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GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

COMMITTEE ON AQUACULTURE

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PROGRESS IN MEDITERRANEAN AQUACULTURE SINCE THE SECOND SESSION OF THE GFCM COMMITTEE ON AQUACULTURE

INTRODUCTION

This paper is intended to complement the information that was provided at the previous two sessions of the General Fisheries Commission for the Mediterranean (GFCM) Committee on Aquaculture (CAQ) by describing the progress made with regards to aquaculture production in the Mediterranean and Black Sea basins. The statistics presented are those related to the production in GFCM member countries with coastlines facing the Mediterranean or Black Sea. The figures also include freshwater aquaculture production and the aquaculture production of France and Spain from the Atlantic coast and of the Red Sea for Egypt. The reason for including these statistics is because the majority of the production from these two geographical areas outside the Mediterranean and the Black Sea ends up in the local domestic markets.

The statistics provided cover the period 1991-2000 and have been obtained from the FAO Fishstat database. In a few cases the Information Systems for the Promotion of Aquaculture in the Mediterranean (SIPAM) provides additional statistics for 2001. However, due to the incompleteness of the regional records, the analysis is limited to the 2000 data using the FAO Fishstat data. Furthermore, discrepancies between the various databases exist and these will need to be clarified in the near future.

GLOBAL TRENDS IN THE REGION

The statistics indicate that the situation in the ranking of country production has changed since 1998 with Egypt at the top of the list followed by Spain, France, and Italy. With regards to Egypt, two species are responsible for the increase in the aquaculture production, the Nile tilapia (*Oreochromis niloticus*) and the flathead grey mullet (*Mugil cephalus*) with outputs in 2000 of 157 000 mt and 80 500 mt, respectively. It should be noted that the largest proportion of the production of the above two species comes from brackishwater culture.

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Over 88% of Egyptian aquaculture products are produced in inland waters and along the eastern coastline. Approximately 42 000 mt are produced along the north or Mediterranean coast.

Likewise in the case of France and Spain the great majority of aquaculture production comes from culture practices carried out along the Atlantic coast. In the case of France, the output from the Atlantic in 2000 was about 71% and was represented mainly by the Pacific cupped oyster (*Crassostrea gigas*) with 123 500 mt. Atlantic aquaculture production in Spain in the same year represented 89% of the national output. The main species cultured in the northern and western coasts is the blue mussel, *Mytilus edulis*, with an output of approximately 250 000 mt. Mediterranean production for France and Spain in 2000 was considerably lower at 9% and 1.3%, respectively, or 24 200 mt and 41 mt. Table 1 shows the ranking of the top three countries in relation to the geographical area.

Altogether, aquaculture has grown steadily over the past few years. Total aquaculture production in the region reached 1 350 500 mt in 2000 (Table 2), or an increase of about 49% from the 907 700 mt recorded for 1996. This corresponds to an average annual growth rate of 10.4% over this period. In terms of groups of species, the group that has shown the fastest growth has been the marine finfish that moved from 87 000 mt in 1996 to 251 600 mt in 2000 which corresponds to an average annual increase of 30.4% (Table 4). Molluscs, the main group in terms of quantities produced, grew in this period from 549 800 mt to 627 100 mt corresponding to an average annual increase of 3.3%, a slight improvement to previous years (Table 4).

Total value of the production in 2000 amounted to about US\$ 2 780 million with an increase of US\$ 795 million compared to the overall value in 1996 (Table 3). This corresponds to an average annual growth rate of 8.8%. In terms of contribution to the economy of the aquaculture sector, marine finfish rank first, with US\$ 1 180 million (US\$ 587 million in 1996), which is a change from 1996 when molluscs were first.

TRENDS IN MEDITERRANEAN MARICULTURE AND BRACKISHWATER CULTURE

Considering exclusively the production of mariculture and brackishwater culture in the Mediterranean and the Black Sea, total production increased by about 128 300 mt, from 230 000 mt in 1996 to 358 300 mt in 2000 (Table 1). These figures indicate an average annual growth rate of 11.7%, compared to the rate of 9.2% during the period between 1994 to 1998 as reported during the Second Session of CAQ. This increase was mainly propelled by marine finfish that moved from 63 400 mt in 1996 to 174 200 mt in 2000, growing at an average annual rate of 28.8%. Molluscs remain the main group in production with nearly 180 000 mt, although the latter statistics may be under-reported, particularly in the case of Italy.

