

**DRAFT REPORT OF THE EXPERTS MEETING  
FOR THE RE-ESTABLISHMENT OF THE GFCM-CAQ NETWORK  
ON ENVIRONMENT AND AQUACULTURE IN THE MEDITERRANEAN**

(Rome, 7-9 December 2005)

**PRELIMINARY DRAFT<sup>1</sup>**

**INTRODUCTION**

1. The Environment and Aquaculture in the Mediterranean Network (EAM) was created in 1992 by the FAO Mediterranean Regional Project (MEDRAP). In spite of this, the EAM effectively ceased to operate as a network in 1996. The present experts meeting takes place as a follow up of a decision by the General Fisheries Commission for the Mediterranean (GFCM) during its twenty-ninth session (Rome, Italy, February 2005). This meeting has been called to discuss and produce specific proposals of Terms of Reference for the re-establishment of EAM within the framework of the GFCM and more specifically in support to the Committee on Aquaculture (CAQ). Furthermore, the aims of the meeting were to discuss and agree on a structure and operational framework for EAM; to define a list of potential priority issues and time frame for its accomplishment; and to propose a time frame for the short- and mid-term work of the network.

**OPENING AND ORGANIZATION OF THE MEETING**

2. The meeting was opened on 7 December 2005 with the participation of 13 experts from eight countries and three partner intergovernmental organizations and five FAO officers. The list of participants is attached as Annex B to this report. After welcoming addresses by members of the organizing committee and FAO senior officers, Mrs Doris Soto and Mr Alain Bonzon, Secretary of the GFCM, Mr Ivan Katavic was appointed as Chairperson and Ms Nuria Marba as rapporteur. Before adopting the agenda, Mrs Soto expressed special appreciation to the experts for their attendance and commitment with the need of re-establishing the EAM and provided a description of the agenda and explanations on organizational matters for the meeting.

**ADOPTION OF THE AGENDA AND DISCUSSION OF MEETING OBJECTIVES**

3. The Agenda as adopted with minor changes is attached as Annex A to this report.
4. The Chairperson called for a round of short introduction of the attendees. After the introduction, the experts were informed that a general view of potential Terms of reference (TORs) could be found in the background document for the meeting (Annex C). It was emphasized, however, that the experts were expected to review the proposals and clearly define TORs that they identify as suitable for the EAM. It was also explained that all proposals will have to go further to CAQ for endorsement.
5. The experts highlighted the relevance of the re-establishment of the EAM for the sustainable development of the Mediterranean aquaculture and how this body could represent a strong support for the CAQ activities and consequently for the GFCM. Many years have passed since its first establishment and the present relation between the environment issues and aquaculture must be reconsidered.
6. Furthermore, experts underlined the suggestion that, instead of the re-establishment of EAM as the previous one, a different and new structure could be offered rather than that of a simple network. The reestablishment must be considered in particular because of recent and increasing relevance of aquaculture in the Mediterranean countries.

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<sup>1</sup> The draft report has not yet been cleared by all participants. The complete report will be released shortly.

## **BACKGROUND PRESENTATION ON THE EAM AND ITS ROLE FOR GFCM**

7. The Secretary of GFCM gave a brief history-background on EAM since its foundation, clarifying the initial objectives, accomplishments and some of the reasons for its cessation of activities. This information is based on the background paper presented to the experts and which is included as Annex D. The experts were also informed about the *modus operandi* of the GFCM statutory body especially the Scientific Advisory Committee (SAC) and the Committee on Aquaculture (CAQ), including an explanation on the structure and connection between the CAQ Networks and GFCM.
8. There was a discussion on the present legal connection/situation of these networks within GFCM. The Secretary explained that since CAQ was fully operational and GFCM was endowed with a true Secretariat, there might be no further need for partner institutions (CIHEAM, UNEP, FAO etc) to ensure the coordination of the networks. These networks, especially EAM, could be formally established as subsidiary body of CAQ with support from the Secretariat as it is the case with SAC. This would require amending GFCM rule of procedure X (1).
9. Mr Katavic provided additional information on the history of EAM. He also noted that EAM could have been very successful but it was not possible to address the most relevant aquaculture environmental issues because of budget limitations and therefore, more emphasis was given to technical issues at the time. However, environment is now becoming more relevant. It was also recalled that EAM, such as other aquaculture networks, was established in the framework of the FAO Regional Project MEDRAP (Mediterranean Aquaculture Network). Experts raised an important issue which was the need of giving information of the working and progress of the other networks: SIPAM (Information System for the Promotion of Aquaculture in the Mediterranean), TECAM (Technical Aspects of Mediterranean Aquaculture) and SELAM (Socio-economic and Legal Aspects of Mediterranean Aquaculture). Such information is relevant to learn from positive experiences. The meeting was informed that the coordinator of SIPAM Regional Centre had not be able to attend the meeting and report accordingly on SIPAM. Mr Bazurco, on behalf of CIHEAM, briefed the meeting on the situation of TECAM and SELAM.

