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**STATUS AND TRENDS OF THE AQUACULTURE SECTOR IN THE
MEDITERRANEAN**

INTRODUCTION

1. This paper is intended to complement and update the information provided at the Fourth Session of the General Fisheries Commission for the Mediterranean (GFCM) Committee on Aquaculture (CAQ) related to the status of aquaculture in the Mediterranean and Black Seas basins. This document was prepared using information available in the National Aquaculture Sector Overviews (NASOs) provided by 21 Member states of the Commission as well as using the official statistics available through FAO. This new approach still has its weaknesses such as problems of standardization and harmonization between the documents of each country and harmonization with official data submitted to FAO. Issues such as employment, the structure of national productive sector and marketing are also dealt with in this document and summarized within a descriptive part of the aquaculture industry of each Member state. This document presents the situation of aquaculture in the GFCM Member states, including the Atlantic area.

REVIEW OF THE AQUACULTURE INDUSTRY IN THE MEMBER STATES

2. According to the NASOs and available data, some general trends appear according to groups of countries, in relation to (i) geographical location and historical traditions; (ii) species diversification (traditional vs. new species); (iii) final objectives of aquaculture production (local market, export/import needs, etc.); and (iv) development of the various institutions involved (regulatory tools, professional organization, research and training development, etc.). Four main groups of countries can therefore be identified.

3. *Western Europe:* France, Italy and Spain. These three countries produce over 805 thousand tonnes and represent 57 percent of the total aquaculture production in the area (48.6 percent in value). They have a long tradition in aquaculture, mainly in shellfish (bivalves) and Rainbow trout farming. Shellfish culture represents about 71 percent of this production (577 thousand tonnes): mainly mussels in Spain and oysters in France. For the last 20 years, these countries have diversified their industries by farming the European seabass (*Dicentrarchus*

labrax) and Gilthead seabream (*Sparus aurata*) in sea cages and in intensive land-based tanks (including the more recent sophistication in recirculation systems) and the development of hatcheries also for the exports of fingerlings. They have developed a wide range of farming technologies and expanded in terms of diversification for both marine and freshwater species. Organization of the sector is at a high level, with regulations, producers associations, research and training programmes in place. With a national consumption raising, these countries are also net importers of seafood products. National producers are now facing international competition and lower income margins. Present challenges are mainly in the optimization of production costs through better production technologies, and market diversification through the development of quality certification programmes.

4. *Central Europe:* Albania, Bosnia, Bulgaria, Romania, Serbia and Slovenia. These countries produce almost 32 thousand tonnes or 2.2 and 2.5 percent in terms of the total production and value, respectively. These countries have abundant continental resources and therefore continental aquaculture is traditional, particularly for carps and cyprinids (64 percent of the production) as well as trouts. Marine aquaculture is in expansion but outputs are still not significant. Overall production in this group of countries decreases in the last two decades either due to economic crisis (politic/market economy transition) and armed conflicts. Production aims mainly to satisfy local markets. Contribution of the aquaculture sector to the national economies is not significant, but aquaculture is considered as an essential economic activity in rural areas. At present the situation is improving, with trends for optimization of the culture practices. However, institutions, regulations, aquaculture development plans and producer associations are still undergoing a restructuring process or being established.

5. *Eastern Europe:* Croatia, Greece, Malta and Turkey. They produce about 163 thousand tonnes (92 percent from Greece and Turkey) or 11.6 percent of the total aquaculture production, but almost 25 percent in value. In fact, even if they produce traditional species (carps, trouts and shells), their aquaculture is mostly oriented towards marine finfish (Turkey has a trout production of 40 000 tonnes), almost entirely for the export market. Seabass and seabream production represents 67 percent of this total (approx. 109 thousand tonnes). In Greece, it represents the third agricultural export commodity. With market saturation for the above two marine species, trends are towards lower prices, merger of small companies into larger holdings, industrialization and diversification of marine species. Croatia and Turkey have also initiated bluefin tuna fattening. Environmental legislations are being developed and reviewed.

6. *North Africa and Middle East:* Algeria, Lebanon, Lybia, Morocco, Syria and Tunisia. These countries produce just over 15 thousand tonnes or 1 percent of the total production and 1.8 percent of the total value. With 8 600 tonnes of carps and tilapia, Syria supplies 56 percent of this total, with aquaculture contributing to 50 percent of the national fish production. The aquaculture sector in these countries is in its initial developmental stage. Traditionnally continental species have been produced for restocking of inland waters. These countries plan to further develop their aquaculture sector using freshwater and marine species for local and export markets. The progress has been limited possibly also due to a poor administrative organization and practical experience. In order for the industry to develop investments are needed including the transfer of technologies and more research. Institutions, relevant legislations and development plans still need to be reinforced. In the last few years a number of private projects have nevertheless materialized.

7. The two exceptions among these country groups above are Egypt and Israel. Egypt is the largest Mediterranean producer with over 376 thousand tonnes (99 percent of carps, tilapias and mullets) or 26,5 and 20 percent of the total production and value, respectively. In this country, aquaculture was identified as a solution to equilibrate the increase of national consumption for fish products (14kg/yr/habitant). The development started in 1978 and it is now the second national production in terms of value. Most of products are marketed locally. Marine aquaculture output is around 3 300 tonnes, but this sector has a good developmental potential. Seabass and seabream are exported. With an annual production of about 21 thousand tonnes, mostly tilapias and carps, Israel is the seventh Mediteranean producer. The products produced are mainly for the

national market. Marine production is 12.5 percent of the total. The specificity of Israel is that, so to develop its aquaculture with a low water availability, it had to promote research, technical qualifications, and the use of high intensive technologies, using recirculation, pure oxygen, etc. For research, it is also involved in diversification towards new fish species.

