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GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

COMMISSION GÉNÉRALE DES PÊCHES POUR LA MÉDITERRANÉE

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

COMMITTEE ON AQUACULTURE (CAQ)

Seventh Session

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TREND AND ISSUES OF MARINE AND BRACKISH MEDITERRANEAN AQUACULTURE

INTRODUCTION

1. This document contains, in the first part, the main trend in aquaculture production in the Mediterranean and Black Sea countries. The overall trend covers the last 20 years, whereas the total growth rate is estimated for 2004-2008[1]. The data reported aim at illustrating the distribution pattern of marine finfish Mediterranean aquaculture, but do not include details in terms of production structures and marketing, which are provided in the documents made available to the seventh session of the CAQ (GFCM/CAQ/VII/2011/Dma.1 and GFCM/CAQ/VII/2011/Dma.2)

2. In the second part of the document specific highlights and priority issues are recalled and pointed out in support to the framework for the development of sustainable aquaculture in the GFCM area. These are based on the priorities selected by the CAQ at its previous session, as well as on the outcomes of its subsidiary bodies and the related documents in which the activities, conclusions and recommendations are reported (see list of documents in GFCM/CAQ/VII/2011/Inf.1).

MEDITERRANEAN AQUACULTURE TRENDS PRODUCTION OVERVIEW

3. The data on aquaculture production in the Mediterranean and Black Sea member countries are those covered by the FAO 37 statistical area, which normally includes species cultured in coastal areas, as well as other areas: FAO 04 (Asia inland) for the inland production of Lebanon, Syria, Israel, Cyprus and Turkey; FAO 34 Atlantic Eastern Central, for the production at sea of Morocco; FAO 01 African inland, for the inland production of Egypt, Libya, Tunisia and Morocco; FAO 27 Atlantic North for France and Spain; and FAO 05 Europe for the inland production of Spain, France, Italy,

[1] The FAO and GFCM aquaculture data bases, respectively FISHSTAT and SIPAM were used, focusing on the main species groups (i.e. fish, mollusc and crustaceans).

Malta, Slovenia, Serbia, Montenegro, Croatia, Albania, and Greece. Figure 1 illustrates all the FAO statistical areas associated with GFCM Member countries.

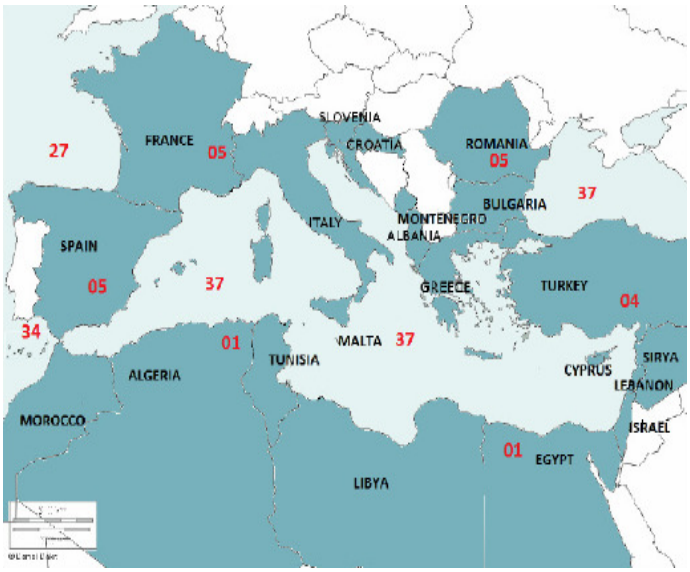

Fig. 1 FAO Statistical Areas

4. Increasing the understanding of the present situation of the aquaculture sector in the Mediterranean and Black Sea is essential to formulate recommendations for its sustainable development. The trend of the sector is therefore considered for common regions since the production, reported for a single statistical area can be biased by the limitation of data reporting. For these reasons the global trend in the Mediterranean countries is considered as a whole sector, and the production, over the last 20 years, is analysed considering the statistical areas covering the Mediterranean and Black Sea countries in a single pool.