## **PRESENT STATE OF KNOWLEDGE OF AQUACULTURE AND ENVIRONMENT IN THE MEDITERRANEAN AND SHORT PRESENTATION ON POLICY AND REGULATION**

10. A presentation was made by Ms D. Soto on environmental issues on aquaculture in the Mediterranean. The main purpose of the related background paper and presentation was: a) to put together and synthesize the published information on environment and aquaculture interactions in the Mediterranean in the form of a data base; and b) to contribute to identify main relevant issues which are common to this ecosystem and which can be approached with an integrated management perspective. Some of the conclusions of this paper were: i) the information is available only for certain aquaculture areas; ii) there is little information on environmental management appropriate for farmers (some exceptions, e.g. tuna farming); iii) there is a lack of common harmonized/integrated environmental regulation/standards; and d) there is a need for permanent environmental monitoring program of the Mediterranean connected to the aquaculture activities.
11. The following discussion concentrated on the amount and quality of the information, which was felt to be biased. Negative effects tend to be advertised more systematically than positive effects, such as the enhancement of fisheries due to aquaculture. On the other hand, social (both from tourism and resident population) concerns on aquaculture are increasing as fish farming with cages is growing. The presentation was appreciated and it was agreed to release the database which will be maintained by SIPAM on behalf of the GFCM Secretariat.
12. The following presentation by Mrs D. Crosetti, dealt with an overview of some available information on policies and the regulatory frameworks for aquaculture and related environmental impact. Information on legislations dealing with the environment and aquaculture can now be found in important databases (FaoLex, EcoLex) and for already selected topics, in specific FAO reports. In addition, the NASO (National Aquaculture Sector Overview) and NALO (National Aquaculture Legislation Overview) are being prepared by FAO/FIRI. They provide comprehensive information

especially on regulations related to aquaculture and environmental impact for most GFCM Members. The different regulations adopted for each country showed the necessity of harmonization at regional level, though countries have recently made a great effort for adopting new regulations, thus responding to the development and intensification of aquaculture activities in the Mediterranean.

13. In the discussions that followed, the relevance of implementing some common process with effective results such as an EIA (environmental impact assessment) system was emphasized. It was also stressed that the EU was already promoting such a process, including for countries exporting products to the EU. Legislations needed to be more visible for all as well as strategic environmental impact assessment at coastal zone scale (not at individual farm scale). Another priority would be to properly estimate the holding capacity of farming area.

## **PRESENTATIONS ON RESEARCH AND ACTIVITIES RELEVANT TO ENVIRONMENTAL ISSUES OF AQUACULTURE IN THE MEDITERRANEAN**

14. Short presentations were made by each of the participating experts. They highlighted their respective institutional and individual activities of relevance to environmental issues and aquaculture in the Mediterranean, for consideration in the framework of potential networking, coordination and future EAM activities.

15. Presentations showed many Mediterranean public and private initiatives and activities from various organizations, projects and networks. The integrative role played by some of the institutions, such as IUCN and MAP or CIHEAM in the field of training, through involving many stakeholders was appreciated. Research institutions, such as IFREMER, several universities throughout the region are also involved in, or host several networks dealing with environmental issues of aquaculture in the Mediterranean. This is, for example, the case with MARAQUA, ECASA, SAMI, MEDVEG BIOFAQs, SPICOSA, and AQCESS. Several of these networks have been funded by the EU. Other government initiatives such as coastal zoning are also proving to be relevant in the integration and planning process for aquaculture development such as in Croatia.

16. Participants concluded that there was a vast offer of scientific expertise in the region and noted that many ongoing activities involved the development of aquaculture impact models all the way from genes to an ecosystem perspective for aquaculture management. They further shared the opinion that the issues at stake carry a great potential. It was therefore an adequate historical moment to re-establish the EAM which would be able to use and reinforce the potential for synergistic integration of the mentioned initiatives. However, it was also emphasized that activities should purposely include more actively south Mediterranean countries.

## **PRIORITIES TO BE ADDRESSED BY EAM**

17. Experts agreed that the Terms of reference (TORs) for the EAM should be to:

- i) provide recommendation and advice to GFCM, through CAQ, following task-oriented and problem-solving approaches;
- ii) support and coordinate existing networks for improving information flow and integrating outputs on the management of aquaculture environmental issues throughout the region,
- iii) support and enhance aquaculture within integrated coastal zone management activities, for example on site selection and on economical and social benefits assessment;
- iv) improve the image and perception of aquaculture–environment interactions at policy and institutional and at public at large, through strategic approaches

18. Following extensive discussions, the experts agreed that the following were among the relevant issues to be included in the mandate of EAM:

- a. Harmonization of legal framework for aquaculture;
- b. Integrated EIA, monitoring and information management system;
- c. Integrated coastal zoning for aquaculture;
- d. Enhancement of the image of aquaculture.

19. On this basis, Experts proceeded to discuss the most effective institutional set up for EAM, taking into consideration a suitable affiliation to the GFCM. The following three options were identified:

- a) EAM remains within CAQ and GFCM takes care of it. Under this option there would be no need for an inter-governmental institutions to ensure the coordination of EAM activities, this task being assumed by the GFCM Secretariat;
- b) EAM is developed as a Network and coordinated by a Partner Organization. Under this option criteria (including the range of financial and organizational support) for identifying such Partner would need to be sorted out;
- c) EAM is established as an independent Network, the representatives of which may participate within GFCM/CAQ activities with an observer status. Under this option, the fulfillment of the (second) terms of reference of the mandate of CAQ (to monitor the interaction between aquaculture development and the environment) would not necessary be secured.

20. The review of these options generated active discussion, especially with regard to technical, scientific and financial backstopping required in support of EAM. The Meeting agreed on the basis of a full consensus that EAM should be re-established as a formal subsidiary body of the GFCM Committee on Aquaculture (CAQ), either as a Working Party, Sub-committee or otherwise. Experts expressed the opinion that this was the only possibility for an efficient, immediate and realistic functioning of EAM, particularly considering the present role and activities of CAQ. It was also stressed that EAM should actively cooperate with and coordinate stakeholders, such as fish farmers, NGO's, international and regional organizations outputs. Indeed, it was felt essential that EAM incorporates in its activities existing international and regional agenda issues affecting Mediterranean aquaculture.

