

AQUACULTURE IN THE WORLD AND AN OVERVIEW TO THE FUTURE OF TURKEY

Dr. Nadir BAŞÇINAR – CFRI

Aquaculture is assumed to start for the first time in China in 2000 B.C. The Romans started fish farming in ponds on the coasts. Later on in the Middle Ages, carp were stocked in the ditches of the castles and monasteries.

Marine fish culture started most probably in 1400 B.C. during the tidal events by means of stocking the milk fish fries in ponds. Today, aquaculture has reached half of the amount obtained by fishing. Especially during last two decades, the demand for the fishery products has gradually increased and the new strategies and new applications have paved the way for rapid development of this very old culture (De Silva, 2001).

China, a country that started fish farming for the first time has produced 34.21 million tons in 2001, which represented 70.7% (48.41 million ton) of the global production. China, the pioneer of fish farming is followed by the Far Eastern countries e.g. India, Indonesia, Japan and Thailand (FAO, 2004a) (Figure 1).

The total production of 3.53 million tons in 1970s has rapidly increased in 1990s (Figure 1). The production from world wide farming was 37.85 million tons except for algae. Amount of production for algae and other water plants is 10.562.279 tons (FAO, 2004a).

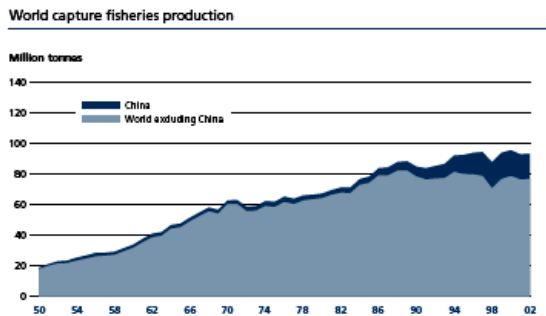


Figure 1. Amount of fishery products in the world during the period between 1950-2002 (106 tons)

The top species groups cultured in the world are cyprinidae in the fish, shrimp in the crustaceans, oyster in the mollusks, and brown algae in the algal group (FAO, 2004a) (Table

1). As to culturing by species, the first top is Pacific oyster (*Crassostrea gigas*) with 4.11 million tons followed by grass carp (*Ctenopharyngodon idellus*) with 3.64 million tons. Silver carp (*Hypophthalmichthys molitrix*) ranks the third with 3.55 million tons. Considering the profits, black tiger shrimp (*Penaeus monodon*) ranks the first with USD 4.721.568.000 (FAO, 2004a) (Table 2).

The number of cultured species by fish, crustaceans and mollusks is 151, 39 and 72, respectively, amounting to 262 (Garibaldi, 1996). However, as per the amount of the farming activities, the total amount (30.55 million tons) of production for 30 species constitutes 80.7% of the total farming activities (FAO, 2004a).

The total length of the rivers in Turkey is 177714 km. There are 48 lakes, 66 dams which are bigger than 5 km². And the total surface area is 12322 km². The volume of annual consumable surface waters is 186.1 km³ and the volume of exploitable ground waters is 12.2 km³. The total length of littoral line is 8.333 km, including the islands (Çelikkale et al., 1999).



According to the official records, trout, carp, gilthead bream, sea bass, Atlantic salmon, shrimp, mussel and two-banded seabream are the species cultured in Turkey. Yet, Atlantic salmon, shrimp and two-banded seabream have not been produced for a few years and the mussel production (2 tons) has almost stopped. Until year 2000, the production has experienced a rapid increase and has

Table 1. Mostly cultured groups of species in the world in 2001 (FAO, 2004a)

		Product (ton)	Değer (US\$)
Fish	Carps	16 427 626	15 986 670
	Salmonids	1 781 985	5 181 656
	Tilapia and other Cichlid	1 385 223	2 002 162
Crustaceans	shrimp	1 270 875	8 432 149
Mollusks	Oyster	4 207 818	3 474 955
	Mussels	1 370 631	616 401
	Scallop ve Pectenler	1 219 127	1 667 949
Algae	Brown algae	4 691 210	2 852 500
	Red algae	2 215 193	1 446 733