5. The role of the aquaculture sector in enhancing global food production has been recalled during the 29th session of the COFI held in Rome (31 January – 4 February 2011). The trend of world aquaculture production over the last five years, excluding aquatic plants, rose by 25.3 % and increased from 41.9 million tonnes in 2004 to 52.5 million tonnes in 2008.

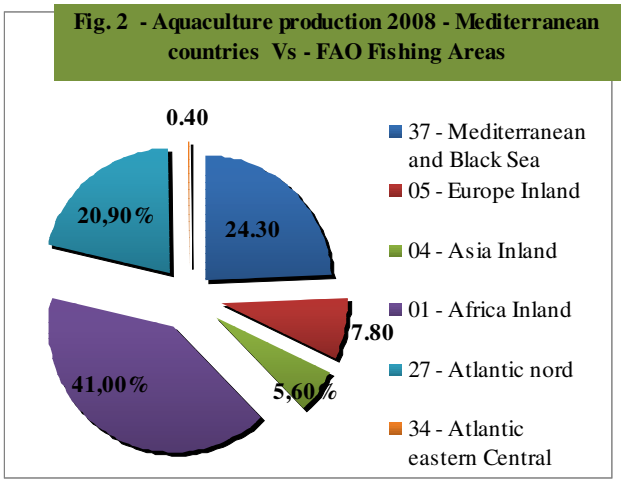

Fig. 2 Aquaculture production 2008

6. A similar trend can be observed for the whole aquaculture production of the Mediterranean and Black Sea GFCM member countries. It rose from 1,385,803 tonnes in 2004 to 1,706,117 tonnes in 2008, with an increase of 23.11 %. The different production figures provided in the "Trend and issues of marine and brackish Mediterranean aquaculture" reported during the VI Session of CAQ (2008,

Albania) is determined by the analysis made only for the area 37 and by the appropriate revisions made by the statistical sources. Considering only the FAO 37 statistical area, the aquaculture sector continued to develop rapidly and over the last five years the production increased by over 42%, from 291,838 tonnes in 2004 to 415,036 tonnes in 2008. Over the same period an increase of 47.47% for the Mediterranean countries in FAO statistical area 01 (North Africa) can also be observed but, on the contrary, the growth production has slowed (-0.48%) in the FAO statistical area 05 (Europe Inland) and even more so in the FAO statistical area 27 (North Atlantic) (– 13.7%).

7. Aquaculture in marine and brackish environment in the Mediterranean and Black Sea GFCM member countries is mainly characterised by the production of molluscs and fishes. The production of crustaceans and aquatic plants cannot be considered relevant in terms of quantities. According to FishStat data, total aquaculture production, including all the categories except aquatic plants, has increased from 406,461 tonnes in 1998 to around 1,031,674 tonnes in 2008, with an average annual growth rate of 11%.

8. Freshwater production increased from 149,433 tonnes in 1998 to 521,177 tonnes in 2008 with an average annual growth rate of 16%. The two main groups of fish species showed a different total growth rate from 2004 to 2008: carps and cyprinids decreased by -32%, and tilapia and other cichlids increased by 89%. The production of diadromous species during the last 20 years remains stable: 171,692 tonnes in 1998 and 176,526 tonnes in 2008, with an average annual growth rate of 0.23%. Within this category all the groups showed a negative total growth rate during the last five years: river eels -13.09 %; salmon and trouts – 14.58% and sturgeon -7.3%. The marine fish is the group that determined the major production increase in the last 20 years in the Mediterranean, from the 127,025 tonnes in 1998 to 434,095 tonnes in 2008, with an average annual growth rate of 16%. The production of flathead grey mullet (*Mugil cephalus*), European sea bass (*Dicentrarchus labrax*) and gilthead sea bream (*Sparus aurata*) in the last five years increased by 57.06 % , 42.98 % and 43.9 % respectively.

