue of agreed indicators bewteen the different stakeholder is one of the main aspects identified by the project in relation conflict solutions.

20. Participants stressed that in the Mediterranean, now there are a conspicuous number of initiatives focused on the issues on sustainability aquaculture and the use of indicators. All of them aimed to provide both managers and farmers tools to monitor and assess aquaculture activities. There was a general consensus that cooperation and exchanging project results, knowledge and experience are essential in

designing indicators. Reviewing and taking advantages of the different initiative will avoid duplication and will help country and stakeholders in designing development strategy in aquaculture.

IDENTIFICATION AND DEFINITION OF SUSTAINABLE INDICATORS FOR AQUACULTURE: METHODOLOGICAL PERSPECTIVE

21. Contribution papers and documents on the development of co-construction approach in the implementation of sustainable indicators in aquaculture were prepared and distributed in support to this point of the Agenda.

22. The paper, "Analysis of the Standards and Indicators for Sustainable Development of aquaculture", evaluated the experiences in sustainability, carried out so far and initiatives finalised to develop indicators for sustainable aquaculture**,** in particular in the Mediterranean. Based on bibliography, the indicators are inventoried, classified and analysed. The analysis demonstrated the existence of significant progress regarding measures fostering on sustainable aquaculture, with recent initiatives showing an attempt towards standardization. The analysis also underlined the necessity of having common principles as basis to develop indicators and a common protocol taking into consideration the different typology of aquaculture systems and farms size.

Ms Hélène Rey-Valette - presented the document "Aquaculture Sustainable Development and Governance Systems" which stressed the strictly relationship between sustainable development and governance at aquaculture farms level. The paper, based on the experience of the project EVAD, describes the constructions of sustainable indicators through a reading grid. The analysis of governance implementation conditions is also taken into consideration. The construction of principles by harmonising referential and norms developed by policy decision-makers and of the representation of stakeholders and citizen actors is highlighted. Particular attention is given to the territorial governance by analyzing aquaculture integration procedures based on potential synergies between action routes promoting sustainable aquaculture and its contribution on territory sustainability. The paper pointed out that the integration of aquaculture into ICZM (Integrated Coastal Zone Management) is possible only if the former can make the necessary changes of its reference system and if its integration is made in the governance mechanism at the level of the territory.

23. The contribution paper "Key issues and some postulates concerning the use of sustainable development indicators: the example of Aquaculture" highlighted the increasing interest on the appropriation of sustainable indicators and illustrated the importance of learning and governance systems and of processes for the appropriation of sustainable development. Example was given of a research project on the elaboration of a set of indicators on sustainability of aquaculture systems. The document addresses the elaboration of the use of indicators**,** analyses the different reference systems elaborated for the development of indicators, highlights the advantage of the cooperative construction of indicators, and presents postulates related to condition and modalities of sustainable development appropriation

Mr Jérôme Lazard made a presentation on "Evad – Evaluation of the sustainability of the aquaculture production systems", focusing on the main aspects related to the methodology applied, based on the participatory approach when identify indicators. The document "Guide to the co-construction of sustainable development indicators in aquaculture" prepared on the achievements of the Evad research project (Cirad, IFREMER, INRA, IRD and University of Montpellier 1) was distributed to the participants.

24. Ms Syndhia Mathé and Mr Joël Aubin leaded the collective exercised toward the selection of principles, criteria and indicators. A document in table format proposing the guidelines (approach and method) for the preparation of a Grid of Principles, Criteria and relative Indicators to be adapted to the Mediterranean was distributed among the participants.

25. Participants agreed that indicators are essential tools for the communication between farmers and society and that the targets of the WGSA are the countries and decision makers. Discussion was raised on how principles, criteria and indicators should be selected, as well as on a common understanding of the terms used. After discussion, participants agreed and adopted, with minor changes, the terms reported in

the Evad document. The Principles are associated to the different dimensions (or pillars) of sustainable aquaculture (Economic, Social, Environmental and Governance). The Principles could correspond to one or more postulates or priories concepts determining or promoting the sustainable development of aquaculture. Criteria break down the principle into specific themes or characteristics and specify the issue to be addressed through the relevant variables. Indicators allow the criteria to be measured, (qualitative or quantitative), and are essential to monitor or assess the behaviours of the criteria over the time. Once an indicator is associated with its standard it is possible to have a reference point indicating the particular state of the issue to be monitored.

