MASMANAP country report: Greece

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SUMMARY – The current paper presents the evolution of the Greek "aquatic-food" production, the international trade of it and the apparent consumption. Emphasis is placed on the aquaculture sector, with regard to the species and volumes produced, and the evolution of the market prices. Finally, the national aquatic-food market chain is briefly described, elaborating on the "primary-level" trading infrastructure facilities.

Key words: Greece, fishery, aquaculture, seafood, supply, consumption.

RESUME –*"Rapport national dans le cadre de MASMANAP : Grèce". Cet article présente l'évolution de la production d'aliments aquatiques en Grèce, leur commerce international et la consommation apparente. L'accent est mis sur le secteur de l'aquaculture, en ce qui concerne les espèces et les volumes produits, ainsi que l'évolution des prix de marché. Finalement, une brève description est faite de la chaîne des marchés nationaux d'aliments aquatiques, en examinant les installations et infrastructures commerciales au niveau primaire.*

Mots-clés : *Grèce, pêche, aquaculture, produits de la mer, offre, consommation.*

Introduction

Assessing the national consumption of food products of aquatic origin, various data sources can be identified. Despite the inherent differences in the methodologies of each data source, and in many cases the incompatibility of the data provided, a number of issues emerge when assessing the national aquatic food production and consumption, and in particular the apparent consumption of such products. In this respect, while the landings from the traditional capture fisheries sector have been declining during the 1990s the development of the aquaculture sector not only has compensated for that loss but has contributed to the overall increase in the total production. As regards the trade balance for such products, Greece has been long suffering a deficit, with imports being significantly higher than exports, a deficit which nevertheless is being reduced at slow but fairly constant rate. The marginal increase in the overall production of aquatic food products and the reduction on the respective trade deficit (with high volumes of import maintained) is being mirrored in the increase of the apparent consumption which has risen from almost 190,000 t to over 220,000 t, an increase in the annual *per capita* apparent consumption from 18 kg to 21.2 kg from 1989 to 1998. It should be noted that there have hardly been any marketing efforts, at national level, for the promotion of aquatic food to the end consumers, apart from a "generic" promotion of the aquacultured products that took place a couple of years ago through the initiative of the Federation of the Greek Mariculturists.

Production and apparent consumption of aquatic food

Total production of aquatic food

Assessing and quantifying the total national production of aquatic-food, a major constraint arises, attributed to the fact that the current statistical system does no distinguish between the catches and landings for human consumption and those for fishmeals and/or other uses. Nevertheless, an overall adequate picture can be drawn, based on the best available information, and as Fig. 1 depicts, it becomes evident that capture fisheries suffer a slowly declining trend with aquaculture increasing production and "filling in" for the total. The decline in the capture fisheries is attributed to the decommissioning of a large number of artisanal fishing vessels as well as the change in the statistical

methodology for the collection of data for 1998. The explosive increase of aquacultured products has increased their share in the overall production from 3% in 1989 to 35% in 1998.

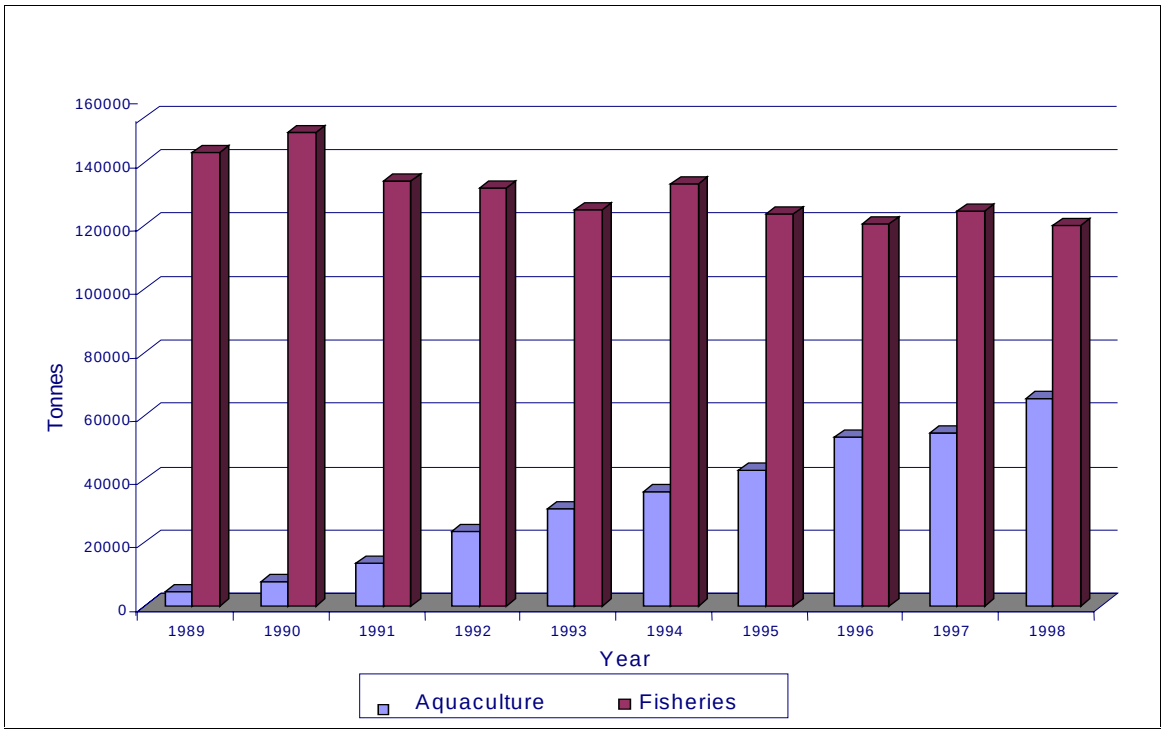


Fig. 1. Quantities of "aquatic-food" production, in t (source: National Statistical Service of Greece; Agricultural Bank of Greece).

Total production by capture fisheries

The primary production sector of the national economy is considered an important one, not only due to its economic implications but also because of its importance for the maintenance of the socio-demographic status of certain areas of the country. Within this framework, the national "Fisheries" sector, despite its relatively low contribution to the GNP (0.36% for 1997), is considered as an important one, particularly in the rural, coastal and island regions of the country. Its "marine fishery" category in specific, is the most numerous in terms of employment and the most important in terms of production volumes.