Table 2. Mostly cultured species with most commercial value in the world in 2001 (FAO, 2004a)

species	Product (tone)	species	Value ('000 \$)
1. <i>Crassostrea gigas</i>	4 109 784	1. <i>Penaeus monodon</i>	4 721 568
2. <i>Ctenopharyngodon idellus</i>	3 636 367	2. <i>Crassostrea gigas</i>	3 379 276
3. <i>Hypophthalmichthys molitrix</i>	3 546 285	3. <i>Hypophthalmichthys molitrix</i>	3 176 221
4. <i>Cyprinus carpio</i>	2 849 492	4. <i>Ctenopharyngodon idellus</i>	3 053 903
5. <i>Ruditapes philippinarum</i>	2 090 800	5. <i>Cyprinus carpio</i>	3 000 335
6. <i>Hypophthalmichthys nobilis</i>	1 663 499	6. <i>Salmo salar</i>	2 788 007
7. <i>Carassius carassius</i>	1 527 058	7. <i>Ruditapes philippinarum</i>	2 477 343
8. <i>Patinopecten yessoensis</i>	1 196 135	8. <i>Penaeus chinensis</i>	1 850 534
9. <i>Oreochromis niloticus</i>	1 109 412	9. <i>Labeo rohita</i>	1 570 528
10. <i>Salmo salar</i>	1 025 287	10. <i>Patinopecten yessoensis</i>	1 555 003

become 79031 tons; but it has first decreased to 67.244 tons in 2001 and then to 61.165 tons in 2002. The number of species cultured has decreased to four (FAO, 2004b). In addition to the economic crisis occurred in 2001, the other reasons of this decrease are the difficulties in obtaining the crude material of feed, high costs, limitations on the imported fish flour and other flesh products due to BSE (mad cow disease), and the fluctuations in the exchange rate of dollar. It has been accepted that the reasons of this decrease must be well assessed to learn lessons from these fluctuations, and the efforts are being exerted for the future in continuous manner accordingly. Turkey is not the only country experiencing the decrease in the production. France, Italy and Spain have gone through this decrease in production in the same period.

Some trout farming enterprises, although not mentioned in the official records, have dealt with brook trout (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*) farming in small amounts. The studies have been initiated under the umbrella of Fisheries Research Institutes connected to the Ministry of Agriculture and Rural Affairs and the species with important achievements are Black Sea salmon (*Salmo*

trutta labrax), and turbot (*Psetta maxima*) with the supports of JICA (Japan International Cooperation Agency). *Sparus pagrus* common seabream, common pandora, white grouper, dentex, sharpsnout seabream and crayfish (*Astacus leptodactylus*) are the mostly studied species by the research institutes of Turkey. Small eels (*Anguilla anguilla*) captured from the nature are reared in the culture environment and a considerable success is achieved at such an extent that they are reared to portion size. Studies on sturgeon (*Acipenser* sp.) are still continuing. Private sector has gained a successful reproduction from common pandora (*Pagellus erythrinus*), dentex (*Dentex dentex*), sharpsnout seabream (*Puntazzo puntazzo*), and common seabream (*Pagrus pagrus*). Furthermore, extensive farming of oyster (*Ostrea edulis*), clam (*Tapes decussatus*) and warty Venus (*Venus verrucosa*) in a few lagoons in Marmara Region, and production of tilapia fish in Çukurova University, Adana have been continuing for a very long period despite that they are not included in the aquacultural records. Again the private sector has started farming bluefin tuna (*Thunnus thynnus*) which are reared until the period between October-December during which the commercial value increases for the fish captured and stocked in

the cages. It could be expressed that there are more than 15 species including the species that are still being studied, notwithstanding that the species produced in Turkey seem to be 4.

The number of fishery enterprises in Turkey is approximately 1450. There are some families producing trout with a capacity of less than 1 ton for the purpose of meeting their own needs in such a way that their non-commercial production is not recorded officially. And the number of people dealing with fish culture is increasing every day.

As the organic agricultural crops are becoming attractive, the Ministry of Agriculture and Rural Affairs has initiated "Organic Fisheries" projects.

The area of fisheries has also been improved as a part of many other legislative improvements on the way to access the European Union. And some articles of the laws 1380 and 4950 regulating the fisheries are amended to be in conformity with today's conditions.



That the water potential of Turkey and the valuation of this potential by public and private organizations are increasing is, on one side, a positive development for the Turkish fisheries sector, but is not sufficient on the other side. The locomotive in the world is China. The size of labor force in addition to water resources and surface area makes this country peerless. When the capacity of Turkish fisheries sector is compared with that of the European Union member countries, it could be noticed that Turkish sector is above the EU average which is around 50000 tons for 2002. Similarly, Spain, France, Italy and the Great Britain represent 3/4 of the total production of the EU.

Even though the number of species studied exceeded 15, the efforts to study alternative species are still going on. Those

which are in the candidate species are flounder, bluefish, thick-lip grey mullet, pike, pike perch, catfish, grass carp, silver carp.

That both the importance of the water potential of Turkey and the number of graduates of faculties and higher vocational schools increase gradually indicates the fact that there shall be an important development in the future. The capacity of fisheries could be increased by two-folds with the completion of legal arrangements, economic balance, efficient use of water (recirculation system), elimination of difficulties in the feed production and in the provision of crude material, efforts to eliminate the diseases, completion of R&D efforts by each enterprise, development of marine fish cage culture, improved flesh quality of the cultured species, and good mechanization and marketing efficiency.



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