OVERALL AQUACULTURE PRODUCTION AND TRENDS IN THE REGION

8. Prior to the description of the global trends, it is necessary to point out a statistical constraint in the use of FAO FishStat+ data. Available data from the previous years often has to be corrected *a posteriori*, because of late data submission or corrections by the Member states. This was the case for the last 2004 report of the Fourth CAQ session, which concluded that the global Mediterranean production decrease by 6 percent between 2000 and 2002, on the basis of the 2002 data. After this data was corrected, it showed in fact a decrease of only 1.8 percent over the same period. This shows a small decrease, or, if taking into account statistical uncertainty, a stagnation of the production. For the year 2004, the same problem of under estimation can be identified on: (i) the Italian production (117 thousand tonnes in 2004 while the last 4 years showed an average annual output of 200 thousand tonnes); (ii) the French production (official 2004 data given in the NASO of France amounted to 260 thousand tonnes, whereas FishStat+ 2004 data only amounted to 244 thousand tonnes); and (iii) some species statistics (FishStat+ data shows no production of Atlantic bluefin tuna for Turkey, whereas the NASO of the this country shows a production of 1 000 tonnes). This statistical concern is likely to be the case of other Member states. Trend analysis should be cautious, and this point will be taken into account in the following paragraphs.

9. After a stagnation of the production for the period 2000–2002, an overall increase in production is observed. The data in FishStat+ shows a growth of 8.2 percent, or +110.8 thousand tonnes, from 1 344 thousand tonnes in 2002 to 1 455 thousand tonnes in 2004, which is likely to be even higher (Table 1 and 2). The main producers are still Egypt, Spain, France, Greece, Turkey, Italy and Israel, with a share of 97 percent of the total Mediterranean production. Egypt and Spain represented 32 and 25 percent, respectively, of this total output. The main contributors to this growth were Egypt (+95.2 thousand tonnes between 2002 and 2004), Spain (+40.5 thousand tonnes) and Turkey (+32.8 thousand tonnes). Italy showed a decrease of -66.2 thousand tonnes, but it is likely to be a problem of late data submission. France is also likely to have increased its production by 14 thousand tonnes, according to the NASO of France.

10. The main species which contributed to this growth are carps – all species included – in Egypt (+42 thousand tonnes), Blue mussel in Spain and France (+34.3 thousand tonnes) and Tilapia – all species included – in Egypt (+33.8 thousand tonnes). The following species also contributed to a lower level: Flathead grey mullet in Egypt (+19.7 thousand tonnes), Seabasses – all species included – (+16.7 thousand tonnes), mainly due to the output from Turkey and Gilthead seabream (+13.2 thousand tonnes). For this latter species, a growth is observed for Turkey (+8.7 thousand tonnes), Spain (+2.6 thousand tonnes) and various smaller producing countries (Egypt, Italy, Israel, Tunisia, Libya and Cyprus). One additional farmed species is the Atlantic bluefin tuna. It is expected that this fattening practice will continue to grow and contribute to the aquaculture statistics (according to FishStat+, +2 thousand tonnes, for a global Mediterranean production of 6.9 thousand tonnes in 2004). The 2005 production should be much higher for this species, even if some restrictions appear in the catches of wild tuna juveniles, in relation with the fishing regulations adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and endorsed by GFCM.

11. The main species groups which contributed to the recent growth in terms of volume were marine and freshwater finfish, mainly produced by Egypt. Other groups encountered a low decrease of production (Table 3). Italian data may be higher, especially in the mollusc group (Mediterranean mussels). Thus molluscs may also encounter a small increase.

12. Overall value of aquaculture products increases significantly since 2003. A decrease from US\$ 2 783 million down to US\$ 2 449 million was recorded between 2000 and 2002. In 2003, the peak-level of 2000 was overtaken and the trend was confirmed in 2004. The increase between 2002 and 2004 is supposed to amount US\$ +643 million, for a final level of at least US\$ 3 092 million (Table 4 and 5). The average Annual Percentage Rate (annual growth rate) between 2000–2004 period was 5 percent, contrary to the same indicator for the 2000–2002 period (-7 percent). The main contributors are France (21 percent of global value), Egypt (20 percent), Spain (14 percent), Turkey (12.8 percent), Italy and Greece (11.8 percent each). The relatively low economic level of Egypt in respect to its production in tonnes is due to the local market and low price dedicated production.

TRENDS IN MEDITERRANEAN MARINE AND BRACKISHWATER AQUACULTURE

13. A statistical difficulty should also be pointed out. There is no correspondence between the group species and the environment of production. The same species can be grown in various environments (e.g. Japanese carpet clam is grown in both marine and brackishwater environment). The following statements will take this into account. The comments are made upon the environment basis.

14. Brackishwater culture increased continuously from the mid-90s up to the year 2000. Each year of the 1998–2000 period, there was a growth of +70 thousand tonnes. In 2000, the growth slowed down, and probably stabilised around 430 thousand tonnes, of which 91 percent in tonnes were produced by Egypt. The main fish species involved are Nile tilapia, Flathead grey mullet and carps (mainly Silver carp) (Table 6). Italy produces around 30 thousand tonnes of bivalves (Japanese carpet clam – *Ruditapes philippinarum*). Nine countries are mainly involved in brackishwater production: Albania, Algeria, Egypt, France, Greece, Israel, Italy, Morocco and Tunisia. In Egypt, the production is mainly done in semi-intensive farms. In other countries, this type of aquaculture tends to be related to the traditional practices of aquaculture inherited from a long history. In some other countries, brackishwater culture is also used for diversification attempts in aquaculture (oyster for Morocco).

15. A new fact can be pointed out, regarding carp production in Egypt. A species appeared in 2004 in high proportion in the FishStats+ statistics, whereas no production was registered before 2003. Silver carp grew by +45 thousand tonnes in brackishwater aquaculture and +30 thousand tonnes in freshwater aquaculture. For brackishwater culture, this “new” species increase is probably due to an improved recording of production statistics by species name (shifting between Grass carp, White amur and Silver carp). The other hypothesis could be a brutal switch in production between these two species, which appears to be unlikely as no information on this matter appears in the NASO of Egypt.