Total production from capture fisheries has been demonstrating a slow decreasing trend, having reached 119,901 t in 1998 from 142,900 t in 1989. This reduction, of almost 20% in ten years, is partly attributed to the reduction of the quantities landed by the vessels operating in the Mediterranean region (–12%), as well as the almost halving of the production of the high seas fisheries. However, as mentioned earlier, the change in the methodology for the collection and analysis of the information from 1998 onwards, is also largely influencing the significant change observed. It is interesting to note that while the total production of capture fisheries has been reduced by almost 20%, the reduction in value within the decade 1989-1998 is of a much greater magnitude, reaching a drop of almost 35%, to 33,382 thousand € in 1998 from 50,204 € (Ecus) in 1989.

As regards the major "wild" species marketed, national landings indicate that 60% of the production from the capture-fisheries correspond to 10 species, of which the 6 are marine fin-fish, 2 are crustaceans (shrimps, prawns) and 1 is a bivalve mollusc (mussel), as illustrated in Table 1. It should be noted, however, that both the composition of the catch as well as the prices fetched in the market, as presented in Table 1, should only be considered as indicative, taking into account that both parameters exhibit strong seasonal fluctuations.

Table 1. Major species landed and indicative market prices (source: National Statistical Service of Greece, Statistical Bulletins)

Product	Share in landings	Price (€/kg)
Mussels	16%	1.0671
Sardines	13%	1.0671
Anchovies	10%	1.9817
Horse mackerel	5%	1.6768
Bogue	4%	3.0488
Chub mackerel	4%	2.4390
Hake	3%	6.0976
Mullus sp.	3%	7.6220
Prawns	1%	10.6707
Shrimps	1%	2.4390
Other	40%	

Total production by aquaculture

Greece has a relatively long tradition in the field of aquaculture, which was nevertheless limited until the early 1980's to extensive-type farms. The great development of aquaculture started after 1985 when the state promoted the sector of marine-fish farming on the grounds of certain issues such as: (i) the National and EC policy of incentives; (ii) the favourable geomorphologic and environmental conditions; (iii) the increasing interest shown by private investors; (iv) the market developments, which showed signs of increasing demand for fresh fish; and (v) the developments observed in the research and technology for the culturing of the species.

It has been mostly during the past decade, that aquaculture production in Greece demonstrated an explosive increase, with production volumes in 1998, almost 15 times greater than the volumes produced a decade ago (4410 t in 1989, 65,480 t in 1998).

Aquaculture (in fact mostly mariculture), has become a major industry in Greece, not only because of the impressive results in production volumes but also because a number of important socio-economic issues emerged. A great number of people are involved, directly and/or indirectly, while rural areas, previously "non-developed" received investment funds and created job opportunities for their inhabitants for which the only previous alternative was to flee away and seek for job opportunities elsewhere. The high rate of investment directed into the sector of aquaculture created the necessary infrastructure and "know-how" and improved the economic indices of the fisheries sector in general, as only a few of the other sectors of the primary production have done.

In general terms, the impressive growth the sector is exhibiting is being characterised by the following: (i) rapid increase in the number of the companies involved; (ii) high volumes of production, particularly during the last seven years; (iii) significant increase of the Gross Product and of the sales in domestic and foreign market; (iv) production volume increases parallel to price decreases; and (v) significant reduction in production cost.

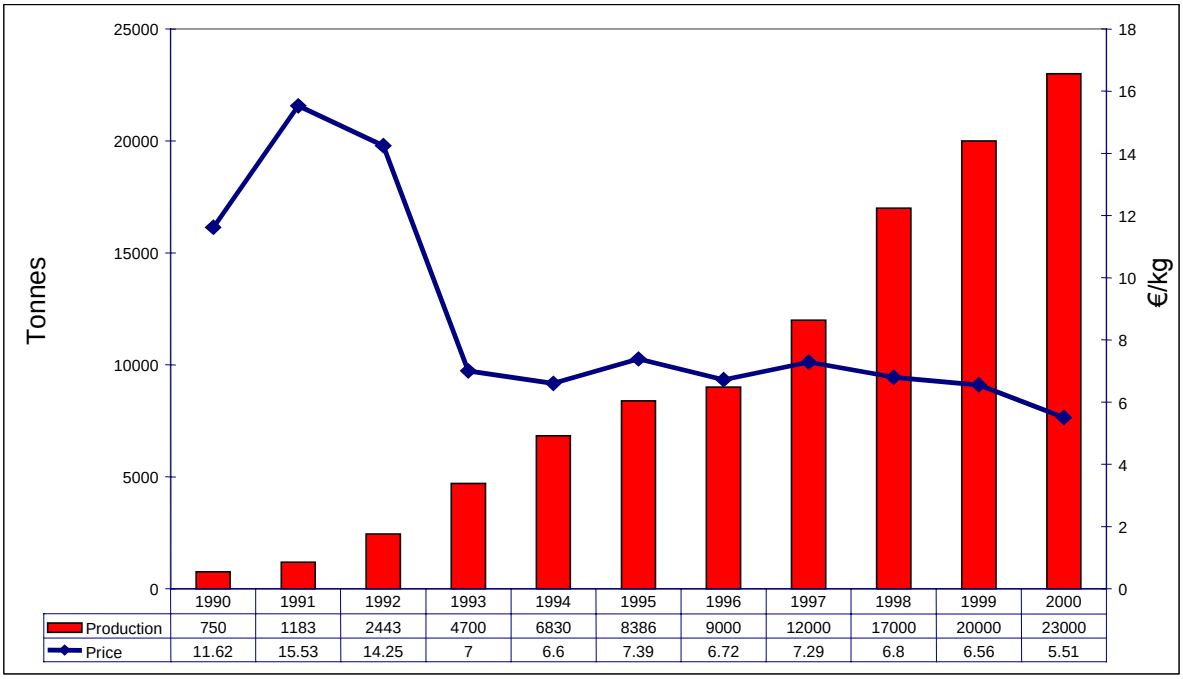
Mariculture (seabass and seabream)

At present, about 250 companies are involved in the sector, producing over 40,000 tonnes annually, employing (directly or indirectly) about 10,000 people, thus making a significant contribution to the national economy.

Of the mariculture finfish production of 1998, 56% accounted for seabream, 43% for seabass and only 1% for the so-called "new" species, the sharpsnout-bream, the red seabream and the common dentex. It is however expected that production of the "new" species will increase in the following years due to the increased investments towards the production of such species. It is indicative to the interest shown by the Greek mariculturists for such "new" species the fact that recent figures of fingerling production from the hatcheries in Greece raised the share of the production of these species at 7.5% of the total annual fingerling production.

The Greek finfish mariculture sector, after a period of impressive growth has come to a critical stage, as production has reached volumes far beyond the wildest expectations. The supply-driven force, which prevailed during the development phase of the sector, coupled by the almost absolute lack of market surveys and marketing strategies, severely disrupted the market supply/demand equilibrium. As a result, the finfish maricuculture products, though initially unknown and later perceived as a sort of delicacy, ended up in the market as a sort of commodity.