The production value of mariculture and brackishwater products in the Mediterranean and in the Black Sea reached about US\$ 1 066 million in 2000 while it was US\$ 719 million in 1996. Also, in this case, the influence of marine finfish has been greater and has remained by far the first aquaculture economic group in the region with over US\$ 810 million. This represented an average annual growth of 10.4% down from 16.3% reported for the period 1994-1998.

The evolution of the production and species groups has not been homogenous in the GFCM member countries. The growth of aquaculture production in some countries, including the freshwater sector and Atlantic production, has evolved negatively, with Albania, Algeria, Bulgaria, France, Morocco and Romania all showing an average negative trend during the 1996-2000 interval. In the case of Albania, with an average annual growth rate of -1.3%, the highest negative performance was recorded in 1997. Since then the production increased progressively at an average annual rate of almost 47%. The situation in both Bulgaria and Romania has remained difficult with productions progressively decreasing compared to the output levels recorded in the late 1980s and early 1990s. Among the countries with relatively

small aquaculture sectors like Cyprus, Lebanon, Malta and Syria that showed a considerable activity in the 1994-1998 period, only Cyprus continued its growth trend with an average annual growth of 24.3% over the five years analyzed.

However, the overall growth of the sector in the last few years resulted from the performance, in order of priority, of Egypt, Turkey, Croatia and Greece. Average annual growth rates in these countries have remained relatively high with over 45% in the case of Egypt, about 24% in Turkey, 23% in Croatia, and 19% in Greece. Italy, which is among the largest producers in the region, registered a 3.4% increase in production while production in France declined by -1.6%. Compared to the performance data presented during the Second Session of CAQ in 2000 the general trend has been an improved growth of the sector.

In the Mediterranean and Black Sea marine and brackishwater aquaculture sector, Italy remains by far the leading producer with about 168 000 mt recorded in 2000, growing at an average annual rate of 5.3% since 1996. The countries in the region can be classified into roughly four groups. The first group includes countries that do not report production in marine and brackish waters, which are Lebanon, Libya, Romania and Syria. A second group contributes a limited amount (below 1 000 mt/country) and includes Albania, Algeria, Bulgaria, Morocco, Spain and Tunisia. A third group with country production between 1 000 mt and 4 000 mt, includes Croatia, Cyprus, Israel and Malta. In the case of the first three countries in this latter group, growth of the sector has been fast with average annual rates ranging from 30-60%. Malta seems to have reached a plateau. The last and fourth group includes countries with productions over 10 000 mt. This group includes Egypt, France, Greece, Italy and Turkey. Of the latter group only Egypt, Turkey and Greece have shown fast growth rates during the 1996-2000 period with average annual growth rates of 53.3%, 23.7% and 20.4%, respectively.

PRODUCTION TRENDS BY SPECIES GROUPS

Table 5 lists the top 15 species produced by all GFCM member countries (including Atlantic and Red Sea production) accounting for 96% of the total production of 1 350 500 mt. The top three marine species are represented by the blue mussel, the Mediterranean mussel (*Mytilus galloprovincialis*) and the Pacific cupped oyster. Growth of the mussel aquaculture sector has continued steadily, but at relatively low annual rates (between 2.5-6.4% depending on the species). In case of the Pacific cupped oyster the output has somewhat declined. The Japanese carpet shell (*Ruditapes philippinarum*) in 2000 ranked ninth on the list with over 95% produced in Italy. The most visible growth in the brackishwater and marine sector is reserved to the gilthead seabream (*Sparus aurata*), seabasses (*Dicentrarchus* spp.) and the flathead grey mullet. In 2000, the gilthead seabream output recorded was over 85 000 mt (annual average growth rate from 1996-2000 was 27.1%) with Greece producing 45% of the total output (or 38 500 mt). In the case of the European seabass, the production in 2000 was over 52 000 mt (annual average growth rate from 1996-2000 was 25.9%) with the lion share claimed by Greece with a production of 26 300 mt (or 51%). FAO Fishstat furthermore report an additional 17 900 mt of *Dicentrarchus* spp produced by Turkey in 2000. The species is probably the European seabass. This culture practice in Turkey has had a rapid growth over the last few years with an average annual growth rate of 36.1% during the 1996-2000 period. Furthermore, the production increase of *M. cephalus* should be noticed, mainly coming from Egypt which appears to have experienced a growth in the culture of this species even faster than that for the European seabass and gilthead seabream. Egyptian production of the flathead grey mullet in 2000 accounted for 66% of the total production of this species.

With regards to alternative aquaculture marine species things have not changed much over the past few years. Trials to identify new finfish species for production are still on-going in most countries, but no real replacement has been found for the two major species (seabream and seabass), which have experienced a considerable decrease in price due to the fast growth in production. Many of the trials have centred on Sparidae species and it is to a certain extent

doubtful that these could be considered real replacements from a marketing point of view. Among the several species under research, production data is available for the sharpsnout seabream, *Puntazzo puntazzo*: in 2000, Italy produced 400 mt while Cyprus 52 mt.