16. The total value of brackishwater culture amounted to US\$ 704 million in 2004, which showed a decrease of US\$ -40 million. This slight decrease in value between 2002 and 2004 can be explained by a global decrease of value in US\$ for the Flathead grey mullet in Egypt (-24 million US\$) and that of the Japanese carpet clam in Italy (US\$ -19 million). The likely under declaration of Italian production should be compensated in the coming years and the impression of a decrease in value of the global Mediterranean brackishwater production in 2004 will be a temporary one.

17. Mariculture mainly involves two types of aquaculture: (i) molluscs traditional and modern aquaculture, and (ii) more recently marine finfish production. The main contribution in volume comes from molluscs aquaculture, but this fact must be pondered by the importance of Atlantic production of molluscs (by itself, around 464 thousand tonnes). The Mediterranean production consists principally of molluscs (around 91 thousand tonnes in 2004, probably 150 thousand tonnes) and finfish (around 136 thousand tonnes in 2004 – mainly seabass, seabream and Atlantic bluefin tuna). The total amount of Mediterranean mariculture is estimated between 270 and 330 tonnes in 2004. Main producers were (i) Greece (around 93 thousand tonnes, mainly Gilthead

seabream, Mediterranean mussel and European seabass); (ii) Italy (50 thousand tonnes declared, probably twice, with the same species as France); (iii) Turkey (around 50 thousand tonnes, mainly seabass and seabream); (iv) Spain (around 31 thousand tonnes mainly seabream, Atlantic bluefin tuna, seabass and turbot); and (v) France (around 23 thousand tonnes, mainly Mediterranean mussel, seabass and seabream).

18. The growth of seabream and seabass production decreased in the Mediterranean during the 2002–2004 period. European seabass showed an average annual growth of 3.2 percent on this period, whereas it was 4.1 percent on the 2000–2004 period. The main producers were Greece, Spain and Turkey. These two species still provide good growth opportunities for countries with relatively young aquaculture industries such as Croatia and Cyprus. Turkey nearly doubled its production of seabream (from 11 thousand tonnes in 2002 up to 20 thousand tonnes in 2004) and that of seabass (from 14 thousand tonnes in 2002 to 26 thousand tonnes in 2004).

19. One of the more recent species grown in Mediterranean mariculture is the Atlantic bluefin tuna. The growth of this culture activity is still expanding, although a number of constraints exists including the supply of inputs (wild juveniles/adults) and pressure from conservation groups. The production in 2004 according to the FishStat+ data is estimated at about 7 thousand tonnes. This data does not however include some 1 000 tonnes from Turkey, as declared in the NASO for this country. In 2004, Spain (6.4 thousand tonnes) was officially joined by Tunisia (260 tonnes), Cyprus (250 tonnes), Lybia (25 tonnes), and Turkey (1 000 tonnes) according to the information made available in the various NASOs. Italy is also engaged in bluefin tuna fattening.

20. Atlantic mariculture consists mainly of the Pacific cupped oyster (*Crassostrea gigas*) (France, 135 thousand tonnes in 2004) and Blue mussel (*Mytilus edulis*) (France 55 thousand tonnes and Spain 295 thousand tonnes in 2004). In 2004 production increased by +50 thousand tonnes due to an increase of the Spanish Atlantic production of Blue mussel following a 5-year period of decline. In 2003 the decrease of -20 thousand tonnes was probably due to the sinking of the oil tanker "Prestige" which mainly affected the Galician coast (Spain).

21. The total value of mariculture amounted to US\$ 1 696 million in 2004, thus US\$ +535 million compared to 2002. This was a strong growth, if compared to the previous trends (2002 was a receding year for global value). Marine finfish represented 61 percent of this value, Mediterranean molluscs 5 percent and Atlantic mariculture production 32 percent. Marine fish showed the strongest growth in value, with an average annual growth of 8 percent over the 2000–2004 period, followed by molluscs. Output from mariculture was the main contributor to the increase of the total value of Mediterranean aquaculture. As a whole, the main fish species that contributed to the 2002–2004 growth were: the European seabass (US\$ +100 million), seabasses nei (US\$ +90 million), seabream (US\$ +74 million) and the Atlantic bluefin tuna (US\$ +30 million) (Table 7).

TRENDS IN MEDITERRANEAN FRESHWATER AQUACULTURE

22. Mediterranean freshwater aquaculture expanded considerably in the 1990s, however the situation is quite different within the various regions. The production showed a small increase between 2002 and 2004, which enabled the 2004 to reach the same production level recorded in 2001, i.e. around 276 thousand tonnes (Table 2).

23. Western European Mediterranean producers (France Italy and Spain) has a well established freshwater aquaculture industry based on rainbow trout production. Altogether these countries produced 95 thousand tonnes of rainbow trout in 2004, which showed a slight but continuous decline of this production over the decade. These countries showed generally a much diversified production in terms of species.

24. Central European Mediterranean producers (Romania, Albania, Bulgaria, Croatia, Serbia and Montenegro and Slovenia) also have a traditional freshwater fishes production, mainly based on carps and salmonids. Their individual national productions may not be significant, but

altogether the overall output in 2004 amounted to 19.5 thousand tonnes. Although production in these countries remains substantially extensive, some countries have developed intensive and semi-intensive systems particularly for salmonids production. Many of these countries still suffer from the 1990s difficulties that had impacted in their freshwater aquaculture industry. For example Romania had a strong decrease in production, from 75 thousand tonnes in the mid-1980s down to less than 9 000 tonnes in 2004 according to the official statistics.