The latter becomes evident from Figs 2 and 3 which illustrate the increase in the production of farmed seabass and seabream, correlated by the concomitant reduction in the average ex-farm price for the two species. In more detail, the seabass increase of production, of about 2500% in ten years, resulted in a decrease of the ex-farm price by 52%. Similarly, the increase of the seabream produced reached almost 3200%, and the reduction of the ex-farm price down by almost 60%. The rapid decline of the prices was somewhat slowed and the prices stabilised towards the mid-1990's, mainly due to the intense efforts by the producers towards the intrusion to new foreign markets, other than the Italian one, which for the first years of development had been the – almost – exclusive destination. Nonetheless, the ever-increasing trends of the production, observed towards the last couple of years, seems to start saturating even the "new" markets and prices are on the decline again.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production	750	1183	2443	4700	6830	8386	9000	12000	17000	20000	23000
Price	11.62	15.53	14.25	7	6.6	7.39	6.72	7.29	6.8	6.56	5.51

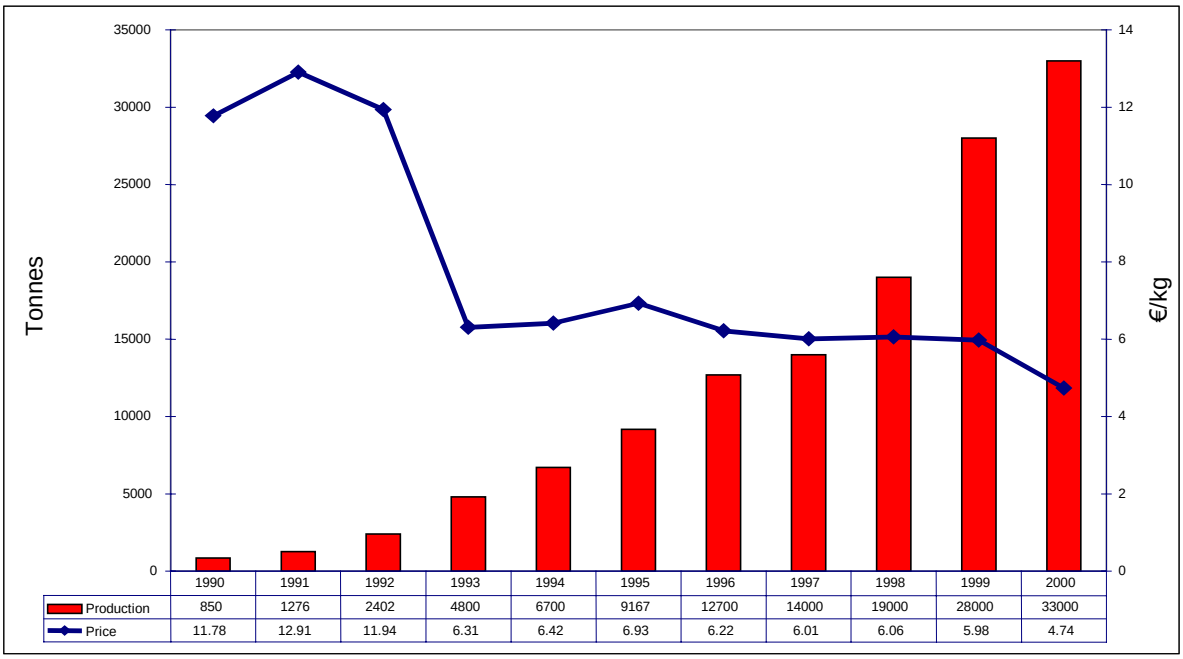
Fig. 2. Development of the national seabass mariculture production and evolution of the average ex-farm price (source: Federation of Greek Mariculturists; Federation of European Aquaculture Producers).

Despite the efforts to "intrude" into new markets, the greatest majority of the export sales (almost exclusive) still remains in the form of "fresh/chilled whole-fish". The following illustration (Fig. 4) manifests the share of the domestic and foreign markets (exports) to the total national seabream and seabass production.

Moreover, it becomes obvious from Figs 5 and 6 that the domestic market exhibits a distinct preference to seabream, while the foreign demand focuses mainly on the sea bass. In any case however, demand of the foreign markets for seabream demonstrates a strong increasing trend towards the last years.

As noted earlier, the main reason for the reduction of the prices has not been the total overproduction, but production being distributed to the same markets. For instance, out of the 70% of the Greek aquaculture production that was initially being exported to Europe, almost 80% of it was

being directed to Italy. However, towards the second half of the decade, it became an issue of strategic importance of the large companies, the intrusion to new markets. As a direct result, Greek mariculturists managed to distribute 20% of the their exports to new markets of the European Union such as Germany, France, Spain and Portugal, while efforts are also being directed towards the UK market.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production	850	1276	2402	4800	6700	9167	12700	14000	19000	28000	33000
Price	11.78	12.91	11.94	6.31	6.42	6.93	6.22	6.01	6.06	5.98	4.74

Fig. 3. Development of the national seabream mariculture production and evolution of the average ex-farm price (source: Federation of Greek Mariculturists; Federation of European Aquaculture Producers).

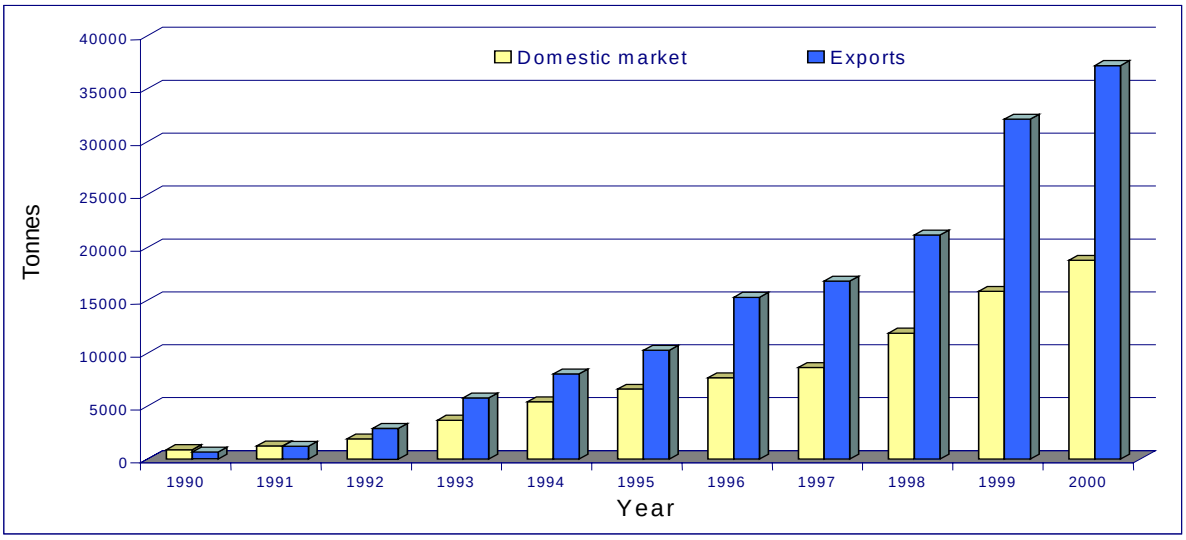


Fig. 4. Evolution of seabass and seabream volume distribution in domestic and international markets (source: Federation of Greek Mariculturists).