Worth mentioning, at this stage, is the recent farming of the blue fin tuna (*Thunnus thynnus*) in the Mediterranean Sea. This farming practice has taken off in Croatia, Spain, Italy, Malta, Morocco and Turkey and is based on catches of wild fish. The tunas are farmed in large off-shore floating netcages. The stocking size range from small fish of about 10 kg to large specimens of over several hundred kilograms depending on the culture period. Tuna farming in the Mediterranean is expanding and production in 2001 was estimated at over 11 000 mt.

In the case of freshwater species, the Nile tilapia ranked top of the list in 2000 with Egypt producing 100% of the 157 400 mt reported in the FAO statistics. The growth of this aquaculture practice has been fast and Egypt tripled its production since 1998. Other major tilapia species producing countries are Israel and the Syrian Arab Republic, which had an additional and combined output in the same year of about 10 000 mt with Israel responsible for 73% of the output. The rainbow trout (*Oncorhynchus mykiss*) ranked second among the freshwater species with an overall production of 123 300 mt with Italy, France and Spain, in this order, sharing 72% of the total production. Growth of this sector has shown a slightly negative annual growth (-0.9%) over the last few years, most likely due to the drop in the market price and high production costs. Among the other freshwater species, grass carp (*Ctenopharyngodon idellus*) showed the fastest growth rate over the few years under consideration. The bulk of the production came from Egypt with 66 200 mt produced in 2000 with an average annual growth rate of about 135%.

VALUE CONTRIBUTION OF MAIN SPECIES

The economic contribution of the various species to the sector remains very different. Table 6 lists the top 15 species reported in 2000, which combined, accounted for almost 93% of the total aquaculture value. In the Mediterranean and in the Black Sea, without including freshwater species, the two principle species were the gilthead seabream and the European seabass, with US\$ 407 million and US\$ 294 million, respectively. These two species together accounted for over 25% of the total aquaculture value in 2000. The average annual value growth rate of these two species was 12.5%, which when compared to the 26.5% increase in the average production rate, shows a reduction in unit prices, principally due to the increased supply. This situation still remains the main preoccupation of the Mediterranean marine farmers. The flathead grey mullet ranked second with almost US\$ 300 million.

Clams, mussels and oysters represent three other marine species of importance with a total value in 2000 of about US\$ 522 million. In the case of mussels the average increase in value has been lower than the average increase in production showing a progressive difficulty to absorb the production in the main markets. This was not the case of the Japanese carpet clam where the market demand continues to grow. Among the other marine species listed among the top 15 species in terms of value are tuna-like species (Scombroidae) and turbot (*Psetta maxima*).

In the freshwater sector, five species were among the top 15 species list, contributing more than US\$ 812 million in 2000. In this ranking the Nile tilapia was the main species with US\$ 272 million, followed by the rainbow trout (US\$ 255 million). Grass carp is another important species with a contribution of US\$ 117 million in 2000, followed by salmon species (*Salmo* spp.) and the common carp with US\$ 86 million and US\$ 80 million, respectively. Of these freshwater species the ones which have shown the fastest annual average growth in value in the period 1996-2000 and in terms of contribution to the local economies were the grass carp, which grew at over 114%, followed by the Nile tilapia with about 53%. The production and economic contribution of the common carp dropped considerably over the period under consideration.

CONCLUSION

In summary, aquaculture production in the region since the Second Session of the GFCM Committee on Aquaculture has increased and so has the contribution of this sector to the national economies. Nevertheless, the sector still faces a number of constraints related to the evolution of markets, the availability of culture sites, inputs (mainly seeds), diseases, planning, infrastructures and human resources. These problems, of multidisciplinary nature and clearly interrelated, require the collaboration of all member countries for a solution and have been debated at length during the Consultation on the Application of Article 9 of the FAO Code of Conduct for Responsible Fisheries in the Mediterranean Region.