21. The Meeting of experts therefore decided to split into small groups to further discuss practical, technical and operational aspects related to each of the above topics, with the understanding that EAM, in future, should be organized around *ad hoc* Working groups focusing on the above topics, with b) and c) merged in a single group. It was felt that this *modus operandi* and related structure would be more efficient than the previous EAM structure

After in depth discussions within the small groups and presentations of output in plenary, major issues/topics and initial activities proposed for the EAM *ad hoc* working groups were reviewed and adapted as necessary. It was agreed that the time frame for the activities of the *ad hoc* Working groups should not be no longer than 3 years, renewable only if so decided by GFCM. Therefore, the following, short-medium term (1 to 3 years) activities and outputs were identified.

*Topic 1: Harmonization of environmental legislations and standards related to aquaculture*

- Activity 1.1. collection and compilation of relevant texts
- Activity 1.2 comparative analysis of hard and soft law, including using the FAO/FIRI National Aquaculture Legislation Overviews (NALO) and other studies on legislation and regulation for aquaculture

*Main outputs:* formulation of a set of recommendations for common rules; produce comparative analysis for main topic at regional level; maintain a data base on environment and aquaculture related legislation, standards and guidelines.

*Topic 2: Scaling Aquaculture-environmental interactions, including monitoring risk of impacts to biodiversity*

- Activity 2.1. Operational synthesis on studies and results from notably transnational research on aquaculture and environment

*Main outputs:* to produce Mediterranean common standards for EIA/SEA and ensure related monitoring, including: publication listing the standards, values, protocols, indicators; guidelines for monitoring; guidelines for best management practices.

*Topic 3: Integrating aquaculture within a Coastal Zone Management framework.*

- Activity 3.1. Zoning for aquaculture
- Activity 3.2. Site selection criteria
- Activity 3.3. Interaction between aquaculture and fisheries

*Main outputs:* Guidelines for aquaculture site selection; Guidelines for best management practices

*Topic 4: Developing a Proper Public perception of aquaculture in relation to environment, including product quality and human health aspects.*

- Activity 4.1. Identification of main issues and criticisms to aquaculture
- Activity 4.2. Devising strategies, in cooperation with private sector organizations, to rehabilitate the image of aquaculture in the Mediterranean.

*Main outputs:* provision of relevant scientific information to devise strategy to enhance the image of aquaculture, to policy makers and the public at large.

22. Following the clarification of the main short-term objectives for the proposed EAM *ad hoc* Working groups, the experts discussed as well the interactions between EAM and the other CAQ Networks, especially SELAM regarding Topic 4, and the role of SIPAM with respect to maintaining and distributing the products of data bases.

23. Other relevant aspects concerning the *modus operandi* of EAM were reviewed. Experts emphasized on the need that National focal points should be nominated in each GFCM Member and that they be endowed with proper terms of reference, as was the case for SIPAM National Coordinators. Nominees should be identified based on technical competences and institutional backing capacity at their level. It was also suggested to initially use CAQ Focal points to identify EAM National Coordinators/Focal points.

24. It was suggested that Partner regional institutions could serve as *ad hoc* Working group Coordinators although this was not supported by all participants. It was clarified however, that each Working group would appoint a Coordinator as in the case of the Sub-committees of the Scientific Advisory Committee (SAC). Coordinators will not necessarily be the key scientific actors but act as facilitator to ensure that the best expertise (in some cases could institutions) will participate to the Working groups and their different projects. Proper TORs will need to be developed as well in this respect.

25. A call was made for GFCM to earmark seed money from the autonomous budget for further developing the *ad hoc* working groups proposals. It was also emphasized the importance to keep in mind that CAQ works on two year period, and that a budget for 2006 should be available to launch EAM activities without delay. A more accurate definition of their respective TORs could be prepared before the 5<sup>th</sup> session of CAQ, for review and possible endorsement by the Committee. Budget allocations for initial priority activities could be redistributed among Working groups, accordingly.

26. The experts therefore decided to start developing simple drafts of the TORs for the Working groups, with the understanding that they will be finalized, as necessary, by the GFCM Secretariat. In

addition, participants to each of the brain storming group provided a rough budget estimates for the respective ad hoc Working groups as well as a time plan for related activities.

The detailed budget and description of initial activities for each *ad hoc* Working groups are in Annex D. The initial forecast of expenditure for each Working group in 2006 was estimated in the range of Euro 15,000 to 30,000 Euros.

27. Finally, the Meeting of experts shared the view that the proposals for the re-establishment of EAM, should possibly be presented at the 30<sup>th</sup> session of GFCM (January 2006), for consideration and possible endorsement in principle, in order to accelerate the process of initiating activities of the Working groups, even before the 5<sup>th</sup> session of CAQ.

#### **ADOPTION OF THE REPORT**

28. The report was sent to the experts by the Secretariat to be adopted by email.

### AGENDA AND TIMETABLE

<b>Wednesday, 7 December</b>	08.30-09.00	Experts are met in FAO lobby or walk straight to Cuba Room (Room: B224)
	09.00-10.00	<ol style="list-style-type: none"> <li>1. Opening of the Session</li> <li>2. Adoption of the Agenda</li> <li>3. Proposed objectives of the meeting</li> <li>4. Background presentation on the EAM and its role for GFCM</li> </ol>
	10.00-10.30	Coffee break
	10.30-12.30	<ol style="list-style-type: none"> <li>5. Presentation on the present state of Aquaculture and Environment in the Mediterranean</li> <li>6. Short presentation on Policy and Regulations</li> <li>7. Discussion</li> </ol>
	12.30-13.30	Lunch break
	13.30-15.00	8. Short presentations by experts on the research and activities on Aquaculture Environmental issues in the Mediterranean, each represented Institution/country (10 minutes: 8 minutes presentation plus 2 minutes for questions).
	15.00-15.30	Coffee Break
	15.30-17.30	<ol style="list-style-type: none"> <li>9. Continue short presentations and summary of ongoing activities on Aquaculture Environmental issues in the Mediterranean</li> <li>10. Work groups to define objectives and most relevant issues to be addressed by EAM</li> </ol>
<b>Thursday, 8 December</b>	08.30-10.00	<ol style="list-style-type: none"> <li>11. Work groups continue</li> <li>12. Report of working groups</li> </ol>
	10.00-10.30	Coffee Break
	10.30-12.30	13. Discussion of objectives and priorities of EAM
	12.30-13.30	Lunch