Because of the – almost geometric – increase in production volumes, the Greek Ministry of Agriculture and the European Commission reached an agreement of cutting down the upper limit of

production through quotas, while the licenses for new production units can be issued under the term that only new species will be produced.

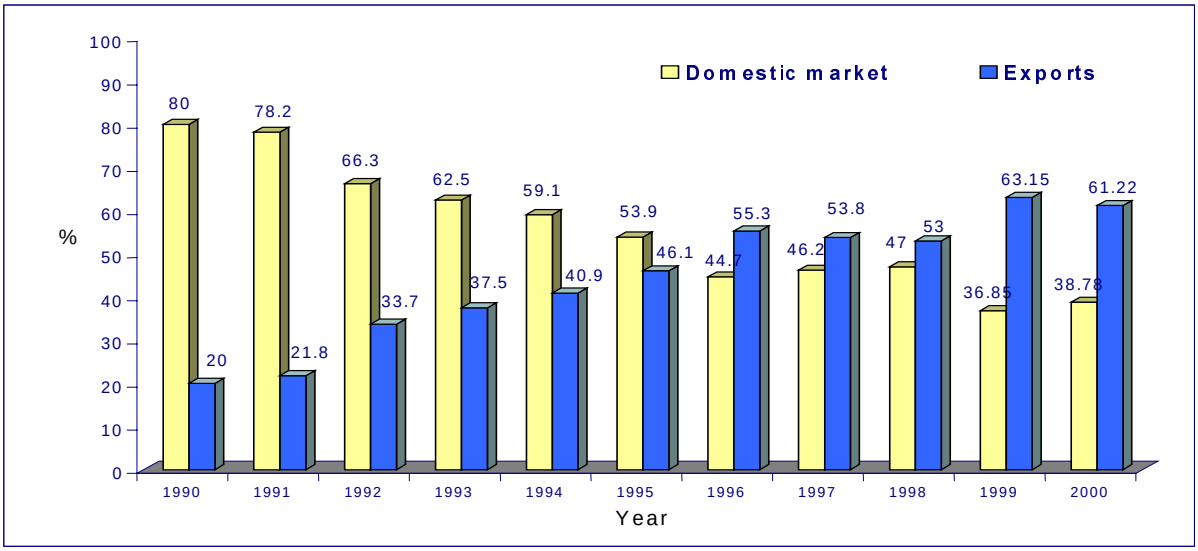


Fig. 5. Development of domestic and export market shares for seabream production (source: Federation of Greek Mariculturists).

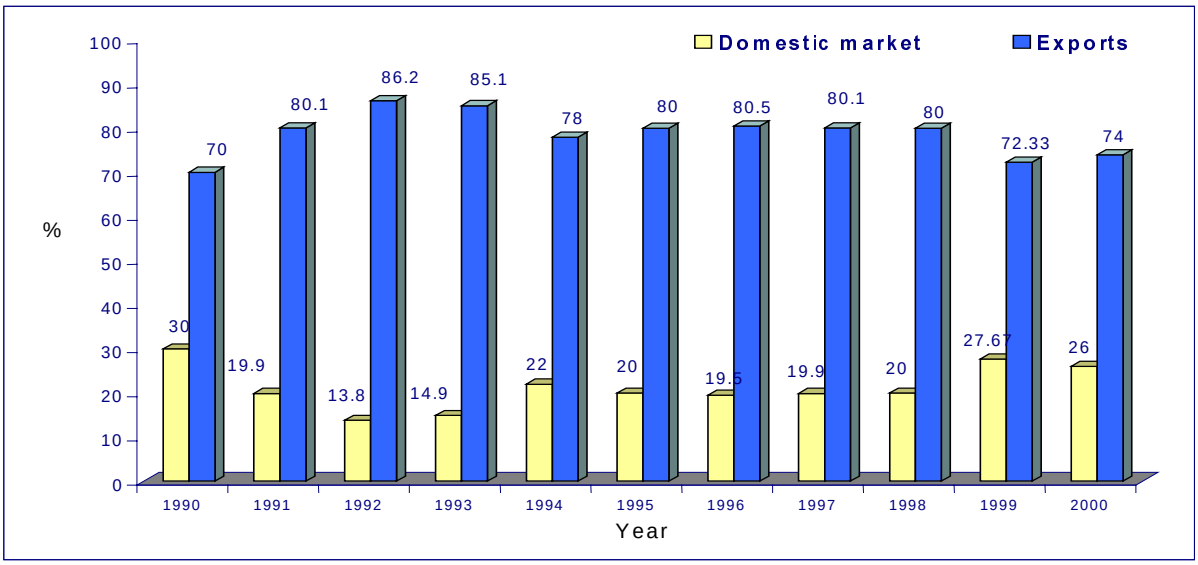


Fig. 6. Development of domestic and foreign market shares for seabass production (source: Federation of Greek Mariculturists).

Following these developments many serious changes have taken place. The most important has been the concentration of the production around large companies or group of companies and co-operatives. Hence, the emerging picture is one of oligopoly, with few companies largely setting the pace of development, and capitalising the markets. It has been mainly within such companies, as well as research institutes, that effort has been directed towards the effective culturing of new species at a commercial scale.

Significant effort has been directed towards the culturing of a wide variety of species. Many of these so-called "new" pecies have similar culturing requirements to the predominantly cultures ones

(i.e. lower cost of diversification). The latter however, have similar marketing attributes, therefore suffering of a distinct marketing handicap. On the other side are the species with quite different culturing techniques which have been more recently developed. These, though more costly at the initial stages of culturing, provide a much higher degree of product differentiation. In general, the 'new' species can be divided into the Sparid and non-Sparid ones, or similarly to the lower growth, better priced and the high growth, medium priced ones. Table 2 lists the main species for which efforts are being directed for their commercial cultivation. It should be noted that while some of these species are presently cultured close to commercial scale, the majority of them are in the experimental or pilot stage.