Table 1. Aquaculture production by area - Ranking of top three countries (MT).

| Area | 1996 | 1997 | 1998 | 1999 | 2000 | APR 91-00 ⁽¹⁾ | APR 96-00 | Rank | Country | Production in 2000 |
|-----------------------------------|---------|---------|---------|---------|---------|--------------------------|-------------|-------------------|--|---------------------------------------|
| Brackishwater culture | 149 704 | 164 592 | 236 227 | 306 950 | 427 256 | 15.2 | 30.0 | | | |
| Freshwater culture | 233 706 | 234 650 | 236 536 | 253 235 | 262 185 | 2.8 | 2.9 | | | |
| Mariculture | 524 278 | 542 220 | 628 803 | 660 989 | 661 081 | 4.1 | 6.0 | | | |
| Africa - Inland waters | 70 135 | 67 316 | 126 296 | 211 085 | 300 093 | 19.5 | 43.8 | 1 2 3 -- | Egypt Morocco Tunisia Other ⁽²⁾ | 297 935 985 834 339 |
| Asia - Inland waters | 41 624 | 49 972 | 57 677 | 60 584 | 67 844 | 12.8 | 13.0 | 1 2 3 -- | Turkey Israel Syrian Arab Republic Other ⁽³⁾ | 43 385 17 184 6 797 478 |
| Atlantic - Eastern Central | 120 | 276 | 202 | 196 | 177 | -2.3 | 10.2 | 1 | Morocco | 177 |
| Atlantic - Northeast | 399 987 | 403 453 | 466 497 | 475 611 | 468 051 | 2.6 | 4.0 | 1 2 3 | Spain France Morocco | 278 585 189 456 10 |
| Europe - Inland waters | 165 828 | 173 558 | 161 128 | 155 070 | 156 086 | 0.2 | -1.5 | 1 2 3 -- | France Italy Spain Other ⁽⁴⁾ | 54 078 48 750 33 545 19 713 |
| Mediterranean / Black Sea | 229 994 | 246 887 | 289 766 | 318 628 | 358 271 | 8.2 | 11.7 | 1 2 3 -- | Italy Greece Turkey Other ⁽⁵⁾ | 167 775 77 033 35 646 77 817 |

(1): Average Annual Percentage Rate.

(2): Algeria and Libyan Arab Jamahiriya.

(3): Lebanon and Cyprus.

(4): Romania, Bulgaria, Croatia, Greece and Albania.

(5): Egypt, France, Croatia, Cyprus, Malta, Tunisia, Morocco, Albania, Spain, Algeria and Bulgaria.

(Sources: FAO Fishstat - Version 2.3).

Table 2. Aquaculture production in the GFCM member countries - Includes freshwater and Atlantic coast production (MT).

| Country | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|-----------------------------|--------------|
| Albania | 859 | 397 | 389 | 395 | 340 | 323 | 97 | 124 | 310 | 307 | -10.8 | -1.3 |
| Algeria | 150 | 147 | 300 | 389 | 369 | 322 | 322 | 283 | 250 | 275 | 7.0 | -3.9 |
| Bulgaria | 7 798 | 8 132 | 7 897 | 6 100 | 4 615 | 4 727 | 5 437 | 4 252 | 7 780 | 3 654 | -8.1 | -6.2 |
| Croatia | -- | 6 802 | 4 603 | 4 941 | 4 007 | 2 889 | 3 510 | 5 958 | 6 228 | 6 674 | -0.2 ⁽²⁾ | 23.3 |
| Cyprus | 127 | 155 | 259 | 291 | 452 | 787 | 969 | 1 178 | 1 422 | 1 878 | 34.9 | 24.3 |
| Egypt | 61 617 | 63 895 | 54 100 | 56 603 | 61 815 | 75 837 | 73 454 | 139 389 | 226 276 | 340 093 | 20.9 | 45.5 |
| France | 245 094 | 250 254 | 277 323 | 280 954 | 280 786 | 285 526 | 287 243 | 267 855 | 264 850 | 267 767 | 1.0 | -1.6 |
| Greece | 12 615 | 20 306 | 32 578 | 33 182 | 32 644 | 39 852 | 48 838 | 59 926 | 79 474 | 79 879 | 22.8 | 19.0 |
| Israel | 15 102 | 12 211 | 13 604 | 14 984 | 16 180 | 17 553 | 18 264 | 18 556 | 18 777 | 20 098 | 3.2 | 3.4 |
| Italy | 175 193 | 170 377 | 166 320 | 176 421 | 214 725 | 189 373 | 195 719 | 208 625 | 210 368 | 216 525 | 2.4 | 3.4 |
| Lebanon | 80 | 130 | 180 | 200 | 300 | 350 | 300 | 400 | 300 | 400 | 19.6 | 3.4 |
| Libyan Arab Jamahiriya | 70 | 80 | 80 | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 4.0 | 0.0 |
| Malta | 200 | 500 | 650 | 904 | 904 | 1 552 | 1 800 | 1 950 | 2 002 | 1 746 | 27.2 | 3.0 |
| Morocco | 659 | 741 | 1 193 | 1 463 | 2 072 | 2 057 | 2 184 | 2 104 | 2 720 | 1 847 | 12.1 | -2.7 |
| Romania | 29 530 | 24 620 | 21 100 | 20 400 | 19 830 | 13 900 | 11 168 | 9 614 | 8 998 | 9 727 | -11.6 | -8.5 |
| Spain | 224 971 | 168 759 | 126 130 | 177 940 | 223 965 | 231 633 | 239 136 | 315 477 | 321 145 | 312 171 | 3.7 | 7.7 |
| Syrian Arab Republic | 3 169 | 5 116 | 4 635 | 4 521 | 5 857 | 6 355 | 5 596 | 7 233 | 6 079 | 6 797 | 8.8 | 1.7 |
| Tunisia | 778 | 859 | 795 | 1 137 | 960 | 1 351 | 1 875 | 1 842 | 1 095 | 1 553 | 8.0 | 3.5 |
| Turkey | 7 835 | 9 085 | 12 438 | 15 998 | 21 607 | 33 201 | 45 450 | 56 700 | 63 000 | 79 031 | 29.3 | 24.2 |
| TOTAL | 785 847 | 742 566 | 724 574 | 796 913 | 891 528 | 907 688 | 941 462 | 1 101 566 | 1 221 174 | 1 350 522 | 6.2 | 10.4 |

