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**REPORT OF THE ADRIAMED EXPERT CONSULTATION
ON THE INTERACTIONS BETWEEN AQUACULTURE
AND CAPTURE FISHERIES
Rome (Italy) 5-7 November 2003**

* Available only in English

FAO-AdriaMed
Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea
GCP/RER/010/ITA

Report of the AdriaMed Expert Consultation “Interactions between
Capture Fisheries and Aquaculture”

¹ Rome (Italy) 5-7 November 2003

Introduction and background information

The FAO AdriaMed Expert Consultation on the Interactions between Capture Fisheries and Aquaculture was held in Rome (Italy) from 5 to 7 November 2003 and hosted by the Italian Ministry of Agriculture and Forestry Policies, Directorate General for Fisheries and Aquaculture. The Consultation was attended by experts from the AdriaMed participating countries (Albania, Croatia, Italy, Serbia Montenegro and Slovenia), by the President of the Scientific Advisory Commission (SAC) of the General Fisheries Commission for the Mediterranean (GFCM) and by the staff of the FAO Regional Project and by the staff of the Inland Water Resources and Aquaculture Service (FIRI) of FAO.

The Italian Director-General for Fisheries and Aquaculture, Mr Attilio Tripodi kindly welcomed the participants and underlined how the Italian Government gives particular relevance to the FAO multilateral initiatives, which are also considered a means for dialogue with the Mediterranean countries, as in the case of AdriaMed and MedSudMed Projects. Furthermore the fact that Italian Government intends to give support to a new FAO Regional Project in the Eastern Mediterranean underlines the belief that greater cooperation at all levels, even in fisheries, can assist in the resolution of regional issues.

The rationale for this Consultation goes back to the first Coordination Committee Meeting of the Project² in the year 2000 in which the representatives from the AdriaMed Countries recognised the important issue of responsible aquaculture and suggested the organization of an expert consultation on the interactions between aquaculture and capture fisheries. The representatives underlined the aspect that aquaculture could determine market and environment effects on fisheries activities and particularly on the prime species market. This initiative could represent a contribution at sub-regional level to the implementation of the principles of the FAO Code of Conduct for Responsible Fisheries (CCRF) concerning responsible aquaculture activities. During the third GFCM Committee on Aquaculture (CAQ) the interactions between aquaculture and capture fisheries were confirmed as priority issues. Furthermore during the Twenty-eighth Session of the GFCM held in Morocco (October 2003), the Consultation was also recalled and was included in the programme of activities in support of the SAC and the CAQ.

¹ The outcome of the AdriaMed Expert Consultation on Interaction between capture fisheries and aquaculture including the author's contribution indicated in this report, will be published as *GFCM Studies and Reviews and AdriaMed Technical Documents series*.

² AdriaMed. 2000. Report of the First Meeting of the AdriaMed Coordination Committee. FAO-MiPAF Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea. GCP/RER/010/ITA/TD-01: 64 pp.

The aims of the Consultation were to achieve a comprehensive description and analysis of the aquaculture sector in the countries which border the Adriatic Sea³, and acquire the tools to improve the knowledge on the relationships between fisheries and aquaculture in the area⁴.

The principal objective of the Consultation was to explore the main issues dealing with the interactions between aquaculture and capture fisheries using the existing knowledge at Adriatic basin level. The national contributions provided background information on the aquaculture sector in the Adriatic countries.

The summary of the contents, results and recommendations of the Consultation are given hereunder.

General issues relative to the interaction between capture fisheries and aquaculture

The general principles and the methodological framework of the Consultation were based on the factor that both aquaculture and capture fisheries have the objective of producing aquatic products for human consumption. The separation between the two sectors has been reinforced in a scientific context and the discussion concerning the interactions between aquaculture and capture fisheries has only recently begun. The FAO CCRF defines the global framework in which aquaculture and capture fisheries are to be considered as parts of the same system. The importance of having correct assessment of such interactions represents one of the crucial issues for the implementation of the Code especially in areas where the use of the coastal zone increase rapidly and conflicts may arise from many resource user (not only fishers and fishfarmers) all competing for space and resources. The presence of a specific article in the Code which deals with aquaculture is of particular significance and marks an important step forward in the systemic treatment of fisheries. Aquaculture is clearly placed in the fisheries system and if responsibly developed, could contribute to trace the pathways towards responsible fisheries. The Consultation provided specific recommendations within a systemic approach in which the different dimensions of fisheries (governance, ecological, economic and social) are taken into consideration⁵.