25. The Middle East and African Mediterranean countries were responsible for the large increase in freshwater production over the last few years. The three main producers were: Egypt (Nile tilapia, Common carp and since 2004, Silver carp), Turkey (trout) and Syrian A.R. (carp and tilapia). In 2004 these countries produced 122 thousand tonnes of freshwater fish compared to the 85 thousand tonnes produced in 2002. The main contributor to this growth was the Silver carp (30 thousand tonnes in 2004 – no production was declared earlier). The growth of Silver carp in Egypt in 2004 is probably the result of recording correctly this species.

26. In 2004 the main producers of freshwater farmed species were: Egypt (69.7 thousand tonnes), France (45 thousand tonnes), Turkey (43 thousand tonnes), Italy (33 thousand tonnes, maybe more) and Spain (31 thousand tonnes). The main contributors in terms of value for the same year were: Turkey (US\$ 150 million – US\$ 50 million in 2002), France (US\$ 122 million), Spain (US\$ 69 million), Italy (US\$ 104 millions) and Egypt (US\$ 64 million).

PRODUCTION TRENDS IN VALUE AND MARKETING ISSUES

27. Several factors have to be taken into account when analyzing global value and unit price of aquaculture products (either by species or by country). The following factors should be taken into account: (i) the type of price recorded, i.e. farm-gate, market price, etc.; (ii) currency exchange rates against the US dollar; (iii) local currency evolutions; and (iv) market considerations particularly with regards to high value species. At this stage, it is still rather difficult to analyze the first factor as no indications are provided in the various NASOs according to the type of price used.

28. In case of the second factor, i.e. the variation of local currency exchange rate against the US\$, several currencies have had a strong evolution during the 2002–2004 period. The Egyptian pound, for example, varied from less than EGP 4 to 1 US\$ in 2001 up to EGP 6.2 to the US\$ in 2004. Over the same period, the value of the Euro showed a reinforcement versus the US\$ (€1.15 for 1 US\$ in 2001 down to €0.85 to the US\$ in the mid-2004). This increase of the currency value strengthened the global aquaculture value of Spain, France, Italy and Greece as well as new comers or candidate countries to the EU accession, even though the currency had yet to be adopted. This is the case of Slovenia, Malta, Croatia, and Cyprus. The Turkish currency rate did not change significantly versus the US\$ over the same period.

29. Futhermore, following the adoption of the Euro in the eurozone countries, inflation grew particularly in Greece and Spain and had an impacted on the production costs. This is a well known fact with regards to the Greek mariculture sector.

30. Market trends and global unit price can be considered by species but should be crossed analyzed taking into account the main producing areas (Table 8). In fact the increase/decrease of the unit value could have been influenced due to a real increase in value but also due to the impact of the exchange rate for the species which are produced, for example, within the eurozone or in Egypt.

31. If considering the global unit prices (total Mediterranean value divided by total volume), the specie that ranks first, among the 15 main species produced in Mediterranean area in 2004, is the Atlantic bluefin tuna. The global unit price ranged between US\$ 14.7-15/kg. The evolution of the price, which is not influenced by the evolution of the global production in volumes probably indicates a continuous increase of the demand and a trader-regulated market. Seabass (US\$ 6.39/kg) and seabream (US\$ 5.28/kg) rank second and third, respectively. The output of the

latter two species grew faster than the market demand (see price decrease from US\$ 13-16/kg in the early 1990s down to the 2004 levels). The unit value in 2004 for these two species almost equalled the 1999 level possibly indicating a renewed increase in market demand and partly to the impact of the exchange rate between the Euro and the US\$.

32. In 2004 Egypt, which is by far the main producer within the Mediterranean basin, ranked second in terms of global value behind France (Table 4). Production value in France amounted to US\$ 655 million with a positive average annual growth rate. Egypt, on the other hand, showed a decrease in its global value during the 2002–2004 period partly due to the strong decrease of EGP value versus the US\$ and increase of the Euro versus the US\$ during the same period. In absolute terms, the relatively low value of the Egyptian aquaculture in respect to the volumes produced is also due to the choice of farmed species, i.e. low commercial value species (US\$ 1.2–2/kg).

33. The first country in terms of global unit price was Syria (US\$ 8.3/kg) followed by Cyprus (US\$ 7.75/kg) and Malta (US\$ 7.3/kg) (Table 9). France only ranked sixteenth (US\$ 2.69/kg) due to the large production of relatively low economic value species such as Blue mussels (US\$ 0.61/kg), but also due to a lower market price for the European seabass and Gilthead seabream. For example, in the case of Cyprus, the unit price in 2004 for the European seabass was US\$ 7.4/kg or 15 percent higher than the Mediterranean average unit price.

Table 1. Aquaculture production in the GFCM Member countries – Includes freshwater and Atlantic production (tonnes 1 000).