(1): Average Annual Percentage Rate

(2): APR from 1992-2000.

(Sources: FAO Fishstat - Version 2.3).

Table 3. Value of aquaculture production by country - Includes freshwater and Atlantic coast production (US\$ 1 000).

| Country | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------------|--------------|
| Albania | 670 | 348 | 358 | 344 | 251 | 276 | 223 | 195 | 540 | 478 | -3.7 | 14.7 |
| Algeria | 505 | 363 | 722 | 960 | 971 | 860 | 860 | 794 | 678 | 734 | 4.2 | -3.9 |
| Bulgaria | 20 725 | 21 624 | 21 004 | 16 350 | 12 374 | 13 147 | 14 858 | 11 066 | 17 025 | 7 335 | -10.9 | -13.6 |
| Croatia | -- | 22 799 | 12 874 | 13 700 | 12 472 | 8 963 | 11 303 | 23 037 | 23 481 | 26 487 | 1.9 ⁽²⁾ | 31.1 |
| Cyprus | 1 803 | 1 888 | 2 868 | 3 108 | 4 467 | 7 512 | 8 173 | 9 013 | 9 574 | 10 304 | 21.4 | 8.2 |
| Egypt | 107 174 | 107 273 | 93 526 | 103 432 | 104 994 | 145 411 | 165 871 | 327 263 | 447 146 | 815 046 | 25.3 | 53.9 |
| France | 496 843 | 563 360 | 571 546 | 640 551 | 663 275 | 600 231 | 627 096 | 560 758 | 488 633 | 433 873 | -1.5 | -7.8 |
| Greece | 94 970 | 177 196 | 150 605 | 119 720 | 157 307 | 235 864 | 246 589 | 274 997 | 324 490 | 287 018 | 13.1 | 5.0 |
| Israel | 40 391 | 32 418 | 37 193 | 40 214 | 48 906 | 52 470 | 63 415 | 64 386 | 69 866 | 76 393 | 7.3 | 9.8 |
| Italy | 372 040 | 381 872 | 345 284 | 351 019 | 419 288 | 394 937 | 397 984 | 449 366 | 365 101 | 455 774 | 2.3 | 3.6 |
| Lebanon | 280 | 488 | 720 | 1 000 | 1 500 | 1 750 | 1 500 | 2 000 | 900 | 1 200 | 17.6 | -9.0 |
| Libyan Arab Jamahiriya | 84 | 120 | 120 | 135 | 150 | 150 | 150 | 150 | 150 | 150 | 6.7 | 0.0 |
| Malta | 1 600 | 4 500 | 5 850 | 8 127 | 8 127 | 10 119 | 10 336 | 10 560 | 8 509 | 5 011 | 13.5 | -16.1 |
| Morocco | 6 290 | 6 958 | 9 744 | 11 014 | 12 254 | 11 754 | 7 793 | 7 574 | 8 173 | 4 831 | -2.9 | -19.9 |
| Romania | 77 102 | 69 118 | 53 110 | 51 369 | 47 982 | 35 130 | 16 572 | 15 783 | 16 544 | 15 637 | -16.2 | -18.3 |
| Spain | 345 539 | 216 485 | 163 285 | 203 418 | 250 015 | 250 131 | 247 943 | 307 611 | 345 584 | 382 392 | 1.1 | 11.2 |
| Syrian Arab Republic | 14 680 | 23 698 | 21 467 | 21 645 | 26 912 | 28 986 | 25 892 | 32 876 | 28 079 | 32 090 | 9.1 | 2.6 |
| Tunisia | 3 879 | 7 210 | 5 951 | 7 548 | 5 454 | 6 826 | 9 489 | 8 846 | 4 306 | 7 107 | 7.0 | 1.0 |
| Turkey | 48 920 | 54 412 | 67 578 | 106 962 | 127 197 | 182 569 | 227 960 | 280 745 | 306 408 | 219 775 | 18.2 | 4.7 |
| TOTAL | 1 633 495 | 1 692 130 | 1 563 805 | 1 700 616 | 1 903 896 | 1 987 086 | 2 084 007 | 2 387 020 | 2 465 187 | 2 781 635 | 6.1 | 8.8 |