³ During the Expert Consultation a general preparatory documents presented the state of fisheries and aquaculture in one of each of the Adriatic sea: these include the Aquaculture Country Profile of the Adriatic countries (Croatia, Slovenia, Albania, Montenegro and Italy) and the presentation of the Adriatic capture fisheries profiles at sub regional level. In these background documents the more relevant topics on the relationships between capture fisheries and aquaculture were also considered.

⁴ Discussion was held on four thematic areas considered relevant for the expert consultation. A first discussion theme concerned general issues relative to the interaction between capture fisheries and aquaculture; a further two themes dealt with interactions between capture fisheries and aquaculture in the market and concerning product quality; the fourth theme concerned a case study: tuna farming. The Consultation suggested that local targets for conservation and management should be established, with particular reference to the species or group of species, for which the interaction between capture fisheries and aquaculture is strong (blue fin tuna; Northern bluefin tuna, *Thunnus thynnus* L., fishing and farming in the Adriatic Sea, I. Katavic, V. Ticina, paper presented to the Consultation; European eel and shell fish). With respect to eels, the Consultation made reference to the existing Action Plan "Development of a Community Action Plan for the management of European Eel" COM(2003) 573 final). The contributions on eels (Interactions between capture fisheries and aquaculture: the case of the eel, *Anguilla anguilla*. E. Ciccotti, paper contribution) and the shellfish (Interactions between capture fisheries and aquaculture: the case of shellfish, G. Prioli, paper contribution) were submitted to the Project as technical papers after the Consultation.

⁵ Interactions between capture fisheries and aquaculture. S. Cataudella, F. Massa, D. Crosetti (paper presented to the Consultation)

Short overviews of the status of capture fisheries and aquaculture in the Adriatic Sea

Adriatic marine capture fisheries have developed since historical time. Due to the semi-enclosed nature of the Adriatic Sea basin, one of the principle features of Adriatic fisheries is that of taking place in one of the largest and best-defined area of occurrence of shared stocks in the Mediterranean. The shared character of Adriatic fishery resources makes it necessary to take in full consideration the indications provided by the CCRF with respect to the issue of shared stocks which emphasizes the cooperation among states as essential and unavoidable requirement to pursue responsible exploitation of such resources. A review of the recent history of some traits of Adriatic fisheries provides an insight on their complexity where several different factors, which may interact simultaneously, can play an important role. Performance dynamics of some fisheries besides being based on resources availability are also strongly driven by market demand and prices. Such multifaceted fishery systems should ideally be addressed and managed through multidisciplinary analysis⁶.

The description of the aquaculture sector for each Adriatic country (Albania, Croatia, Italy, Montenegro and Slovenia)⁷ provide general information on its history, tradition, and evolution and describe the main characteristics of the sector (historical statistics, species reared, methodologies and technologies applied, production data and seed availability); the national policy (national plans, legislative framework, environmental impact assessment, economical feasibility), and the production market (macro economic indicators, export/import; national policy concerning quality control and labelling policy).

Aquaculture in the Adriatic is characterised by a high differentiation in both cultured species and applied technologies, determined by various historical, environmental and socio-economic conditions, and by the different morphology of the eastern and western coasts. The diversity of aquaculture activities and their development emerge from the national reports (local fishing communities, environmental impact on fishing grounds, market competition). However, in some cases aquaculture and capture fisheries are already highly interconnected and this is also reflected in some countries at local (local plans and Coastal Zone Management) and national level (National Commission on Fisheries, Strategy and Development Plans).

⁶ Adriatic Sea Fisheries: outline of some main facts. P. Mannini, F. Massa, N. Milone (paper presented to the Consultation).

⁷ Short overview of the status of aquaculture in the Adriatic countries: Albania, by A. Flloko; Croatia, by V. Franicevic; Italy by G. Marino, E. Ingle, S. Cataudella; Montenegro by V. Macic; Slovenia by M. Kadoic (papers presented to the Consultation).