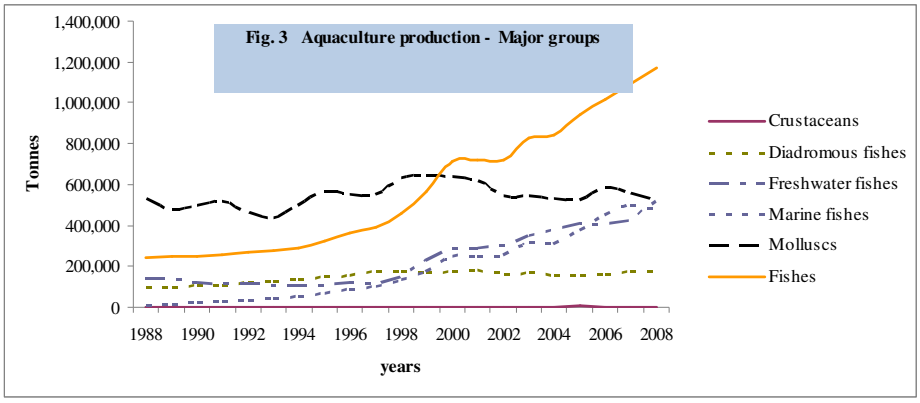

Fig. 3 Aquaculture production – Major groups

9. The total production of molluscs decreased from 634,557 tonnes in 1998 to 523,757 tonnes in 2008, with a negative average annual growth rate of -0,27%. The main species are mussels and oysters, the production of which decreased respectively by -9.55% and -6.80% from 2004 to 2008. Clams, cockles and arkshells are the only groups of molluscs that increased up to 10.9% in the same period.

10. Since the GFCM Recommendation GFCM/33/2009/04 for aquaculture data submission has been implemented, the information available on the portal of the GFCM dedicated to aquaculture, the SIPAM Production Statistics, considerably improved. The Recommendation refers, for its first year of implementation, to the data collected in 2008 and allows, amongst other things, to identify the species reared (quantity and value) and the different technologies and production structures used in different environments. In Table 1 and Table 2, 2008 production of fishes and molluscs, per country, are

provided, according to the production data available in the SIPAM system. These data are integrated with the FishStat data.

11. The production statistics referring to the Mediterranean and Black Sea countries, do not provide an complete picture of the sector. Mediterranean aquaculture consists of various segments depending on the species produced, the countries' tradition and the market conditions. In many countries the diffusion of technologies and the intensification of aquaculture practices is related to the displacement of cages at sea and raceways, along with the traditional systems of semintensive and extensive aquaculture dams, ponds, lagoons and estuarine areas. Egypt, Turkey, Spain, Italy, Greece and France are the main (inland and marine) producing countries. Egypt represents the major producer of fish, with common carp (*Cyprinus carpio*), mullets (*Mugilidae spp*) and tilapia (*Oreochromis spp*) representing 75%, 99% and 97% respectively of the total production of the region. Turkey is the major producer for European sea bass (*Dicentrachus labrax*) and trouts (*Oncorinchus spp*) , with 44% and 42 % of the total production of these species in the region. Greece is the main producer of gilthead sea bream (*Sparus aurata*) in the Mediterranean (41%). Regarding molluscs, Spain is the main producer of Mediterranean mussels (*Mytilus galloprovincialis*), France of Pacific cupped oyster (*Crassostrea gigas*) and Italy of Japanese carpet shell (*Ruditapes philippinarum*): their production accounts for more than 68 %, 98% and 93% respectively of the whole Mediterranean production for these species.

12. With reference to production values, some periods of crises were recorded. These been mainly caused by an unbalanced supply/demand which contributed to forcing the reduction of prices, particularly for some marine species as European seabass and Gilthead seabream. However, for these two species, according to recent information provided by the farmers' organisations, a reduced production of fingerlings was observed in 2009. This will possibly affect future production by about 20%. As a consequence, a possible inversion of the tendency in 2010, and probably also in 2011, is foreseen thus providing an increase of production.

13. Marine Mediterranean aquaculture is a dynamic industry and although the global production trend is growing, some segments of the sector are stagnant. At the same time, some sectors fluctuate and can potentially grow depending on the demand for fish products in the region. The long term stability of the industry is widely considered as an issue of concern for economic, environmental and sociological aspects. In this regard, environmental and marketing aspects of sustainable aquaculture are the most critical to be addressed, especially in relation to the difficulty to integrate aquaculture into coastal zone management. Moreover, the social acceptability and weak governance could further threaten the aquaculture sector.