26. The selection phase represents a strategic opportunity for partner actors to select the principles and criteria that they consider the most appropriate for the implementation and monitoring of the aquaculture systems. In this respect, it was proposed to test the methodological approach applied by Evad. Through a compilation and analysis of questionnaires distributed to the participants, ten principles associated to the four dimensions of sustainable aquaculture were selected. Similar works were made for the criteria to be combined with the principles.

27. Following individual selections and their summary statistical processing, the results were discussed collectively. The outputs of the questionnaire produced common principles and associated criteria (Appendix II). Principles were discussed for what concern both the terminology applied and the results themselves. Clarification was made on the Principles adopted and a workplan of INDAM for the next period was discussed and agreed upon including definition of main characteristic and budget constrains implementing case study(ies).

WORKPLAN AND TIME FRAME

28. On the basis of the discussion and of the activities planned for INDAM in support to the Working Group on Sustainability of Aquaculture, the following workplan and time frame for 2009 was considered:

29. Indicators identification**:**

a. Finalization of the list of selected criteria for the definition of indicators based on the exercise carried out and on the principles identified during the workshop (January 2009);

b. Establishment of a preliminary list of multidisciplinary indicators appropriate for the Mediterranean aquaculture (March 2009);

c. Organization of an interdisciplinary technical meeting based on the identified indicators and, for each selected indicator, definition of the contribution to the sustainability, the feasibility for implementation, the methodology applied for measurement (April/May 2009);

d. Development and implementation of a Pilot study in one or more Mediterranean coastal areas to test and fine tune the methodological framework and the multidisciplinary indicators (June 2009).

e. Organization of a workshop to discuss the outcomes of the first phase of INDAM. In particular, the workshop will focus on the follow-up of the pilot study(ies) (November 2009).

Furthermore:

f. Finalization of the technical documentation prepared in support to the identification of the sustainable indicators;

g. Drafting the guidelines for the use of indicators and reference points, including a description of their feasibility, practicability, expertise requirement and cost effectiveness for application;

h. Incorporation and update of the bibliography on aquaculture sustainability and indicators in a structured database;

i. Validation and publication of the document "Analysis of the Standards and Indicators for Sustainable Development of aquaculture".

CONCLUSIONS

30. The main topics mentioned during the discussion, as well as the main aspects related to the workshop are hereunder summarized.

- On the basis of the contributions (presentation and papers) provided and of the discussion, made the participants agreed on the necessity of common criteria and relative indicators to describe the level of sustainability of aquaculture in the Mediterranean and Black Sea areas. Furthermore, it was remarked that meeting economic, social and environmental demands with common reference systems is an essential condition for the responsible development of marine aquaculture in the GFCM regions.
- Following a multidisciplinary approach, participants considered that the joint exercise made on selecting both principles and criteria was important for generating discussion and for achieving the appropriation of the correct terminology. The performed exercise, including the fulfilment of questionnaire and the ranking application, was considered essential toward the implementation of the INDAM project activities.
- The definition of indicators should continue in a cooperative manner and according to the different level of expertise, taking into account the recent progresses made and outputs obtained by the various research projects and programmes. It was agreed that in producing indicators for sustainable aquaculture, the involvement of the stakeholders is fundamental to harmonise the strategies for the management of aquaculture.
- For the purposes of the Working Group on Sustainability Aquaculture, cooperation and exchange knowledge and experience, represent the base in designing indicators. Reviewing and taking advantages from the outputs of the different initiative will avoid duplication and will help country and stakeholders to design development strategy for sustainable aquaculture.
- For sustainable aquaculture, environmental and marketing aspects are the most critical issues presently to be addressed. Therefore, cooperation and synergy with the CAQ Working Groups on Siting and Carrying Capacity and on Marketing, as well as the proper acknowledgment of their outputs is fundamental, when selecting indicators.
- Participants agreed that indicators should also be considered for the communication between farmers and society. The criteria should respond to the public's and consumers concerns about aquaculture and serve to communicate the positive aspects of a responsible and sustainably managed sector. The targets beneficiaries of INDAM are the farmers themselves and decision makers who will benefit from the use of sustainability indicators.