Table 2. "New" aquaculture species

Non-sparids	Sparids
Thunnus tynnus	*Diplodus sargus, D. puntazzo*
Epinephelus marginatus	*Pagellus erythrinus*
Sciaena umbra	*Pagrus major, P. pagrus*
Sole solea	*Dentex dentex*
Mugil cephalus	

Regarding the new species and their potential in the market, the prospects are generally being positively evaluated, although the development of the demand cannot be estimated nor can it be correlated with the consumption of bass and bream, as their production accounts for only about 6% of the total bass and bream production. The marketing and distribution of the new species does not present any particular difficulties since it undergoes mostly through the same marketing channel as the one followed by the bass and bream, or in some cases where the new species do not have an established market, they are being sold as part of the "wild" catch.

Bivalve culture

The culture and collection of "shellfish" has been traditionally practised in the northern regions of the country, close to the areas with significant river run-off. The relatively high marine primary production, high water temperatures, unpolluted water conditions, very small tidal range and low current velocities were the main environmental parameters which gave rise to the establishment of shellfish culture parks. The culture of certain bivalve species, initially done through very basic systems, provided the living for many families in the past. Nowadays, "shellfish" culture has been modernised, though still operated by family type enterprises. The main product is mussels *(Mytilus galloprovincialis*), through rather intensive or semi-intensive systems, yielding 26,600 t while the extensive culture of oysters yields around 6 t and cockles about 7 t. The prospects for the development of this type of culture are evaluated positive due to the increased demand for such products both at a national as well as an international level. It is noteworthy that the production of mussels from 1993 to 1998 rose to 55.8%.

Shrimp culture

Shrimp culture has been developed in land-based farming systems. At present there is only one company producing shrimps, through a semi-intensive system. Lately there exist business interest for the future transfer of foreign know for the cultivation of fresh-water prawns.

Trout culture

The culture of trout has been a long traditional type of culture in the north-western mountain parts of Greece. Up-to-date most such farms have been small-scale family-type ones. There is only a small number of larger enterprises with vertical systems of production producing about 500 t annually.

Trout culture, overcoming certain problems of market problems during the early stages of development, after a turn of the producers to the marketing of processed forms of the product, started exhibiting high rates of development with production volumes increasing by 24% from 1993 to 1998.

More specifically, from the 98 units operating in 1998, 2334 t were produced with estimates for the 1999 production reaching 2800 t (Fig. 7).

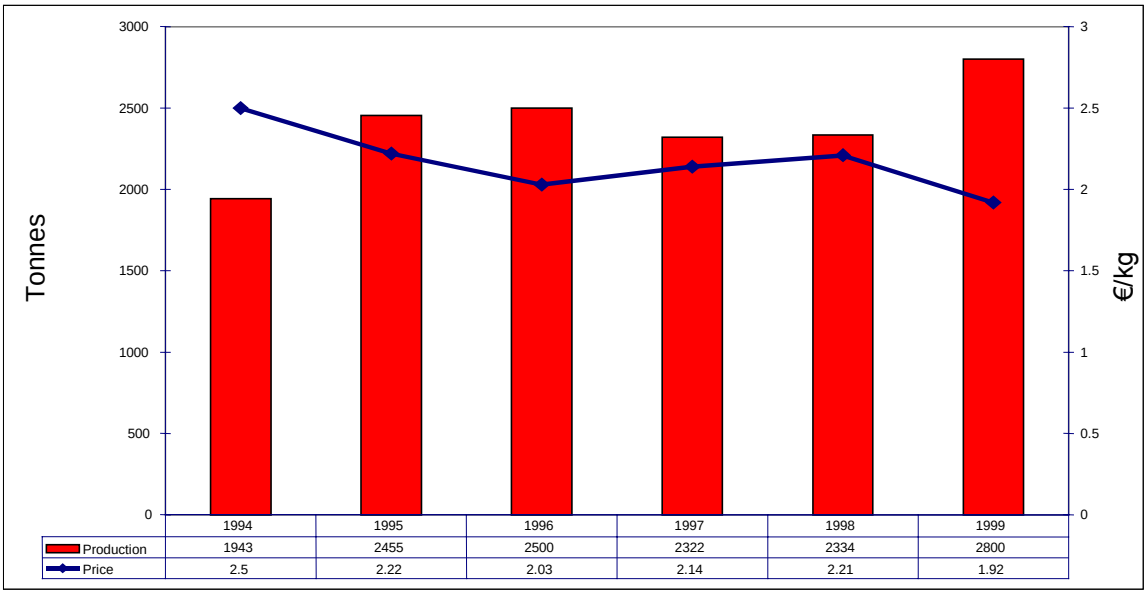


Fig. 7. Development of the national trout-culture production and evolution of the average ex-farm price (source: Federation of European Aquaculture Producers).

Carp culture

Carp culture in Greece has been based on the traditional semi-intensive/extensive systems. The units are small family type enterprises employing only a small number of workers. Profit margins are relatively low, mainly due to the extensive areas required for farming. For 1998, out of 12 units the production was 182 t with an estimated total national production of 200 t for 1999 (Fig. 8).