14. The motivation that determined the increase and the significant changes in the Mediterranean and Black Sea aquaculture sector during the last decades were widely discussed during the last session of the CAQ and mainly focused on: political will; results of research applied; development of technologies; expansion of cage culture; refined fish feed technology, fish health management and new market perspectives.

15. Despite its growth, the CAQ identified some constraints that Mediterranean aquaculture is currently facing and that limits its further sustainable development: timely provision of statistics on marine aquaculture when assessing trends on aquaculture production and production capacity; market data availability; legal and institutional aspects; production and R&D issues and interaction of aquaculture with the environment and the other activities in the coastal zones.

16. The sustainability of aquaculture has been on the agenda of GFCM Member countries since the technical consultation held in FAO (Rome, 1999) during which the application of principles of the Art. 9 of the Code of Conduct for Responsible Fisheries (CCRF) were discussed. This consultation generated action plans for the development of sustainable aquaculture in the GFCM area.

17. The importance of the sustainable development of aquaculture in the Mediterranean Sea has been accentuated by a decrease in activities of coastal fisheries, intensive demand for space, multiple

(often conflicting) uses in the Mediterranean coastal zone, consumer sensitivity to aquaculture products and activity and high market competition.

18. The CAQ, recognising the priority of these issues, during its sixth session further stressed the importance for:

- the necessity for having timely statistics on marine aquaculture to assess the aquaculture production and production capacity; the availability of data marketing to monitoring the marketing of aquaculture products;
- the improvement of the acceptability of Mediterranean aquaculture products (awareness of environmental integrity, food quality safety, social integrity, certification and traceability, organic aquaculture, etc.);
- the attention on the interaction of aquaculture with the environment (interaction with sensitive habitats; assessment of monitoring procedures; harmonisation of regulatory procedures);
- the identification of sustainable site selection procedures for a better integration of aquaculture within the Coastal Zone Management and through an ecosystem perspective;
- the importance of monitoring the interaction between capture fisheries and aquaculture for their mutual benefit and potential conflicts in the context of Integrated Coastal Zone Management;
- the improvement on research on species and new diversification production models for new market opportunities;
- the importance of scientific cooperation, including sharing knowledge and data, and of coordination among the Mediterranean research institutions as a critical element for any further development of the sector. The cooperation should also cover training needs and national capacity building.

19. To better address these points, the CAQ formed in 2007 three working groups: WGSA (Working Group on Sustainability in Aquaculture), WGSC (Working Group on Site Selection and Carrying Capacity), WGMA (Working Group on Marketing on Aquaculture). In addition, a multidisciplinary approach and the involvement of stakeholders in the implementation of some activities were considered fundamental towards a harmonisation of the strategies for aquaculture management. This would facilitate the process of implementation of the Ecosystem Approach for Aquaculture (EAA) and a better integration of aquaculture in the coastal zone management.

20. To face these priorities the CAQ subsidiary bodies identified and adopted a number of recommendations[2] and identified additional issues to be addressed:

- *Legislative issues*: The definition of aquaculture legal frameworks does not include a comprehensive concept, which should include typologies, production systems and other relevant criteria; cumbersome institutional settings, which call for simplification of both regulation and administrative procedures; lack of coordination tools for solving overlapping competences of agencies involved in aquaculture planning; the implementation of specific regulations for aquaculture is essential to promote and facilitate aquaculture development; the improvement of the governance should be pursued by including aquaculture in strategic policy.
- *Site selection criteria for aquaculture issues*: The heterogeneity on the existing procedures and regulatory schemes for site selection assessment: norms, rules and regulations on legal aspects

[2] GFCM/CAQ/VII/2011/Inf.7 Report of the Third Coordinating Meeting of the Working Groups (CMWG)

GFCM/CAQ/VII/2011/Inf.8 Report of the Fourth Coordinating Meeting of the Working Groups (CMWG)

GFCM/CAQ/VII/2011/Inf.11 Report of the WGSC-SHoCMed Workshop on Allocated Zones for Aquaculture (AZA).