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**BACKGROUND PAPER FOR THE RE-ESTABLISHMENT  
OF THE GFCM-CAQ NETWORK ON  
ENVIRONMENT AND AQUACULTURE IN THE MEDITERRANEAN (EAM)**

The Network on Environment and Aquaculture in the Mediterranean (EAM) was created in 1992 following a MEDRAP (Mediterranean Regional Aquaculture project) decision and was transferred under the aegis of the Committee on Aquaculture (CAQ) of the General Fisheries Commission for the Mediterranean (GFCM) through the coordination of the Mediterranean Action Plan. EAM temporarily suspended its activities in 1996. As a result of process, comprising an external evaluation of CAQ and its Networks, in 2004, the GFCM requested as a matter of priority that EAM be re-established. This paper describes the process which led to GFCM decision. It suggests elements to be considered to favour reaching the two main objectives of this Expert Consultation: identifying a short-medium term programme for EAM and a suitable institutional framework and cost-efficient *modus operandi* to ensure its sustainability.

## **1. BACKGROUND ON EAM**

### **1.1 Constitution of EAM**

In 1993, the GFCM endorsed the four aquaculture related networks established by the UNDP/FAO Mediterranean Regional Aquaculture Project, MEDRAP II (1990-1995). These networks were:

- a) Information aspects for promotion of aquaculture in the Mediterranean (SIPAM);
- b) Technical aspects for promotion of aquaculture in the Mediterranean (TECAM);
- c) Economic and legal aspects for promotion of aquaculture in the Mediterranean (SELAM);
- d) Environmental Aspects of Aquaculture in the Mediterranean (EAM).

The constitution of EAM took place in a seminar held in Athens, Greece, in June 1993 (MEDRAP II 1993a) when it was proposed that the Mediterranean Action Plan (MAP) through its Regional Activities Centre for the Priority Actions Programmes (RAC/PAP) should be entrusted with the coordination, continuation and management of EAM activities as a network. The Seminar also suggested having a working group meeting in September of that year to elaborate a more specific programme of activities for 1994-95 (MEDRAP II 1993b) to be submitted to the MEDRAP II Network Steering Committee.

The main objectives of the EAM Network were defined as:

- To contribute to optimization of aquaculture production through ecological characterization of coastal zones, set up of site identification methodology and develop management guidelines for dominant production systems;
- To contribute to the protection and preservation of natural resources environment through specific procedures of monitoring, through establishment of standards, recommendations and framework for national legislation;
- To provide information on the environmental performances of aquaculture in order to define its position within the context of integrated coastal zone management (ICAM).

### **1.2 EAM Priorities and Main Activities**

During the above mentioned EAM Network constitution seminar (MEDRAP II, 1993a), four priority topics were selected:

- 1) Lagoon management
- 2) Interactions between aquaculture and environment
- 3) Site evaluation and protection
- 4) Ecologically sound integrated management of mollusc culture

At the First session of CAQ (Rome, September, 1996), EAM reported several activities carried out during the intersessional period 1994-1995. These included:

- (i) Workshop on "Impacts of intensive farming outfalls on the coastal ecosystem" (Jerba, Tunisia, April 1994; a priority area in the framework of Interactions between aquaculture and environment);
- (ii) Workshop on "Environmental aspects of shellfish culture in the Mediterranean, with special reference to monitoring" (Dubrovnik, Croatia, July 1994; priority area Ecologically sound integrated management of mollusc culture);
- (iii) Two Working Group Meetings on Lagoon management (Nador, Morocco, July 1994, and Montpellier, France, June 1995; priority area Lagoon management); and
- (iv) Workshop on the "Selection and protection of sites suitable for aquaculture" (Heraklion, Greece, November 1995; priority area for Site selection and protection).

Among the salient outputs of EAM was the production of guidelines, such as on Selection and protection of sites suitable for aquaculture.

These activities were facilitated through collaborative efforts mainly by MAP-PAP/RAC, MEDRAP II, INSTOP (Tunisia), ISPM (Morocco), IOF (Croatia), IMBC (Greece), Montpellier University and IFREMER (France) and FAO.

Although the EAM Coordination Committee held its first meeting in April 1995 and prepared a programme of work no activities were carried out after 1996. In its 1996 report of activity, EAM noted that funds allocated by MAP-RAC/PAP were inadequate to carry out the proposed activities for 1996/1997 and called upon additional resources from collaborating institutions and GFCM Members to secure sustainability and continuity of the Network.

Further on, some of the environmental aspects of Mediterranean aquaculture were covered by many actors, including by TECAM and SELAM activities, especially seminars and training Courses, through CIHEAM with some support from FAO.

## **1.2 EAM and the GFCM Committee of Aquaculture**

At its 21th session in 1995, the GFCM established the Committee on Aquaculture in replacement of its Working Group on Artificial Reefs and Mariculture. To date the CAQ has held four sessions. The mandate of the Committee is defined in Rules X (1) of the GFCM Rules of procedure, as summarized below:

- a) to monitor developments and trends of aquaculture practices in the region
- b) to monitor the interaction between aquaculture development and the environment
- c) to oversee and guide the work of the four networks created as a result of the activities of MEDRAP II, and in particular by monitoring the progress, evaluating the proposed programmes of the various networks
- d) to seek additional support to complement the contribution of the institutions, which support the established networks, namely CIHEAM, MAP-PAP/RAC and FAO, and to enhance the work of the four networks
- e) to carry out other duties related to aquaculture promotion and development that may be referred to the Committee by the Commission.