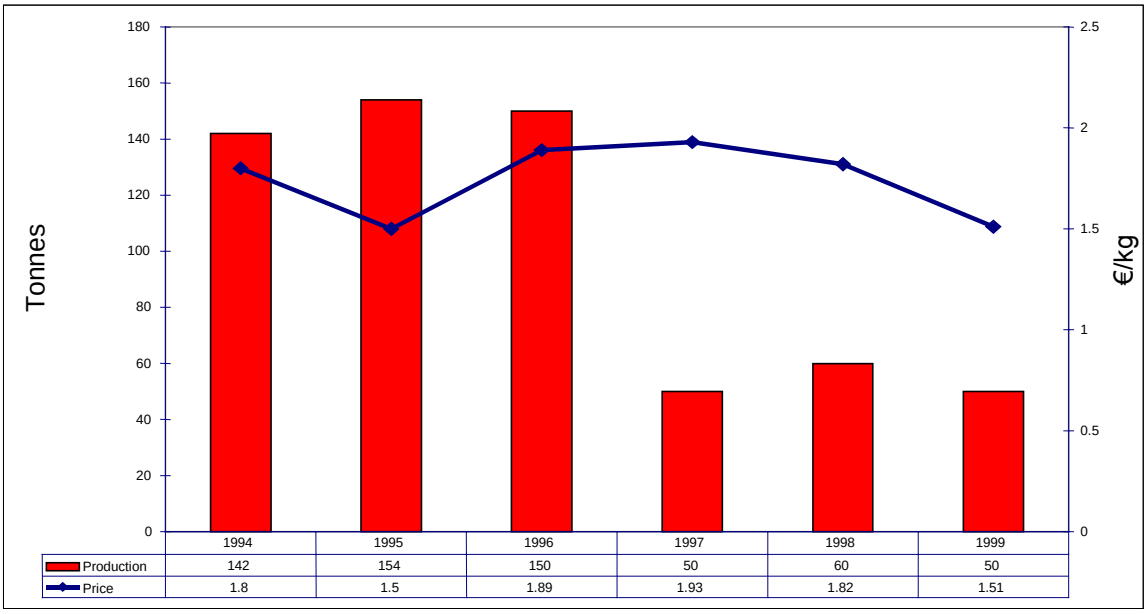
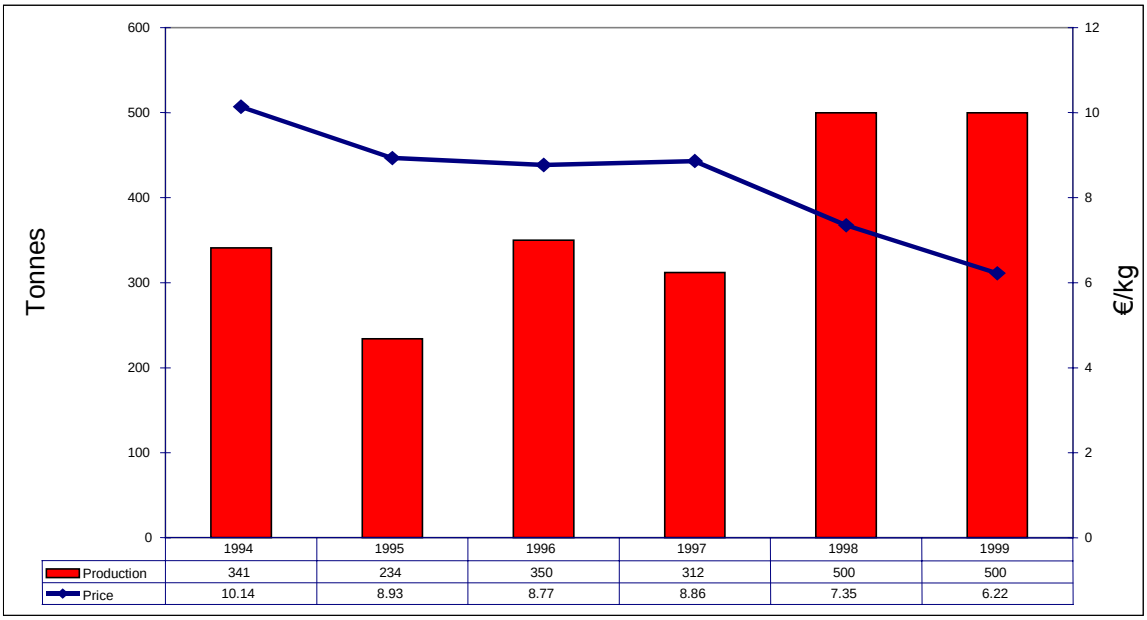


Fig. 8. Development of the national carp-culture production and evolution of the average ex-farm price (source: Federation of European Aquaculture Producers).

Eel culture

Eel culture has also been traditionally practised in various parts of Greece adjacent to estuaries, rivers and closed basins. Following the overcoming of a number of technical problems concerned with the culture of these species, the farming of eels has progressed to semi-intensive and intensive systems. Considering the positive results of the existing units during the last couple of years and taking into account: (i) the increased demand for fresh/chilled and processed ells in the international markets; and (ii) the ensuring of satisfactory price levels, there exist optimism for the further development of eel culture in Greece, despite the fact that so far the production was principally based on the quantities of "wild" fry collected each season.

The sector nowadays employees over 70 people on a permanent basis, and production for 1998 from 11 farming units was about 500 t (Fig. 9).



	1994	1995	1996	1997	1998	1999
Production	341	234	350	312	500	500
Price	10.14	8.93	8.77	8.86	7.35	6.22

Fig. 9. Development of the national eel-culture production and evolution of the average ex-farm price (source: Federation of European Aquaculture Producers).

"Aquatic-food" trade

Total imports-exports

In total Greece suffers a trade deficit in aquatic food, as imports are quite higher than exports. Nonetheless, as shown in Fig. 10, this deficit is being reduced at slow but fairly constant rates from 33,706 t in 1989, to 19,309 t in 1998. In terms of value, imports in 1989 were 56% higher than the exports, while in 1998 this deficit had been reduced to below 10%, at 20,114 thousand €.

Imports of "aquatic food" for the period 1989-1998 increased by about 60%, as the slowly declining trend was reversed in 1995. As demonstrated in Fig. 11, the greatest part of the imports comprises of fresh or frozen fish, followed by crustaceans and molluscs (with shells or not), chilled, frozen, salted, in brine or dried. Member countries of the EU supplied 43% of the 1998 imports and 56% were imported from third countries.

The value of the imported aquatic food follows a similar pattern, reaching in total 256,163 thousand €, in 1998, accounting by 48% to imports from EU countries and 51% from third countries. In 1998, Denmark was the largest supplier to the country accounting for 24% of the total imported volumes of fishery and aquaculture products, followed by Italy and Holland with 11% and 9% respectively.