COUNTRY	1990	1995	1999	2000	2001	2002	2003	2004	APR 00–04	APR 02–04
Albania	5.0	0.3	0.3	0.3	0.3	0.9	1.5	1.6	54.1%	92.8%
Algeria	0.4	0.4	0.3	0.4	0.5	0.5	0.4	0.6	20.5%	11.0%
Bulgaria	7.8	4.6	7.8	3.7	2.9	2.3	4.5	2.5	-9.0%	9.3%
Croatia	0.0	4.0	6.2	6.7	10.2	8.4	7.6	10.1	13.2%	2.2%
Cyprus	0.1	0.5	1.4	1.9	1.9	1.9	1.8	2.4	12.4%	10.0%
Egypt	61.9	71.8	226.3	340.1	342.9	376.3	445.2	471.5	17.0%	11.3%
France	256.7	280.8	264.9	266.8	251.7	252.0	239.9	243.9	-1.6%	-1.0%
Greece	9.5	32.6	84.3	95.4	97.5	87.9	101.4	97.1	3.3%	0.4%
Israel	14.6	16.2	18.8	20.1	21.3	22.3	20.8	22.3	3.6%	1.7%
Italy	153.7	214.7	210.4	216.5	218.3	184.0	191.7	117.8	-9.3%	-16.7%
Lebanon	0.1	0.3	0.3	0.4	0.3	0.8	0.8	0.8	34.3%	54.4%
Libyan Arab Jamahiriya	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.3	-	-
Malta	0.0	0.9	2.0	1.7	1.2	1.1	0.9	0.9	-14.9%	-10.8%
Morocco	0.4	2.1	2.8	1.9	1.4	1.7	1.5	1.7	-7.1%	7.6%
Romania	35.0	19.8	9.0	9.7	10.8	9.2	9.0	8.1	-1.5%	-8.9%
Serbia and Montenegro	0.0	2.4	3.4	2.8	2.7	2.5	2.6	4.0	5.8%	17.2%
Slovenia	0.0	0.8	1.2	1.2	1.3	1.3	1.4	1.6	5.6%	7.7%
Spain	203.8	224.0	321.1	312.2	312.6	322.7	313.3	363.2	2.7%	5.4%
Syrian Arab Republic	2.7	5.9	6.1	6.8	5.9	6.0	7.2	8.7	8.2%	14.2%
Tunisia	1.0	1.0	1.1	1.6	1.9	2.0	2.1	2.5	18.8%	10.7%
Turkey	5.8	21.6	63.0	79.0	67.2	61.2	79.9	94.0	10.0%	13.1%
TOTAL	758.6	904.7	1 230.7	1 369.2	1 352.8	1 344.8	1 433.5	1 455.6	3.5%	2.5%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production: quantities 1950-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 2. Aquaculture production by environment and area in the GFCM Member countries (tonnes 1 000).

Environment / area	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04	Top Producers	2004 Production
Brackishwater culture	296.0	411.9	409.9	378.4	429.2	439.4	9.4%	2.7%	--	--
Freshwater culture	257.8	266.8	275.1	257.1	268.1	276.4	1.5%	0.3%	--	--
Mariculture	676.9	690.6	667.8	709.2	736.2	739.8	1.8%	3.5%	--	--
TOTAL	1 230.7	1 369.2	1 352.8	1 344.8	1 433.5	1 455.6	3.5%	2.5%	--	--
Atlantic – Eastern Central	0.2	0.2	0.2	0.3	0.2	0.2	-0.7%	7.5%	Morocco	0.2
Asia – Inland waters	60.6	67.8	61.9	60.4	66.0	72.6	4.0%	5.6%	Turkey Israel Syrian A.R.	44.1 18.9 8.7
Atlantic – Northeast	475.6	469.8	438.9	457.4	438.9	498.2	1.2%	4.6%	Spain France	331.9 166.4
Africa – Inland waters	211.1	300.2	315.0	342.5	403.4	431.2	16.1%	11.1%	Egypt	428.9
Europe – Inland waters	159.6	160.6	169.1	149.5	150.5	132.6	-3.4%	-7.6%	France Italy Spain	45.2 33.6 31.1
Mediterranean / Black Sea	323.5	370.6	367.7	334.9	374.5	320.7	0.0%	0.0%	Greece Italy Turkey Egypt France	94.0 84.2 49.9 42.7 32.3

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : quantities 1950-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 3. Aquaculture production and main value of main species groupings - Includes freshwater and Atlantic production.

PRODUCTION (tonnes 1 000)										
Species group	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Molluscs	498.543	566.615	647.151	640.962	621.682	612.106	591.96	598.972	-1.5%	-1.2%
Freshwater fishes	127.11	117.054	236.929	295.476	298.154	311.598	359.143	385.871	10.6%	9.1%
Marine fishes	19.707	68.457	176.988	252.213	253.485	259.899	317.635	313.724	13.3%	7.8%
Diadromous fishes	105.51	147.222	166.318	177.28	179.153	160.775	164.494	156.774	-1.0%	-4.2%
Crustaceans	2.758	0.273	0.277	0.276	0.278	0.361	0.269	0.201	-4.1%	-7.0%
Aquatic plants	5.006	5.1	3.032	3.032	0.038	0.038	0.037	0.037	-20.3%	-0.9%
Miscellaneous aquatic animals	0	0	0.003	0	0	0	0	0	--	--
TOTAL	758.6	904.7	1 230.7	1 369.2	1 352.8	1 344.8	1 433.5	1 455.6	3.5%	2.5%

VALUE (US\$ 1 000 000)										
Species group	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Marine fishes	178.6	460.7	964.9	1 177.2	1 083.7	935.5	1 221.1	1 318.0	7.8%	8.3%
Molluscs	704.5	801.4	644.5	655.6	635.8	653.9	733.2	771.6	3.8%	6.7%
Freshwater fishes	298.0	238.5	423.7	546.8	548.4	517.2	500.8	525.4	5.1%	-1.3%
Diadromous fishes	384.3	416.5	436.7	391.1	400.6	338.4	461.9	474.1	3.1%	7.9%
Crustaceans	44.7	4.3	3.7	2.8	3.1	3.9	3.8	3.1	-2.0%	1.1%
Aquatic plants	2.5	1.8	8.7	10.0	0.0	0.0	0.0	0.0	113.1%	216.7%
Miscellaneous aquatic animals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
TOTAL	1 612.7	1 923.2	2 482.2	2 783.7	2 671.7	2 448.9	2 920.7	3 092.2	5.0%	5.6%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : 1950-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 4. Value of aquaculture production in the GFCM Member countries – Includes freshwater and Atlantic production (US\$ 1 000 000).