31. To select indicators for each Dimension of Sustainable Aquaculture, the following Principles were selected:

Economic dimension	Increase the adaptation capacity to cope with uncertainties and crises (risk assessment and strategies to meet challenges)
	Strengthen enterprise long term future
	Promote market oriented aquaculture activities
Environmental dimension	Respect the carrying capacity, assess and control the environmental impact
	Improve the ecological footprint of the activity
	Respect biodiversity

Social dimension	Contribute to food security and healthy nutritional needs
	Strengthen the role of the professional organization in improve image of aquaculture, social awareness, and responsibilities
	Strengthen corporate social responsibility (respect animal well-being)
Governance dimension	Strengthen integration of aquaculture in local development
	Promote participation in decision making processes
	Strengthen research, information systems and extension services
	Strengthen institutional capacities in relation with sustainable development

ANY OTHER MATTERS

32. The participants agreed that, at this stage, there are not enough technical elements to structure data banks into the SIPAM system. However, all the available information related to the selected indicators, as well as other relevant information and bibliography on sustainable aquaculture and indicators collected during the activities of INDAM will be gathered in a structured data base as indicated in the project document.

APPENDIX I

Agenda

1. **Opening of the meeting, arrangements for the Workshop and adoption of the Agenda**

2. **CAQ – Working Groups Activities**

3. **Progress made by the programmes to develop indicators for aquaculture (output and main achievements)**

4. **Identification and definition of sustainable indicators for aquaculture: methodological perspective**

5. **Implementation of a Strategy for the application of Indicators for Sustainable Aquaculture methodological reference framework within the Mediterranean Sea.**

6. **Conclusion**

7. **Any other matters**

APPENDIX II

First selected criteria to be finalized according to the principles

SELECTED CRITERIA	
P1	Contribute to food security and healthy nutritional needs
P1C1	Importance of fish availability
P1C2	Level of accessibility
P1C3	Level of nutritional contribution
P1C4	Presence of xenobiotics
P2	Promote market oriented aquaculture activities
P2C1	Existence of a quality-based approach
P2C2	Existence of traceability
P3	Respect the carrying capacity, assess and control the environmental impact
P3C1	Importance of harvesting from fish stocks
P3C3	Importance of space occupation
P3C6	Respect for carrying capacity
P3C7	Existence of management systems
P4	Improve the ecological footprint of the activity
P4C2	Level of productivity compared to resources
P6	Increase the adaptation capacity to cope with uncertainties and crises (risk assessment and strategies to meet challenges)
P6C6	Control of site access
P7	Strengthen enterprise long term future
P7C2	Level of production costs
P7C3	Level of management
P10	Strengthen integration of aquaculture in local development
P10C1	Importance of development initiatives
P10C2	Importance of the wealth-building role
P10C3	Level of contribution to local employment and to poverty reduction
P10C5	Level of contribution to local economy
P10C7	Capacity as environmental indicator
P10C8	Level of social recognition
P11	Promote participation in decision making processes
P11C1	Level of comprehensibility of the industry
P11C3	Level of participation
P11C4	Level of decentralisation of decision-making
P11C5	Level of management and territorial planning
P12	Strengthen research, information systems and extension services
P12C1	Importance of research in aquaculture
P12C3	Level of interaction between research and industry
P12C5	Access to scientific and administrative data
P13	Strengthen institutional capacities in relation with sustainable development
P13C1	Level of national recognition of sustainable development
P13C2	Level of implication of the State in sustainable development
P13C3	Level of commitment of the State towards the industry
P13C4	Capacity of governance systems
P13C5	Familiarity with and local support to sustainable development (local agenda 21s)

APPENDIX III

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