At the First Session of CAQ, (Rome, Italy, September, 1996), the Committee acknowledged the difficulties, especially financial, encountered by EAM, and took note of the high priority given by MAP to environmental interactions of aquaculture. Given the limited funds available, the delegates suggested that themes should be further prioritized. Suggestions on most urgent needs include guidance on appropriate environmental impact assessment and monitoring techniques, definition of environmental quality objectives and standards, development and harmonisation of environmental regulations at national and international levels, research on environmental impacts of aquaculture, with emphasis on cage culture, as well as methodologies for selection, allocation and protection of sites suitable for aquaculture.

At the CAQ Consultation on the Application of Article 9 of the FAO Code of conduct for responsible fisheries in the Mediterranean region, held in Rome, Italy, 19-23 July 1999, within the five elements (or objectives) identified in the proposed Action Plan for the Promotion of Responsible Aquaculture in the Mediterranean, Element C concerns the enhancement of harmonisation between aquaculture development and environmental conservation. (FAO, 1999, see Annex 2).

The Report of the Consultation, including its Action Plan was endorsed at the Second Session of CAQ (Rome, Italy, June 2000) and further on by the GFCM. While discussing at this session the work of its Network, questions were raised by CAQ Delegates about the inclusion of environment related activities which were to be carried out by the EAM, such as problem of genetic pollution, fish escapes, effects of introduced species, etc.. The need to work on aspects of environmental policy and strategies for decision-making was also pointed out.

At the Third Session of CAQ (Zaragossa, Spain, September 2002), several Delegates insisted on the importance of environmental aspects in the work of the Committee. CAQ considered, however, that in view of current financial constraints, a reactivation of EAM was premature and that TECAM should pursue activities related to environmental issues.

An *Ad Hoc* Meeting of Experts on the External Evaluation of the Committee on Aquaculture and its Networks was convened in Rome, Italy, in March 2004. The Group of experts stressed that the activities under the EAM Network have only partly been addressed by the TECAM Network, and that the former should be resumed and operated as a separate entity. Indeed, the Group noted that among the weaknesses of the four networks was the fact that they were not used as tools for policy issue discussion and implementation, and that liaison and collaboration among networks was inadequate (GFCM, 2003a).

At its Fourth session (Alexandria, Egypt, June 2004), the Committee stressed that an adequate share of the GFCM autonomous budget should be allocated to support and direct the activities of its networks and to strengthen the synergies among them. Specific recommendations were endorsed concerning the strengthening of TECAM, SELAM and EAM networks. In particular, the re-establishment of EAM was recommended, including the broadening of its scope of activities to encompass issues of strategic and regional importance (GFCM, 2004a).

At its Extraordinary Session (Malta, July 2004), the GFCM endorsed the above recommendation from CAQ and further agreed that funds from the GFCM autonomous budget, for CAQ activities be dedicated in priority to the strengthening of SELAM and the re-establishment of EAM.

Finally, at its 29th session (Rome, Italy, February 2005), the Commission reiterated the the need to re-establish EAM and to have it functional timely. The EC delegate further insisted on the particular relevance for the Community to benefit from an efficient EAM network, and, following an explicit request from Croatia, the delegate from France expressed willingness to positively consider various options to give a new impetus to EAM. The Commission, however, did not discuss the working paper (GFCM/30/2005/8), already put before GFCM at its Extraordinary session by which, the Secretariat was inviting GFCM to provide clarifications on the institutional relationship between CAQ and its networks, particularly for EAM, on the issue of coordination and financing.

## **2. RELEVANCE OF CURRENT SCENARIOS AND FRAMEWORK FOR THE SCOPE OF EAM IN THE XXI CENTURY**

### **2.1 Present state of Mediterranean aquaculture**

Marine and brackish water aquaculture production in the Mediterranean and Black seas has increased steadily since the 1980s and in 2003 reached an estimated 371 000 tons (FAO Fisheries Statistics, 2005) of which the largest proportion is represented by marine finfish (49%). Aquaculture production is expected to continue at the present level or is expected to increase some more.

### **2.2 Missing information for policy and decision making process: a potential scope for EAM**

Although aquaculture relieves pressure on fisheries, its impact on aquatic resources and on the environment is not yet fully understood and is still being debated.

In general, while local effects of nutrient enrichment are very well covered by the UNEP/MAP report (2004) and by other recent studies (Karakassis *et al.*, 2005), there is little or no information on ecosystem carrying capacity at regional levels, for example in the Adriatic Sea, or along the coasts of Greece, etc. Such information is very relevant to prevent regional eutrophication, hypoxic conditions, outbreak of red tides, toxic outbreaks, etc.

Other potential impacts are not well studied, such as the effect of escaped fish and their interactions with wild species and fisheries. In a similar case are the potential effects of species introductions and transfers. Indeed, much of the research on the genetic impacts of farm escapes and restocking concerns salmonids, especially Atlantic salmon and brown trout, whereas much less is available for Mediterranean marine species.

Similarly, for the use of chemicals and drugs, such as antibiotics, pesticides, vitamins, etc., it is acknowledged that there is limited or no information on their effects in the Mediterranean Sea, while effects are well documented elsewhere.

There is comparatively less information on the effects of bivalve aquaculture on the Mediterranean Sea and such effects should not be underestimated. Indeed one of the first activities of EAM included a seminar on "Environmental aspects of shellfish culture in the Mediterranean, with special reference to monitoring" (Dubrovnik, Croatia, July 1994; FAO, 1996).