COUNTRY	1990	1995	1999	2000	2001	2002	2003	2004	APR 00–04	APR 02–04
Albania	3.0	0.3	0.5	0.5	0.5	1.9	3.0	2.5	58.9%	98.5%
Algeria	1.1	1.0	0.7	0.9	1.2	1.3	1.0	1.3	17.1%	5.4%
Bulgaria	20.5	12.4	17.0	7.3	7.9	5.4	8.0	8.8	-4.5%	9.1%
Croatia	0.0	12.5	23.5	26.5	32.6	29.2	24.1	33.3	9.2%	3.4%
Cyprus	1.7	4.5	9.6	10.3	9.5	10.5	11.7	18.8	16.5%	27.4%
Egypt	124.6	115.2	447.1	815.0	757.0	655.6	615.0	618.0	11.2%	-6.4%
France	527.6	663.2	487.9	425.1	453.8	501.1	580.4	655.1	6.6%	13.0%
Greece	63.1	157.3	330.4	291.3	307.4	243.9	348.2	365.6	4.2%	9.0%
Israel	39.8	48.9	69.9	76.4	78.9	61.9	59.0	63.9	-1.1%	-6.0%
Italy	336.5	419.3	365.1	455.8	415.3	337.1	519.4	365.4	4.3%	1.9%
Lebanon	0.3	1.5	0.9	1.2	0.9	2.4	2.4	2.4	34.1%	54.1%
Libyan Arab Jamahiriya	0.1	0.2	0.2	0.2	0.2	0.0	0.3	1.3	-	-
Malta	0.0	8.1	8.5	5.0	3.1	3.7	4.5	6.3	0.5%	27.4%
Morocco	3.7	12.3	8.6	5.1	3.4	4.5	4.7	5.9	-2.4%	20.9%
Romania	87.7	48.0	16.5	15.6	17.4	16.6	16.2	14.9	-1.9%	-5.1%
Serbia and Montenegro	0.0	6.0	8.3	7.1	6.8	5.7	6.1	9.4	5.3%	15.2%
Slovenia	0.0	3.2	4.3	3.6	3.5	3.5	3.9	5.1	4.4%	13.7%
Spain	353.8	250.0	344.4	377.8	392.1	374.7	361.5	432.0	5.0%	3.8%
Syrian Arab Republic	13.4	26.9	28.1	32.1	28.7	50.8	62.3	71.9	23.7%	38.3%
Tunisia	4.4	5.5	4.3	7.1	9.2	8.7	10.2	14.3	29.3%	17.3%
Turkey	31.4	127.2	306.4	219.8	142.3	130.5	278.6	396.1	16.8%	49.1%
TOTAL	1 612.7	1 923.2	2 482.2	2 783.7	2 671.7	2 448.9	2 920.7	3 092.2	5.0%	5.6%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : values 1984-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 5. Aquaculture production and main value of main species groupings - Includes freshwater and Atlantic production.

PRODUCTION (tonnes 1 000)										
Species group	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Molluscs	498.543	566.615	647.151	640.962	621.682	612.106	591.96	598.972	-1.5%	-1.2%
Freshwater fishes	127.11	117.054	236.929	295.476	298.154	311.598	359.143	385.871	10.6%	9.1%
Marine fishes	19.707	68.457	176.988	252.213	253.485	259.899	317.635	313.724	13.3%	7.8%
Diadromous fishes	105.51	147.222	166.318	177.28	179.153	160.775	164.494	156.774	-1.0%	-4.2%
Crustaceans	2.758	0.273	0.277	0.276	0.278	0.361	0.269	0.201	-4.1%	-7.0%
Aquatic plants	5.006	5.1	3.032	3.032	0.038	0.038	0.037	0.037	-20.3%	-0.9%
Miscellaneous aquatic animals	0	0	0.003	0	0	0	0	0	--	--
TOTAL	758.6	904.7	1 230.7	1 369.2	1 352.8	1 344.8	1 433.5	1 455.6	3.5%	2.5%

VALUE (US\$ 1 000 000)										
Species group	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Marine fishes	178.6	460.7	964.9	1 177.2	1 083.7	935.5	1 221.1	1 318.0	7.8%	8.3%
Molluscs	704.5	801.4	644.5	655.6	635.8	653.9	733.2	771.6	3.8%	6.7%
Freshwater fishes	298.0	238.5	423.7	546.8	548.4	517.2	500.8	525.4	5.1%	-1.3%
Diadromous fishes	384.3	416.5	436.7	391.1	400.6	338.4	461.9	474.1	3.1%	7.9%
Crustaceans	44.7	4.3	3.7	2.8	3.1	3.9	3.8	3.1	-2.0%	1.1%
Aquatic plants	2.5	1.8	8.7	10.0	0.0	0.0	0.0	0.0	113.1%	216.7%
Miscellaneous aquatic animals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
TOTAL	1 612.7	1 923.2	2 482.2	2 783.7	2 671.7	2 448.9	2 920.7	3 092.2	5.0%	5.6%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : 1950-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 6. Top 15 aquaculture species item (by quantity) in 2004 – Includes freshwater and Atlantic production (tonnes 1 000).