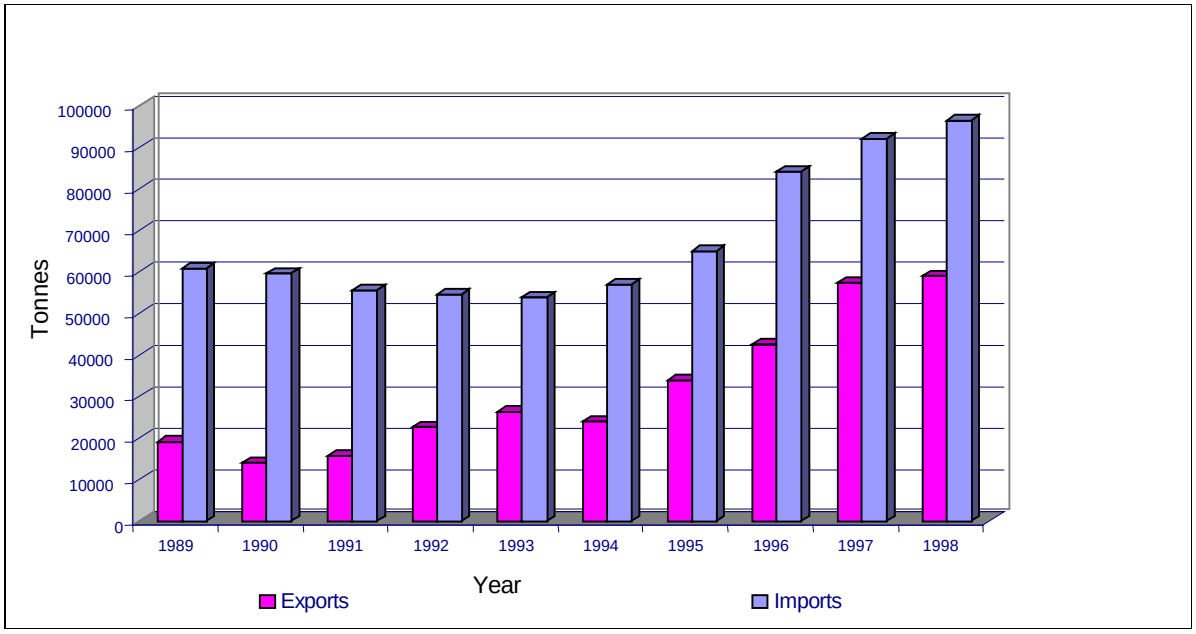


Fig. 10. "Aquatic-food" trade (source: National Statistical Service of Greece).

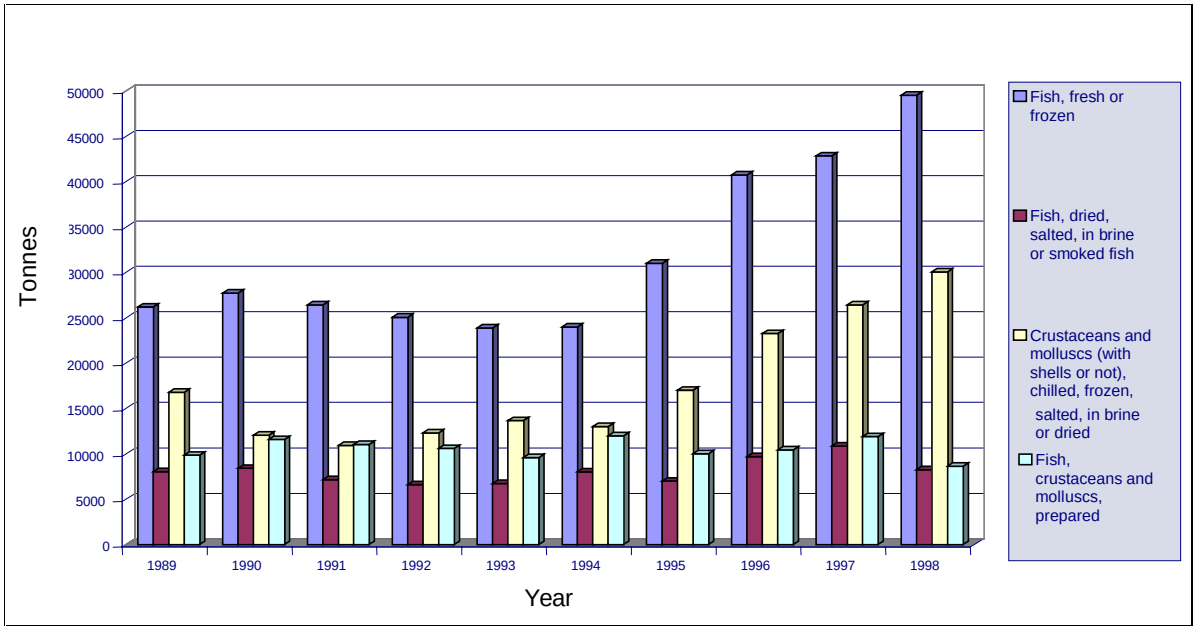


Fig. 11. Volume of "aquatic food" imports, in t (source: National Statistical Service of Greece).

As regards the total exports of aquatic food (Fig. 12), for the same period (1989-1998), there is an almost three-fold increase, with fresh and frozen fish accounting for its major part, having doubled its export volumes. It is noteworthy that 87.5% of the 1998 exports was directed to EU member countries and only the remaining 12.5% to third countries. Respectively, 92% of the export value was of EU origin with just 8% accounting for the value from the exports to third countries.

It is becomes therefore quite clear that the demonstrated increase in the export category is mostly attributed to increased export activities of the aquaculture production companies. The latter notion can be further supported by the fact that the only category of products that the country exhibits a trade surplus is the one concerning the fresh and chilled products, the form of products the aquaculture industry mainly concentrates (Fig. 13), while the deficit focuses largely on the processed products,

within which the frozen ones are included. Moreover, as the greatest part of the seabass and seabream production is exported to Italy, France and Spain, it becomes of no surprise to observe that Italy accounts for 70%, of the total export volumes of country's fishery and aquaculture products, with France and Spain attracting 5.3% and 4% respectively.

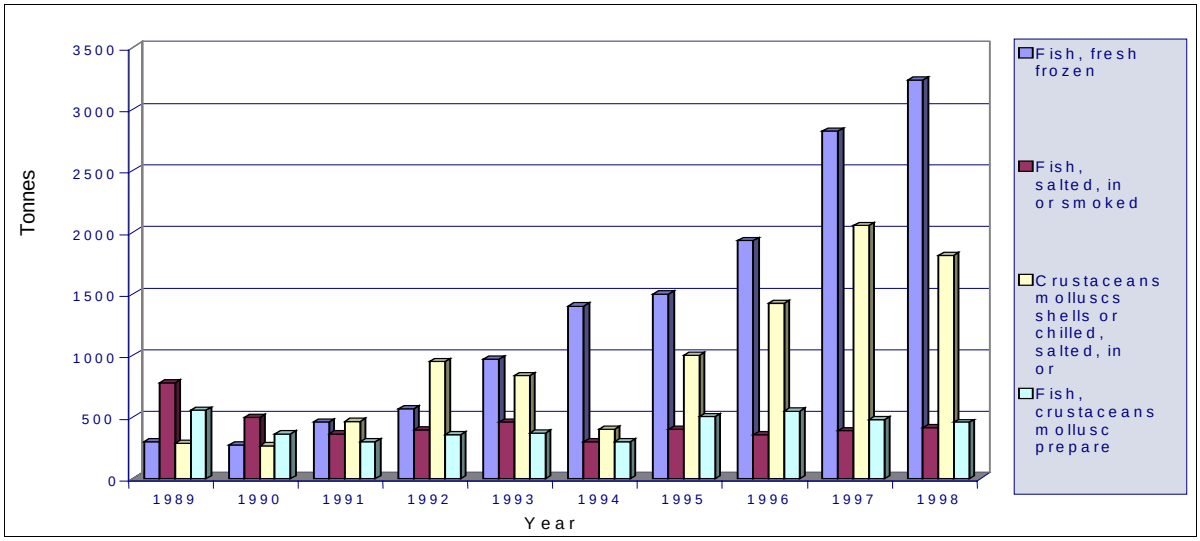


Fig. 12. Volume of "aquatic food" exports (t) (source: National Statistical Service of Greece).