GFCM/CAQ/VII/2011/Inf.12 Report of the WGSC- SHoCMed meeting on Environmental Quality Standards for marine fish farms

GFCM/CAQ/VII/2011/Inf.14 Report of the WGSA-InDAM meeting on "Definition of Regional minimun set of indicators for Sustainable Aquaculture

on aquaculture and on the concepts and terms used could be considered in view of a harmonisation of aquaculture legal aspects within the GFCM region; space limiting factors and local conflicts can be reduced through the adoption of the Allocation Zones for Aquaculture (AZA). The AZA is considered a good instrument for decision makers, administration and investors: it induces self-regulation and improves inter-administrative coordination for the sustainable development of aquaculture.

- *Data availability and marketing issues*: The absence of a sector marketing strategy has been criticized. Price stability, exploitation of emerging niche market, public image of the sector and the aquaculture products should be improved; structured and continuous promotion and marketing communication strategy to select target groups for increasing the domestic consumption should be encouraged; introduction of certification and labelling systems; introduction and enforcement of traceability systems. Encourage harmonization of traceability systems (*i.e.* species and country origin); improve consumption and image of farmed products; better exploitation of existing and emerging markets and encourage the development of added value and processed products; establish a data collection system and dissemination on consumption, distribution channels, market trends and trade information of aquaculture products; consideration of Producers Organization;
- *Health management*: Pathologies problems are sometimes faced by aquaculture farms representing significant constraints in their management. The loss of production for some marine species caused by a series of pathogens factors were recently reported by producers with consequences on the market availability of products and the sustainability. Cooperation in managing aquaculture fish's diseases should be considered, including the responsible use of drugs and vaccines and the use of risk assessment as management tools with regard to disease prevention.
- *Climate change*: There is a wide awareness that climate change has an impact on aquaculture. Aquaculture activities in the Mediterranean region are under the influence of local climate, characterised by mild wet winters and warm to hot dry summers. Because of its latitude, the Mediterranean Sea is located in a transitional zone where both mid-latitude and tropical variability is important and competes against each other. Freshwater resources are very limited and are under increasing pressure in terms of both quantity and quality, and in most areas marine waters are characterised by limited productivity, but host one of the richest biodiversity of the world. The impact of climate change on Mediterranean aquaculture should be taken into consideration, in particular to face the vulnerability of the sector in terms of growing performance of the species reared determined by environmental conditions, and consequently on the impact on the economic performance and social aspects in the different areas of the Mediterranean. The impact of climate change on aquaculture was also recalled during the last COFI (Rome, February 2011) that recognized the necessity to downscale the analysis at national and local level, and acknowledged the role of Regional Fisheries Bodies, such as the GFCM, and their leading role in coordinating action in their region**.**

SUGGESTED ACTION BY THE COMMITTEE

21. The Committee is invited to comment on recent aquaculture development and on the main priority issues identified for Mediterranean aquaculture. It is also called to advise on additional elements that could contribute to achieve sustainable coastal aquaculture.

22. The Committee may also wish to consider the pace at which the priority issues should be undertaken. This is necessary in order to ensure the integration of all the above priorities into a common and single strategic plan for the development of sustainable aquaculture in the Mediterranean and Black Sea.