There are also new forms of aquaculture which have recently being developed in the Mediterranean, one of the most relevant being blue fin tuna fattening, the impact of which is still largely unknown. The *ad hoc* GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/ Fattening Practices in the Mediterranean recently adopted the "Guidelines on Sustainable Bluefin Tuna Farming Practices in the Mediterranean" (GFCM/ICCAT, 2005). These guidelines put much emphasis on environmental issues, especially environmental impact assessments (EIA).

### **2.3 Opportunities**

An important event during the past decade was the adoption of the FAO Code of Conduct for Responsible Fisheries (CCRF) in 1995. The above mentioned Consultation on the Application of Article 9 of the FAO CCRF in the Mediterranean Region (FAO, 1999), especially its Action Plan, should be considered as an important step forward that could serve as a guide for future actions of EAM.

The active presence of the FAO regional projects in support of GFCM (AdriaMed, CopeMed, EastMed and MedsudMed) could also provide opportunities for investigations, interactions, joint activities, coordination, etc.. For example, AdriaMed organized in November 2003. In addition to providing a

comprehensive framework on aquaculture in the Adriatic, the Consultation defined a matrix and identified indicators using a systemic approach (ecology, economy, governance and legal framework) to support the analysis of the interaction between the two sub-sectors. The results of the Consultation were highly received by the fourth session of CAQ as well as the Sixth session of the GFCM Scientific Advisory Committee, and it was recommended to consider using such an approach in other part of the Mediterranean, taking into account the impact on biodiversity, restocking, space competition, marketing and the role of local fishing communities.

As mentioned above, other networks under or within the GFCM-CAQ realm have partially taken environmental “responsibilities”. Such is the case of TECAM and SELAM under the coordination of CIHEAM. As an example of such activities there was the CIHEAM sponsored seminar on the “Impact assessment of Mediterranean aquaculture farms” (Uriarte and Basurco, 2001) already referred to. Also the UNEP/MAP 2004 report which is the latest synthesis of environmental issues related to aquaculture in the Mediterranean provides important baseline information and advance in the understanding of the environmental problems in the Mediterranean (or evidence of the lack of it). Another noticeable initiative has been developed by IUCN who held a special seminar on environmental issues in the MED (De Monbrison, 2004). In April 2004, an International workshop entitled: “Sustainable aquaculture: animal welfare, human health and interactions with the environment” was held in Pontignano (Siena, Italy) (Focardi, 2005).

Numerous scientific groups have been doing research related to aquaculture and environment in the Mediterranean Sea with an ecosystemic perspective including the development of norms and regulations (ASLO 2005, ECASA 2005, MARAQUA project, Read *et al.*, 2001, MEDVEG project 2004, see section 4 for details). The presence of these groups, networks, NGOs, etc., with potentially common interests could be considered as a great advantage for partnership.

Another opportunity relies on SIPAM, which is now being renewed, which could serve as a dissemination of synthesis information on environmental issues and conditions of sub-regions, coastal areas, etc., produced by EAM if the latter could operate as a robust subsidiary body of CAQ.

However, all these initiatives may require coordination and streamlining, only if, to avoid overlaps, to ensure cost-effectiveness and possibly lead to establish the basis for sound decision making process. EAM within the GFCM and related partnership framework could play an important role in this respect.

### **3. CONSIDERATIONS FOR THE RE-ESTABLISHMENT OF EAM**

#### **3.1 Selected Issues related to EAM mandate**

Although there are several environmental initiatives related to aquaculture in the Mediterranean, there is a need to integrate all actions, existing networks and programmes to ensure GFCM with the provision of suitable advice and recommendations that could be channelled as enabling decisions on aquaculture and environmental issues for GFCM Members. This is relevant particularly considering that the Mediterranean is one ecosystem even though it may be necessary to consider different basins carrying capacities in order to protect the whole ecosystem. On the other hand the need for a coherent regulatory framework on a regional scale has been strongly recommended by the UNEP/MAP (2004) review.

These are complex issues since there are numerous initiatives which are somehow networking on environmental issues in the Mediterranean (e.g. UNEP/MAP, ECASA, etc.). However EAM can play a role coordinating these actions under the CAQ and GFCM umbrella.

In general from the experience of other working networks such as NACA it is very important to underline clearly which are the services to be provided by EAM and establishing some sort of “Value” for such services. Some of these “Services”/activities are describe in the following paragraphs.

**a) Toward a common environmental regulatory framework for aquaculture activities**

Even though from a scale perspective aquaculture contributes only with a very small proportion to the pollution (eg. organic matter) into the Mediterranean Sea (Karakassis *et al.*, 2005), given its location in coastal zones, often well exposed to public perception, its potentially notorious local impacts could make the activity “damaging” or perceived as such.

Often, problems with licencing of aquaculture sites and the different regulations and requirements (or the lack of them) for different regions within a country and among countries make difficult the development/use of clear environmental standards and even more the reinforcing of such regulations. Although for European countries the EU<sup>2</sup> requires that certain aquaculture activities undertake some various type of Environment Impact Assessments (EIA) before a permit/licence is granted, variability among countries could be great (Read *et al.* 2001).

Therefore EAM could play an essential role for promoting the development of guidelines and common environmental methodologies and standards, thereby contributing to the establishment of a coherent and compatible regulatory framework. For example, commonly accepted EIA systems and monitoring tools for aquaculture could further produce a database with a GIS support system and could be connected to a more global permanent monitoring program.

**b) Permanent environmental monitoring program of the Mediterranean connected to the Aquaculture activities.** Such program should evaluate the general physicochemical conditions of the Mediterranean taking care of potential eutrophication events, climatic events (increases in temperature, decreases in Oxygen, development of red tides or harmful algal blooms). Such monitoring program would also serve as a prevention tool with warning capabilities for environmental management. Such a tool should also help the farmers to better planning the production process, optimizing feed conversion factors etc. Global warming is a fact and it is also being observed in the Mediterranean where there are clear sea warming tendencies (Duarte *et al.*, 1999; Duarte, 2003) which may have strong effects on aquaculture. Such monitoring program should also produce a GIS connected with production intensity and distribution of aquaculture activities.