(1): Average Annual Percentage Rate.

(2): APR from 1992-2000.

(Sources: FAO Fishstat - Version 2.3).

Table 4. Production (MT) and value (US\$ 1 000) of main species groupings - Includes freshwater and Atlantic coast production.

| Production (mt) | | | | | | | | | | | | |
|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|-----------------------------|--------------|
| Species Groups | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
| Molluscs | 521 459 | 461 828 | 440 257 | 496 534 | 566 595 | 549 783 | 554 337 | 633 560 | 642 778 | 627 054 | 2.1 | 3.3 |
| Freshwater fishes | 120 735 | 122 700 | 109 008 | 109 967 | 104 406 | 109 200 | 107 742 | 156 297 | 233 235 | 292 398 | 10.3 | 27.9 |
| Marine fishes | 25 655 | 33 701 | 42 921 | 52 317 | 68 408 | 86 987 | 99 373 | 136 818 | 176 442 | 251 639 | 28.9 | 30.4 |
| Diadromous fishes | 110 593 | 119 045 | 127 059 | 132 758 | 146 746 | 156 073 | 174 253 | 171 266 | 165 414 | 176 130 | 5.3 | 3.1 |
| Aquatic plants | 5 053 | 5 052 | 5 070 | 5 087 | 5 100 | 5 062 | 5 062 | 3 060 | 3 020 | 3 020 | -5.6 | -12.1 |
| Crustaceans | 2 352 | 240 | 259 | 250 | 273 | 583 | 695 | 565 | 282 | 281 | -21.0 | -16.7 |
| Aquatic animals | 0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0 | 0 | 3 | 0 | -- | -- |
| TOTAL | 785 847 | 742 566 | 724 574 | 796 913 | 891 528 | 907 688 | 941 462 | 1 101 566 | 1 221 174 | 1 350 522 | 6.2 | 10.4 |

| Value (US\$ 1 000) | | | | | | | | | | | | |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------------|--------------|
| Species Groups | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
| Marine fishes | 242 602 | 351 270 | 335 220 | 365 848 | 460 392 | 587 241 | 644 030 | 865 037 | 962 988 | 1 179 866 | 19.2 | 19.1 |
| Molluscs | 682 110 | 649 266 | 573 538 | 682 204 | 801 433 | 660 938 | 630 348 | 658 289 | 641 684 | 662 247 | -0.3 | 0.0 |
| Freshwater fishes | 262 680 | 269 296 | 239 107 | 244 202 | 221 530 | 242 867 | 233 099 | 321 693 | 414 675 | 537 747 | 8.3 | 22.0 |
| Diadromous fishes | 403 185 | 416 659 | 411 306 | 403 363 | 414 375 | 475 970 | 557 066 | 522 823 | 433 368 | 388 866 | -0.4 | -4.9 |
| Aquatic plants | 2 432 | 2 450 | 1 907 | 1 868 | 1 848 | 9 724 | 8 823 | 10 371 | 8 713 | 10 045 | 17.1 | 0.8 |
| Crustaceans | 40 484 | 3 189 | 2 728 | 3 130 | 4 317 | 10 348 | 10 640 | 8 804 | 3 750 | 2 864 | -25.5 | -27.5 |
| Aquatic animals | -- | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | 9 | -- | -- | -- |
| TOTAL | 1 633 493 | 1 692 130 | 1 563 806 | 1 700 615 | 1 903 895 | 1 987 088 | 2 084 006 | 2 387 017 | 2 465 187 | 2 781 635 | 6.1 | 8.8 |

(1): Average Annual Percentage Rate.

(Sources: FAO Fishstat - Version 2.3).