Table 1 - Aquaculture production 2008 (Fish)																					
Countries	Albania	Algeria	*Bulgaria	Croatia	Cyprus	Egypt	*France	Greece	*Israel	Italy	*Lebanon	*Libya	Malta	Montenegro	Morocco	*Romania	Slovenia	Spain	*Syria	Tunisia	Turkey	TOTAL (tonnes)
Atlantic bluefin tuna / *Thunnus thynnus*				3,711	1,020		263			344			1					2,567			74	7,979
Atlantic salmon / *Salmo salar*							1,100	8														1,108
Catfish (black bullhead) *Ameiurus melas*			75			15,993																16,068
Channel catfish / *Ictalurus punctatus*										128												128
Common carp / *Cyprinus carpio*	74	20	1,469	1,689		73,206	4,200	113	6,700	200					600	3,977	166	1	3,696	288	1,258	97,658
Bighead carp / *Hypophthalmichthys nobilis*			721	156												2,228						3,105
Common sole / *Solea solea*		1								19								54				74
Common two banded seabream *Diplodus vulgaris*										7								6				13
Cyprinids nei / *Cyprinidae*	199	1,445		651			300				16					80		29				2,720
European eel *Anguilla anguilla*		12		62				489		551				9	79			460		15		1,677
European seabass *Dicentrarchus labrax*		1		2,500	752	4,383	3,200	34,357	120	6,813		170	97		29		50	8,980		788	49,270	111,510
Flathead grey mullet *Mugil cephalus*		52						395	2,000	457										367		3,270
Gilthead seabream / *Sparus aurata*	337	3		2,000	1,926	4,530	1,600	51,254	2,200	5,455		60	1,586					20,744		1,105	31,670	124,471
Greater amberjack / *Seriola dumerili*																		1				1
Marbled spinefoot / *Siganus rivulatus*					2																	2
Meagre / *Argyrosomum regius*							300			109								449,56				409
Mullets nei Mugilidae						209,313				233								119		367		210,032

Table 1 - Aquaculture production 2008 (Fish)																					
Countries	**Albania**	**Algeria**	***Bulgaria**	**Croatia**	**Cyprus**	**Egypt**	***France**	**Greece**	***Israel**	**Italy**	***Lebanon**	***Libya**	**Malta**	**Montenegro**	**Morocco**	***Romania**	**Slovenia**	**Spain**	***Syria**	**Tunisia**	**Turkey**	**TOTAL (tonnes)**
Nile Tilapia *Oreochromis niloticus*		297													40							337
Northern pike / *Esox lucius*			25	8											40	14	1					88
Pike-perch / *Sander lucioperca*		0	12	7												49	1			198		267
Rainbow trout / *Onchorhynchus mykiss*	254		1,805	2,689	57		32,270	3,430	450	34,146	708			292	90	268	775	19,971			68,659	165,863
Sea trout			5				700									752						1,457
Salmonoids nei / Salmonidae				21			300			1,247												1,568
Silver carp / *Hypophthalmichthys molitrix*			31	421					1,200						400	2,959	3		<0.5			5,014
Sturgeons nei / *Acipenseridae*					0					355												355
Sturgeon / *Acipenser sturio*																		150				150
Tilapias nei / *Oreochromis spp.*						386,186			8,000	19	27	10							3,874			398,116
Trouts nei / *Salmo spp.*								3,390		1,746							1					5,137
Turbot / *Psetta maxima*							850											7,129				7,979
Wels(=Som)catfish *Silurus glanis*			75	31			200									149				125		580

Source: GFCM-SIPAM 2008 and (*) FAO- FishStat 2008

Table 2 **- Aquaculture production 2008 (*molluscs and crustaceans*)**

Countries	Albania	Algeria	*Bulgaria	Croatia	Cyprus	Egypt	*France	Greece	Italy	Montenegro	Morocco	Slovenia	Spain	Tunisia	Turkey	TOTAL (tonnes)
European flat oyster *Ostrea edulis*		0		100			***1,960***	***20***			181		759			**3,020**
Mediterranean mussel *Mytilus galloprovincialis*	950	5	595	3,000			***16,060***	***21,078***	67,239	200	4	224	192,859	117	196	**302,527**
Pacific cupped oyster *Crassostrea gigas*		2					***111,000***		14		181		1,113	12		**112,322**
Japanese carpet shell *Ruditapes philippinarum*							***540***		28,268				1,825			**30,633**
Grooved carpet shell *Ruditapes decussatus*							***540***		349				385			**1,274**
Common edible cockle *Cerastoderma edule*							***1,640***						2,398			**4,038**
Kuruma prawn *Penaeus japonicus*	***7***					10,131			***14***				6,982			**17,134**
Caramote prawn *Penaeus keraturus*																**0**
Indian white prawn *Penaeus indicus*					20											**20**
Giant river prawn *Macrobrachium rosenbergii*									11							**11**

Source: GFCM-SIPAM 2008 and (*) FAO- FishStat 2008