The data bases and information should also be connected to the action of other Networks/Entities/Projects such as SIPAM, AdriaMed, CIHEAM, IUCN, ECASA etc. There are some data bases and modelling systems such as MODB<sup>3</sup> (Mediterranean Oceanic database of the University of Liege Geohydrodynamics and Environmental Research) which should also be linked to support more localized information for Aquaculture. This kind of information of technical character could be edited and translated for practical use in Aquaculture.

**c) Developing responsible Management Practices for farmers in the Mediterranean Sea.** This can offer important advantages not only for the environment but also for the access to regional and global markets; here the Network could act as a coordinator amongst the scientific technical community- the private sector- governments. Such activity with private sector could include other related actions such as the establishment of Clean Production Agreements which can be achieved in a stepwise manner being easier to adopt by farmers. Management practices can be revised and permanently improved according to technological development, training etc.

**d) Facilitating the development of integrated aquaculture projects optimizing the use of coastal zones** and minimizing environmental impacts, e.g. coupling mussel farming with fish farming (Neori *et al.*, 2000). The integration of some forms of aquaculture and fisheries could be very synergic both diminishing environmental impacts because organic matter/nutrients are better re-cycled and also because it can provide better environmental conditions for the culture of fish (cleaner water) and filter feeders which have more food. Also the possibility to couple aquaculture and recreational fisheries has been little

<sup>2</sup> EC Directive 97/11/EC amending Directive 85/337/EEC

<sup>3</sup> <http://modb.oce.ulg.ac.be/modb/welcome.html>

explored although having much potential. Such approaches could provide environmental, economic and also social benefits when there is enough outreach to the community on the advantages of such systems. Such facilitation should include the better management of aquaculture and fisheries interactions.

Such activities could require developing a GIS base description (with oceanographic data, carrying capacities of areas etc) of adequate and optimal areas for different aquaculture activities, defining as well optimal areas for integrated aquaculture and polyculture.

**f) Monitoring and prevention of diseases for cultured fish** and other species. The Mediterranean is one ecosystem including multiple connected basins therefore having intensive aquaculture even though it may be spatially spread will always present the risk for diseases outbreaks and dissemination. A permanent data base and GIS map of present diseases and health status/problems for aquaculture species will be an “insurance” tool and a very relevant management tool.

**g) Specific actions for mitigation of impacts** of high societal and environmental relevance. The development of joint and coordinated mitigating actions to solve impacts from aquaculture for example the damage to *Posidonia* beds. This could include recreation of habitats, protection activities etc.

All the above proposed initiatives can be undertaken through several independent and /or coordinated actions such as workshops, training courses, working groups etc. These would need a consolidation and/or redrafting of EAM mandates and the identification of the most suitable institutional set-up to ensure sustainability, including funding.

Many of these initiatives have been partially or fully mentioned in the “Element C of the Action Plan for the Promotion of Responsible Aquaculture in the Mediterranean” (FAO, 1999, see Annex 2).

### **3.2 Experts meeting**

As mentioned above, at its Extraordinary session in 2004, GFCM decided that a Meeting of Expert for the re-establishment of the Network on Environment and Aquaculture in the Mediterranean should be organized, as soon as the autonomous budget will permit it. This Meeting was scheduled to take place in Rome, Italy, 7-9 December 2005.

#### **Main objectives of the meeting**

- To bring together the relevant expertise and knowledge on issues related to aquaculture and the environment, including operational networking frames and elaborate a diagnosis of present situation;
- To identify the rationale, objectives, mandate and operational structure for EAM, taking into consideration existing programmes, network and institutional available capacity;
- To set-up initial common priorities and activities on the basis of a short-medium term programme of work for EAM, and,
- To suggest the most appropriate institutional set-up and *modus operandi* for EAM.

### **3.3 Institutional set-up, structure and functioning of EAM**

Once the relevant issues and actions to be undertaken by EAM (under a general framework of initiatives such as those proposed above) have been developed, these would need to be translated into a programme of work and preliminary budget, from which funding would be investigated.

From the institutional stand, many options could be envisaged, among which are the following:

- EAM is maintained as a “Network” coordinated through an International Organization (as in the past) or a national institution, although it will continue to report to the GFCM and receive guidance from the Commission;

- EAM is developed as a full-fledged subsidiary body of the GFCM Committee on Aquaculture. This can take the format of a Sub-committee, of a Permanent Working group or as a set of independent, *ad hoc* and problem solving activities based on experts networking, or, a combination on those.

It can also be foreseen that the *modus operandi* and financing of EAM would, in turn, likely be influenced by the institutional set-up retained.

**DRAFT TORs AND ESTIMATED BUDGET  
FOR INITIAL ACTIVITIES OF EACH WORKING GROUP**

**WORKING GROUP 1. Harmonization of environmental regulation and standards for aquaculture**

- Activity 1.1. NALO type of studies on legislation and regulation for aquaculture
- Activity 1.2. Formulation of a set of recommendations for the harmonization of Med legislation

Budget : \$ 600-1000 / NALO

Approximate Total \$ 15 000

**WORKING GROUP 2. SCALING AQUACULTURE-ENVIRONMENTAL INTERACTIONS**

Activity 2.1 could start in 2006, within the GFCM project (no special project)

Activities 2.2 and 2.3 should be part of a specific project, for which a project proposal should be written, and financial support searched.