Table 5. Top 15 Aquaculture production species in 2000 - Includes freshwater and Atlantic coast production (MT).

| Species | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|-----------------------------|--------------|
| Blue mussel (<i>Mytilus edulis</i>) | 241 003 | 186 333 | 146 461 | 191 100 | 231 444 | 238 424 | 241 143 | 311 862 | 313 569 | 305 730 | 2.7 | 6.4 |
| Nile tilapia (<i>Oreochromis niloticus</i>) | 22 156 | 21 505 | 19 857 | 25 214 | 21 969 | 27 854 | 30 416 | 52 755 | 103 988 | 157 425 | 24.3 | 54.2 |
| Pacific cupped oyster (<i>Crassostrea gigas</i>) | 130 288 | 133 511 | 144 898 | 147 123 | 145 388 | 150 829 | 148 378 | 137 446 | 137 876 | 134 259 | 0.3 | -2.9 |
| Rainbow trout (<i>Oncorhynchus mykiss</i>) | 96 991 | 103 894 | 111 404 | 116 560 | 124 351 | 127 762 | 135 272 | 127 212 | 117 269 | 123 267 | 2.7 | -0.9 |
| Mediterranean mussel (<i>Mytilus galloprovincialis</i>) | 112 820 | 105 232 | 112 387 | 103 392 | 110 936 | 104 768 | 106 592 | 118 435 | 121 730 | 115 519 | 0.3 | 2.5 |
| Flathead grey mullet (<i>Mugil cephalus</i>) | 11 182 | 11 827 | 10 952 | 12 290 | 19 255 | 25 230 | 21 461 | 33 639 | 48 168 | 86 001 | 25.4 | 35.9 |
| Gilthead seabream (<i>Sparus aurata</i>) | 6 152 | 9 284 | 12 737 | 20 125 | 24 029 | 32 658 | 40 669 | 53 100 | 65 747 | 85 235 | 33.9 | 27.1 |
| Grass carp (<i>Ctenopharyngodon idellus</i>) | 9 648 | 9 685 | 4 636 | 4 150 | 2 867 | 3 216 | 16 154 | 39 043 | 52 876 | 67 614 | 24.2 | 114.1 |
| Japanese carpet shell (<i>Ruditapes philippinarum</i>) | 27 116 | 26 740 | 24 000 | 40 000 | 60 000 | 40 385 | 40 140 | 49 630 | 51 826 | 55 737 | 8.3 | 8.4 |
| European seabass (<i>Dicentrarchus labrax</i>) | 5 864 | 9 317 | 13 557 | 14 689 | 19 180 | 20 715 | 26 970 | 34 548 | 40 635 | 52 091 | 27.5 | 25.9 |
| Trouts nei (<i>Salmo</i> spp) | 4 146 | 6 271 | 6 848 | 6 977 | 12 689 | 18 511 | 28 505 | 34 640 | 38 580 | 44 543 | 30.2 | 24.5 |
| Common carp (<i>Cyprinus carpio</i>) | 53 111 | 60 050 | 50 801 | 46 861 | 48 622 | 49 272 | 34 393 | 39 049 | 49 200 | 39 646 | -3.2 | -5.3 |
| Seabasses nei (<i>Dicentrarchus</i> spp) | 777 | 808 | 3 158 | 2 229 | 2 773 | 5 210 | 6 300 | 8 660 | 12 000 | 17 877 | 41.7 | 36.1 |
| Tilapias nei (<i>Oreochromis</i> spp) | 6 383 | 4 494 | 5 245 | 6 622 | 7 070 | 7 987 | 7 107 | 8 068 | 7 475 | 9 685 | 4.7 | 4.9 |
| European flat oyster (<i>Ostrea edulis</i>) | 3 039 | 3 644 | 2 709 | 3 740 | 4 896 | 5 154 | 4 929 | 4 911 | 5 408 | 5 453 | 6.7 | 1.4 |
| SUB-TOTAL | 730 676 | 692 595 | 669 650 | 741 072 | 835 469 | 857 975 | 888 429 | 1 052 998 | 1 166 347 | 1 300 082 | 6.6 | 10.9 |
| Other (94 entries) | 55 171 | 49 971 | 54 924 | 55 841 | 56 059 | 49 713 | 53 033 | 48 568 | 54 827 | 50 440 | -1.0 | 0.4 |
| TOTAL | 785 847 | 742 566 | 724 574 | 796 913 | 891 528 | 907 688 | 941 462 | 1 101 566 | 1 221 174 | 1 350 522 | 6.2 | 10.4 |

(1): Average Annual Percentage Rate.