Overview of the interactions between capture fisheries and aquaculture

Market and quality were considered as key arguments within the relationships between capture fisheries and aquaculture in the Adriatic area.

The market of fish products with specific reference to the Adriatic Sea stressed the influence of different distribution channels for farmed products and by-catches and their link to the trend of the market price, as well as the cost of imported products. The importance of the demand for cultured species is also determined by the pattern of added value in terms of labelling, brand certification, traceability and other information that qualifies the product⁸.

Fish quality and certification systems are continuously important in both capture and cultured products. A closer interaction between aquaculture and capture fisheries is relevant as the product reaches the same market place. Wild and cultured fish products can be considered substantially equivalent to meet the human nutritional requirements. As far as quality is concerned (commercial size, organoleptic and chemical nutritional attributes) differences exist for the same fish species due to the seasonal reproductive phase and to the quality of the aquatic environment. Quality changes from farm/boat to table, and new techniques for improvement and quality certification are required for both captured and fish-farmed products.⁹

One market strategy for the fisheries sector is to increase the quality and certification of the product. On the question of quality and market, especially of tuna, seabass and seabream, the improvement of the quality of the product generally represents additional costs (up to 20-30%) for farmers. The consumer in some cases is willing to pay a little more for a product where quality is guaranteed, but this is not always so in some parts of the Adriatic area where the minimal consumer spending power constitutes a limiting factor. Labelling of fish products represents an important tool to guarantee food safety and quality to the consumer. However, the danger of too many labels can generate misrepresentation and/or confusion to consumers. A specific strategy is required to guarantee a correct labelling system for the area, as it is important that fishery products do not lose credibility and therefore their value. National or indeed sub-regional coordination is a useful step to be competitive on the market. In spite of the recognised importance of eco-labelling, in areas where quality certification strategies are less well developed, producers can fear that an excess of internationally fixed standard could create a barrier to the development of their activity. Certification must not become a limiting factor⁹.

The case study on blue fin tuna farming provided a good example of different interactions between capture fisheries and aquaculture, and how the two sectors could be synergic or not.

⁸ Market interactions between fishery and aquaculture in Italy, M. Cozzolino (paper presented to the Consultation).

⁹ Quality and certification of fishery products from both capture and farming in the same market place, B.M. Poli (paper presented to the Consultation).

Blue fin tuna farming in the Adriatic area and in particular in Croatia¹⁰ is a typical example of relationships with capture fisheries, as it involves issues common to both aquaculture (i.e., cage technology) and capture fisheries (i.e., gear technology and stock assessment). The principal fishing grounds for Croatian blue fin tuna purse-seiners are offshore waters of the central part of the Adriatic Sea. After capture, tuna are transferred into a floating towing cage. The use of space in the sea for cage allocation and also the use of small pelagic fish as feed are elements of interaction with capture fisheries.

Tuna farming shows positive interactions with capture fisheries (fleet reconversion, restocking, market, etc.), but can also have a negative impact on tourism, navigation during the transport of live fish and conflicts with longline fishing. However, tuna farming does not only aim at producing biomass but at improving the quality of the final product for the target market, which is for the most part Japanese. Currently market demand changes according to the season, and quality. If farmers manage to maintain a constant high level the market will react accordingly, thus increasing product value and improving benefit.

A further relationship between aquaculture and capture fisheries is the use of small pelagic species, especially sardine, as fish feed in tuna farming. This is an important area for the future development of interactions, which could require further study.

Identification of a set of indicators

A comprehensive framework of aquaculture and capture fisheries in the Adriatic countries was defined as a result of the presentations on specific themes provided by the regional experts and the discussion that followed the Consultation's methodological approach.

In the Adriatic Sea the interactions between aquaculture and capture fisheries is determined through a series of inputs according to the nature of the decisions made by aquaculture or fisheries activities. At different levels these interactions could determine a positive or negative impact for each different fisheries dimension: governance, ecological, economic and social. The importance of the correct assessment of such interactions and the establishment of local and regional targets for conservation and management, represent the basic steps towards the sustainable development of the two sectors in the Adriatic area. The use of an appropriate set of indicators could help in monitoring the different levels of these interactions and support the decision-makers in the process of identifying or implementing a specific action at local and national level¹¹.