Activity 2.1: Identification of information sources

- Review of global progress on aquaculture environmental interactions and identification of key issues
- Inventory of existing and past research (and monitoring?) projects on this issue (national and international) in the Med
- Bibliographic list including published papers and reports on aquaculture-environment interactions throughout the Mediterranean
- Classification of information on the above in terms of variables/processes addressed, spatial-temporal scales examined
- Gap analysis

Time not considered within the project budget: 3 months

***Budget***

labour: 6 person months\* 1500 Euros/month (€9 000)

Meeting: 8 experts \* 3 days = €14 000 (meeting aims report draft, planning year 2, preparation of project proposal)

Report €3 000

General costs: 10%

Total= €29 000

Duration : 12 months

***Deliverables:*** 1 report

Electronic data base

Planning of year 2

Project proposal

Activity 2.2. Synthesis (based on achievements of activity 2.1)

- Extraction of data from the above (2.1)
- Meta-analysis of existing information to identify common patterns in response to different driving forces

- Comparison of observed change in environmental variables due to aquaculture, at different scales, to other existing standards in environmental quality indicators (e.g WFD)
- Selection of most relevant indicators of environmental change and evaluation of their cost benefit ratio, feasibility, applicability

Time not costed in the project: 6 months

**Budget**

labour: 12 person months\* 1500 Euros/month (€18 000)  
 Meeting: 16 experts \* 3 days = €28 000  
 General costs: 10%  
 Total = €51 000

Duration: 12 months

Workshop with external participants (35 people) €60 000 (extra funds)

Activity 2.3. Formulation of guidelines

- Identification of issues needing guidelines at Mediterranean level
- Inventory of existing guidelines
- Types of aquaculture
- Types of environments
- Spatial scales involved

Draft guidelines for uniform methods/standards/protocols in the Med (monitoring, management, EIA)  
 Evaluation by stakeholders (administration, policy makers, farmers, NGOs, scientific )

Identification of training/infrastructure needs to implement the above

Time not costed in the project: 6 months

**Budget**

labour: 3 person months\* 1500 Euros/month (€4 500)  
 Meeting: 25 experts \* 3 days = €35 000  
 Final Meeting all activities 8 experts \* 3 days = €14 000  
 General costs: 10%  
 Total= €60 000

Duration: 12 months

**Deliverables:** Database  
 Workshops  
 Documents  
 Web site

**WORKING GROUP 3. INTEGRATING AQUACULTURE WITHIN A COASTAL ZONE MANAGEMENT FRAMEWORK.**

Site selection in aquaculture is a key issue to be addressed by EAM. It must be recognized that site selection decision making must be viewed on an integrated way such as ICZM, zoning, or ecosystem approach. Site selection is continuously evolving process which must take into account the growth of aquaculture sector, the evolution of production techniques, interaction with captured fisheries and other

human activities, etc., considering present knowledge on environmental conditions, and should thereby be considered as an open book and therefore be revisited periodically.

The mandate of the WG is to:

- i) develop practical guidelines for aquaculture site selection. Procedures to be used in site selection according to technology and species (e.g. GIS analysis, viewing environmental data over space and time, etc.). Identify main environmental conditions - define for each specific zone holding capacity. (Activity 3.1. Site selection criteria)
- ii) provide administration with suitability criteria for the zoning and site selection, licensing and administrative management of zones and sites. (Activity 3.2. Zoning for aquaculture)
- iii) identify the main interactions between aquaculture and capture fisheries and human activities, develop indicators and propose guidelines to reduce conflicts, promote synergies that can ensure a sustainable development of aquaculture within the coastal zone (including for best management practices). (Activity 3.2. Interactions between aquaculture and capture fisheries)

Workplan and Proposed budget for 3 years:

1<sup>st</sup> Meeting (2<sup>nd</sup> semester 2006) : €20 000 euros. To be covered by GFCM

Definition of objectives for every workshop

Definition of methodology and workplan

Identification of consultants, experts and coordinators

Fine tuning of budget and projects for donors

3 Workshops (one per action) on 2007 and 2008

Estimated cost per workshop (including preparatory consultation, organization of meeting, reports and publications )

€50 000 per workshop x 3 = €150 000 . GFCM to cover 30% (25 000 per year)

#### **WORKING GROUP 4. PUBLIC PERCEPTION OF AQUACULTURE IN RELATION TO ENVIRONMENT** (Aquaculture as an activity and as a product – including human health issues),

(PROJECT PROPOSAL)

- Activity 4.1. To prepare adapted and homogeneous questionnaires to be disseminated to all Mediterranean countries at four different levels: consumers, fishermen, administration, medias; the objective is to identify the components of the perception of aquaculture and aquaculture products
- Activity 4.2. To undertake the survey in each country at the four levels
- Activity 4.3. To synthesize the results at the national level
- Activity 4.4. To synthesize the results at the regional level and consequently to identify the major issues and criticisms addressed to aquaculture in the Mediterranean countries
- Activity 4.5. To propose concrete actions to evaluate and counteract the possible negative image of aquaculture as well as to build on the existing positive image (to provide notably supports to national implementation. e.g. information leaflets, specific adverts, feature articles in specialised or wide public magazines, public debates, ...)

Products:

- Questionnaires
- National reports on the surveys
- Regional report on the general survey

- Proposal for a regional programme of actions to be adapted to the national specific characteristics
- National outputs of the above mentioned programme: leaflets, features articles...

### Estimate Budget

#### 1) Consultant 7,000 UD

- coordinate, select experts, prepare a draft document (working doc)

#### 2) Meeting

8 experts from Mediterranean countries + FEAP

Skills: Socio-Economics, Aquaculture, Communication

Travel 600 USD/person

+ DSA tot 10,000 USD

Cost estimates to produce a full project ready to be presented to a funding agency.

A meeting attended by 8 people including an expert meeting to prepare the project draft approx. 17 000 U\$.