(Sources: FAO Fishstat - Version 2.3).

Table 6. Top 15 Aquaculture production species in 2000 by values - Includes freshwater and Atlantic coast production (US\$ 1 000).

| Species | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | APR ⁽¹⁾ 91-00 | APR 96-00 |
|--|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------------|--------------|
| Gilthead seabream (Sparus aurata) | 82 537 | 119 830 | 115 540 | 159 415 | 192 793 | 272 996 | 287 846 | 362 075 | 375 653 | 407 151 | 19.4 | 10.5 |
| Flathead grey mullet (Mugil cephalus) | 33 791 | 38 392 | 36 331 | 39 866 | 51 914 | 67 808 | 68 265 | 103 911 | 137 751 | 299 064 | 27.4 | 44.9 |
| European seabass (Dicentrarchus labrax) | 99 503 | 159 925 | 136 068 | 124 120 | 160 154 | 169 925 | 197 633 | 257 084 | 257 421 | 294 606 | 12.8 | 14.7 |
| Nile tilapia (Oreochromis niloticus) | 42 983 | 39 354 | 36 736 | 45 385 | 37 347 | 49 135 | 62 596 | 111 672 | 177 638 | 272 184 | 22.8 | 53.4 |
| Rainbow trout (Oncorhynchus mykiss) | 302 048 | 306 984 | 315 660 | 287 317 | 293 213 | 335 968 | 383 843 | 344 406 | 248 010 | 255 730 | -1.8 | -6.6 |
| Pacific cupped oyster (Crassostrea gigas) | 260 826 | 296 174 | 287 957 | 314 385 | 339 385 | 261 929 | 243 248 | 228 169 | 231 286 | 202 233 | -2.8 | -6.3 |
| Japanese carpet shell (Ruditapes philippinarum) | 70 198 | 65 379 | 45 864 | 99 360 | 147 360 | 105 050 | 95 046 | 120 372 | 107 756 | 164 292 | 9.9 | 11.8 |
| Blue mussel (Mytilus edulis) | 203 352 | 140 317 | 102 985 | 117 545 | 145 665 | 141 737 | 135 730 | 152 995 | 145 671 | 155 726 | -2.9 | 2.4 |
| Grass carp (Ctenopharyngodon idellus) | 12 946 | 13 211 | 7 184 | 6 980 | 4 467 | 5 588 | 24 205 | 57 993 | 79 147 | 117 299 | 27.7 | 114.0 |
| Trouts nei (Salmo spp) | 21 974 | 31 355 | 25 475 | 38 722 | 49 106 | 69 789 | 99 780 | 114 314 | 133 873 | 86 873 | 16.5 | 5.6 |
| Common carp (Cyprinus carpio) | 108 200 | 123 814 | 105 544 | 101 711 | 101 875 | 110 618 | 86 747 | 94 056 | 98 666 | 80 389 | -3.2 | -7.7 |
| Mediterranean mussel (Mytilus galloprovincialis) | 81 535 | 85 200 | 76 755 | 69 921 | 76 445 | 77 181 | 72 039 | 82 574 | 77 964 | 74 039 | -1.1 | -1.0 |
| Seabasses nei (Dicentrarchus spp) | 9 324 | 9 696 | 29 369 | 19 125 | 27 813 | 47 880 | 56 700 | 77 074 | 92 640 | 73 832 | 25.8 | 11.4 |
| Tuna-like fishes nei (Scombroidei) | 208 | 247 | 247 | -- | 195 | 1 078 | -- | 29 385 | 50 190 | 57 071 | 86.6 | 169.7 |
| Turbot (Psetta maxima) | 12 627 | 17 719 | 14 410 | 20 503 | 25 755 | 23 603 | 24 779 | 25 118 | 32 264 | 35 823 | 12.3 | 11.0 |
| SUB-TOTAL | 1 342 052 | 1 447 597 | 1 336 125 | 1 444 355 | 1 653 487 | 1 740 285 | 1 838 457 | 2 161 198 | 2 245 930 | 2 576 312 | 7.5 | 10.3 |
| Other (94 entries) | 291 443 | 244 533 | 227 683 | 256 260 | 250 407 | 246 802 | 245 551 | 225 822 | 219 258 | 205 324 | -3.8 | -4.5 |
| TOTAL | 1 633 495 | 1 692 130 | 1 563 808 | 1 700 615 | 1 903 894 | 1 987 087 | 2 084 008 | 2 387 020 | 2 465 187 | 2 781 636 | 6.1 | 8.8 |

(1): Average Annual Percentage Rate.

(Sources: FAO Fishstat - Version 2.3).