¹⁰ Northern bluefin tuna, *Thunnus thynnus* L., fishing and farming in the Adriatic Sea, I. Katavic, V. Ticina (paper presented to the Consultation).

¹¹ On the basis of the information available, a preliminary commented inventory of the main (or potential) relationships between aquaculture and capture fisheries were presented and discussed, including: local fishing communities (i.e. competition for coastal area use), the impact of aquaculture on local aquatic resources (i.e. genetic pollution, exotic species introduction, pathology spreads), market competition, product quality, mechanisms to control and prevent competition, existing agreements.

In order to monitor the relationships between aquaculture and capture fisheries in the Adriatic Region, a table (Table 1) was prepared by the experts present at the meeting, as a first step towards the definition of a set of indicators¹².

In the table, for each Dimension (governance, ecological, economic and social) a number of issues were identified (Table 1, Column 1). These issues represent a series of conditions for which some interactions between aquaculture and capture fisheries exist or might be produced.

The necessary criteria to identify reliable indicators (Table 1, Column 2) associated with the Dimensions are indicated.

A series of specific technical recommendations (Action Tools) are identified. These tools in many cases represent an instrument that aims to develop local, national or regional strategies or a monitoring system which might be considered by the participating countries.

The Consultation considered the Table proposed as methodological contribution to the identification of the list of reliable indicators to be monitored, but also represents a basic element to addresses research and monitoring programmes towards the study of relationships between capture fisheries and aquaculture. The structural approach and the content of the Table proposed was not considered exhaustive but it was intended to provide a useful checklist for further explanation and development¹³.

The use of these indicators allow support to be given to the decision-makers in management strategy and in assessing progress towards sustainable development of the sector.

Recommendations of the Consultation

The AdriaMed EC on the Interactions between Aquaculture and Capture Fisheries concluded that positive and negative relationships must be considered in the context of integrated CZM. Aquaculture and capture fisheries could benefit from the appropriate assessment of the interactions between these two sub-sectors.

The Consultation adopted a series of recommendations addressed to the Adriatic countries, which could be summarized as follows:

- The establishment of national programmes and international cooperation for research activities dealing with the interaction between capture fisheries and aquaculture would be useful in both marine and freshwater environments

- The implementation and the monitoring of the principles of the CCRF in many cases needs appropriate assessment on the interactions between capture fisheries and aquaculture,

¹² The indicators selected followed a methodological approach consistent with the FAO Technical Guidelines for Responsible Fisheries No.8 “Indicators for Sustainable Development of Marine Capture Fisheries”, for which the same terminology was also partially adopted.

¹³ In order to provide additional and useful information for the finalization of the Table of indicators, experts from the Adriatic countries sent additional information. In particular information on the state of the existence of specific Action Tools (i.e National Programme, Fisheries Regulations, CZM plans) were provided to the AdriaMed Project for further development of the Table.

leading to benefits to both sub-sectors (increased product value, optimal use of discards and by-products from capture fisheries, safeguarding of income for small scale fishermen through reconversion policies from capture to farming).

- The possibility of developing pilot projects at sub-regional level (Adriatic Sea) based on the enhancement of interactions between capture fisheries and aquaculture should be considered.

- Fishermen and farmers should consider the competitive opportunities that the positive interactions between capture fisheries and aquaculture can offer (total quality certification systems applied to specific local conditions, identification of new services such as tourism).

- In the coastal zone management planning approaches to allocate resources (space, grants, loans) to capture fisheries and aquaculture especially, in the case in which the relationships between capture fisheries and aquaculture contribute to the sustainable use of environmental resources, must be followed.

- Specific cases of interactions between capture fisheries and aquaculture, such as tuna farming, wild fry collection and coastal lagoons management, require a sound knowledge base and a decision making process based on the participation of the different stakeholders to be correctly considered.

The results of the Expert Consultation, including the Table with the indicators and the recommendations, were considered by the experts a useful support for the Adriatic countries in promoting guidance, which may be used in the development of national fisheries strategic policy and to advance relevant issues at sub regional level. These results will be also presented at the next AdriaMed Coordination Committee in order to orientate the Project for further development of this issue.