SPECIES	1990	1995	1999	2000	2001	2002	2003	2004	APR 00–04	APR 02–04
Blue mussel (<i>Mytilus edulis</i>)	219.9	231.4	313.6	308.5	301.2	316.1	297.3	350.4	2.6%	5.6%
Nile tilapia (<i>Oreochromis niloticus</i>)	24.9	22.0	104.0	157.4	152.5	167.7	199.6	199.0	15.4%	9.6%
Flathead grey mullet (<i>Mugil cephalus</i>)	9.8	19.3	48.2	86.0	102.4	115.7	141.0	135.4	25.7%	10.3%
Pacific cupped oyster (<i>Crassostrea gigas</i>)	143.1	145.4	137.9	134.3	108.2	114.1	115.6	114.5	-3.2%	1.9%
Rainbow trout (<i>Oncorhynchus mykiss</i>)	93.4	124.8	118.1	124.5	132.8	117.8	116.2	104.1	-2.2%	-7.7%
Mediterranean mussel (<i>Mytilus galloprovincialis</i>)	107.6	111.0	126.1	127.3	141.1	129.6	145.7	95.4	-3.7%	-10.1%
Gilthead seabream (<i>Sparus aurata</i>)	4.4	24.0	65.8	85.4	80.3	75.4	92.5	88.5	7.2%	4.1%
Silver carp (<i>Hypophthalmichthys molitrix</i>)	11.9	8.6	4.8	4.8	4.7	3.5	3.4	78.7	439.1%	732.5%
European seabass (<i>Dicentrarchus labrax</i>)	3.7	19.2	41.1	52.1	43.9	42.8	50.4	47.5	4.1%	3.2%
Trouts nei (<i>Salmo spp</i>)	3.3	12.7	38.6	44.5	38.1	34.6	40.9	45.1	4.1%	6.4%
Common carp (<i>Cyprinus carpio</i>)	59.6	51.2	52.9	42.6	42.8	41.0	41.2	42.9	-3.7%	0.2%
Grass carp(=White amur) (<i>Ctenopharyngodon idellus</i>)	9.1	12.9	52.9	67.7	73.3	76.6	89.3	41.5	0.8%	-10.8%
Japanese carpet shell (<i>Ruditapes philippinarum</i>)	16.7	60.0	51.8	56.2	57.3	42.3	26.8	29.9	-8.2%	-17.1%
Seabasses nei (<i>Dicentrarchus spp</i>)	0.1	2.8	12.0	17.9	15.5	14.3	21.0	26.3	20.0%	21.3%
Tilapias nei (<i>Oreochromis (=Tilapia spp)</i>)	5.4	7.1	7.5	9.7	11.4	10.5	10.4	13.0	12.6%	5.3%
SUB TOTAL	712.9	852.3	1 175.1	1 319.1	1 305.5	1 302.0	1 391.1	1 412.4	3.9%	2.7%
Other (112 item)	45.8	52.5	55.6	50.1	47.2	42.8	42.4	43.2	-4.8%	-2.8%
TOTAL	758.6	904.7	1 230.7	1 369.2	1 352.8	1 344.8	1 433.5	1 455.6	3.5%	2.5%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : quantities 1950-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 7. Top 15 aquaculture species item (by value) in 2004 – Includes freshwater and Atlantic production (US\$ 1 000 000).

SPECIES	1990	1995	1999	2000	2001	2002	2003	2004	APR 00–04	APR 02–04
Gilthead seabream (<i>Sparus aurata</i>)	61.8	192.9	375.9	407.8	344.7	294.0	417.9	467.9	6.5%	13.1%
Pacific cupped oyster (<i>Crassostrea gigas</i>)	285.6	339.4	231.3	198.1	200.7	236.9	286.4	316.0	7.2%	16.4%
European seabass (<i>Dicentrarchus labrax</i>)	60.3	160.4	259.1	290.4	226.5	204.6	303.7	303.7	5.8%	12.9%
Rainbow trout (<i>Oncorhynchus mykiss</i>)	294.6	295.2	250.9	258.4	300.7	241.5	315.8	265.9	2.9%	-1.6%
Flathead grey mullet (<i>Mugil cephalus</i>)	38.1	51.9	137.8	299.2	349.4	272.5	279.3	249.1	20.7%	-10.1%
Nile tilapia (<i>Oreochromis niloticus</i>)	49.8	37.3	177.6	272.2	263.9	257.2	230.7	247.3	8.9%	-1.9%
Blue mussel (<i>Mytilus edulis</i>)	219.9	145.7	145.7	159.8	153.6	165.8	173.2	214.4	8.4%	12.1%
Trouts nei (<i>Salmo</i> spp)	17.8	49.1	133.9	86.9	56.4	51.9	100.1	156.4	14.2%	47.1%
Seabasses nei (<i>Dicentrarchus</i> spp)	1.3	27.8	92.6	73.8	48.3	43.0	101.3	128.9	19.4%	50.6%
Japanese carpet shell (<i>Ruditapes phillinarum</i>)	46.1	147.4	107.8	164.4	140.1	134.0	140.5	118.4	4.5%	-5.1%
Atlantic bluefin tuna (<i>Thunnus thynnus thynnus</i>)	3.6	0.2	50.2	57.1	66.7	73.8	57.4	102.6	19.5%	22.4%
Mediterranean mussel (<i>Mytilus galloprovincialis</i>)	91.3	76.5	81.3	74.4	82.5	84.1	109.4	90.2	3.4%	4.8%
Common carp (<i>Cyprinus carpio</i>)	138.0	108.5	107.6	87.9	87.9	74.5	74.7	84.9	-3.9%	-0.4%
Silver carp (<i>Hypophthalmichthys molitrix</i>)	28.6	20.0	6.7	5.9	5.7	7.0	7.0	67.7	175.8%	297.7%
Tilapias nei (<i>Oreochromis (=Tilapia</i> spp)	15.2	18.7	18.9	33.0	36.5	42.7	49.5	51.1	24.3%	12.0%
SUB-TOTAL	1 352.3	1 670.9	2 177.2	2 469.2	2 363.7	2 183.6	2 647.1	2 864.4	6.2%	7.3%
Other species (112 items)	260.4	252.3	305.0	314.5	308.0	265.3	273.6	227.9	-5.3%	-9.2%
TOTAL	1 612.7	1 923.2	2 482.2	2 783.7	2 671.7	2 448.9	2 920.7	3 092.2	5.0%	5.6%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : values 1984-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 8. Species global unit price (US\$/kg) (Total value divided by total volume).

SPECIES	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Gilthead seabream (<i>Sparus aurata</i>)	14.00	8.02	5.71	4.78	4.29	3.90	4.52	5.28	-0.6%	7.9%
Pacific cupped oyster (<i>Crassostrea gigas</i>)	2.00	2.33	1.68	1.48	1.85	2.08	2.48	2.76	11.3%	14.2%
European seabass (<i>Dicentrarchus labrax</i>)	16.48	8.35	6.30	5.57	5.16	4.78	6.03	6.39	1.2%	8.2%
Rainbow trout (<i>Oncorhynchus mykiss</i>)	3.16	2.37	2.13	2.08	2.26	2.05	2.72	2.55	4.8%	5.7%
Flathead grey mullet (<i>Mugil cephalus</i>)	3.89	2.70	2.86	3.48	3.41	2.36	1.98	1.84	-6.9%	-18.0%
Nile tilapia (<i>Oreochromis niloticus</i>)	2.00	1.70	1.71	1.73	1.73	1.53	1.16	1.24	-5.4%	-9.5%
Blue mussel (<i>Mytilus edulis</i>)	1.00	0.63	0.46	0.52	0.51	0.52	0.58	0.61	5.8%	6.3%
Trouts nei (<i>Salmo spp</i>)	5.47	3.87	3.47	1.95	1.48	1.50	2.45	3.47	7.7%	35.4%
Seabasses nei (<i>Dicentrarchus spp</i>)	13.00	10.03	7.72	4.13	3.11	3.00	4.83	4.90	-2.5%	19.6%
Japanese carpet shell (<i>Ruditapes phillinarum</i>)	2.76	2.46	2.08	2.92	2.45	3.17	5.24	3.96	19.0%	23.5%
Atlantic bluefin tuna (<i>Thunnus thynnus</i>)	10.00	13.00	15.00	15.50	15.00	15.00	14.57	14.74	-0.3%	-0.6%
Mediterranean mussel (<i>Mytilus galloprovincialis</i>)	0.85	0.69	0.64	0.58	0.58	0.65	0.75	0.94	8.6%	17.5%
Common carp (<i>Cyprinus carpio</i>)	2.32	2.12	2.04	2.06	2.06	1.81	1.82	1.98	-0.4%	-0.9%
Silver carp (<i>Hypophthalmichthys molitrix</i>)	2.41	2.34	1.40	1.21	1.23	2.02	2.06	0.86	-0.9%	2.4%
Tilapias nei (<i>Oreochromis (=Tilapia spp)</i>)	2.82	2.64	2.53	3.41	3.20	4.09	4.76	3.94	11.1%	9.0%
SUB-TOTAL	1.90	1.96	1.85	1.87	1.81	1.68	1.90	2.03	2.1%	4.2%
Other species (112 items)	5.69	4.81	5.49	6.28	6.52	6.20	6.45	5.28	-0.1%	-6.3%
TOTAL	2.13	2.13	2.02	2.03	1.97	1.82	2.04	2.12	1.3%	2.8%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : values 1984-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>

Table 9. Country global unit price (US\$/kg) (total value divided by total volume).

COUNTRY	1990	1995	1999	2000	2001	2002	2003	2004	APR 00-04	APR 02-04
Albania	0.61	0.74	1.74	1.55	1.85	2.17	2.04	1.56	-0.8%	-4.0%
Algeria	2.61	2.63	2.72	2.67	2.71	2.69	2.34	2.26	-3.4%	-5.7%
Bulgaria	2.61	2.68	2.19	2.01	2.68	2.33	1.80	3.54	17.3%	20.4%
Croatia	--	3.11	3.77	3.97	3.21	3.47	3.17	3.28	-2.2%	1.0%
Cyprus	13.52	9.88	6.73	5.49	5.06	5.63	6.43	7.75	3.9%	15.3%
Egypt	2.01	1.60	1.98	2.40	2.21	1.74	1.38	1.31	-6.7%	-15.6%
France	2.06	2.36	1.84	1.59	1.80	1.99	2.42	2.69	8.5%	14.3%
Greece	6.63	4.82	3.92	3.05	3.15	2.77	3.43	3.77	0.5%	7.2%
Israel	2.72	3.02	3.72	3.80	3.70	2.78	2.84	2.87	-4.5%	-7.3%
Italy	2.19	1.95	1.74	2.10	1.90	1.83	2.71	3.10	14.1%	19.6%
Lebanon	3.50	5.00	3.00	3.00	3.00	2.99	2.99	2.99	-0.1%	-0.1%
Libyan Arab Jamahiriya	1.20	1.50	1.50	1.50	1.50	--	6.00	4.75	--	--
Malta	6.00	8.99	4.25	2.87	2.49	3.36	5.12	7.29	16.8%	43.2%
Morocco	8.82	5.91	3.08	2.68	2.41	2.68	3.07	3.43	2.9%	12.5%
Romania	2.51	2.42	1.84	1.61	1.61	1.79	1.80	1.83	0.2%	4.4%
Serbia and Montenegro	--	2.51	2.41	2.51	2.52	2.33	2.33	2.34	-0.5%	-2.3%
Slovenia	--	4.04	3.59	3.06	2.78	2.74	2.91	3.24	-1.6%	5.4%
Spain	1.74	1.12	1.07	1.21	1.25	1.16	1.15	1.19	2.3%	-1.7%
Syrian Arab Republic	4.93	4.59	4.62	4.72	4.88	8.48	8.64	8.28	15.4%	23.8%
Tunisia	4.35	5.68	3.93	4.58	4.92	4.43	4.78	5.66	8.1%	5.4%
Turkey	5.43	5.89	4.86	2.78	2.12	2.13	3.49	4.21	3.7%	28.4%
TOTAL	2.13	2.13	2.02	2.03	1.97	1.82	2.04	2.12	1.3%	2.8%

Note: APR refers to Average Annual Percentage Rate (average annual growth rate)

Source: FAO Fishstat Plus V 2.30. Aquaculture Production : values 1984-2004. <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>