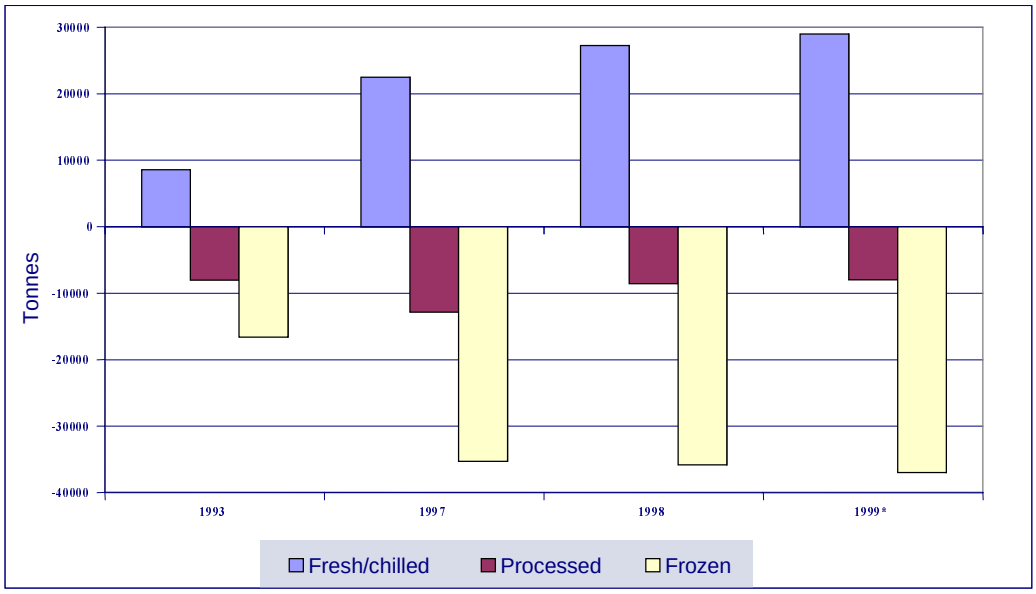


Fig. 13. Trade balance by category of aquatic-food (t) (source: National Statistical Service of Greece).

Apparent consumption of aquatic food

Over the last decade or so, demand for "aquatic-food" has been slowly but steadily increasing. The combined result of the low increase in the overall production and the reduction of the aquatic food trade deficit is mirrored in the increasing trend of the apparent consumption. In total, apparent consumption has been raised from 189,022 t in 1989, to 222,745 t in 1998. Taking into account the latest country population estimate (around 10.5 million in 1995), the annual *per capita* consumption rose from 18 kg to 21.2 kg per year (Fig. 14).

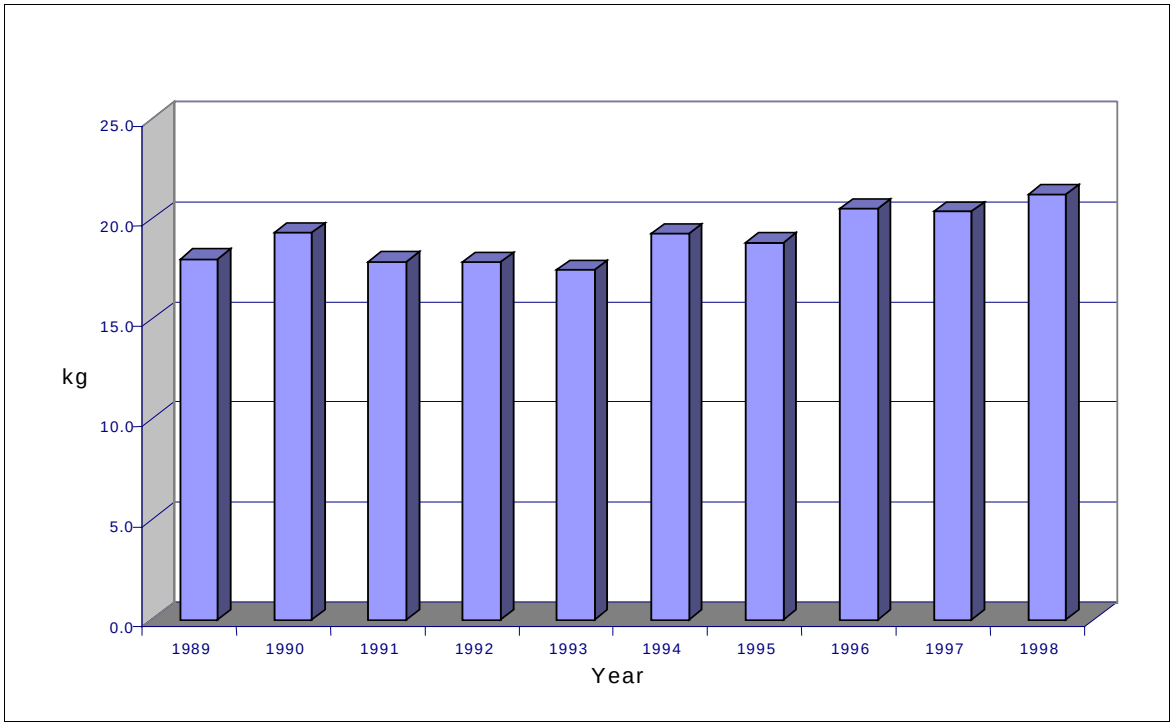


Fig. 14. Apparent per-capita consumption of "aquatic-food" in kg (source: National Statistical Service of Greece; Agricultural Bank of Greece).

It should be noted, that there have hardly been any marketing efforts for the promotion of aquatic food to the end consumers, referring to both the fisheries and the aquacultured products. In fact, the only promotional activity from the side of the aquaculture producers has been through the Federation of Greek Mariculturists, which in any case was a "generic" approach with no direct message nor continuation (follow-up).

However, while the annual apparent per capita consumption of total "aquatic-food" is better assessed through the combination of two different sources of information (National Statistical Service of Greece and Agricultural Bank of Greece), the Ministry of Agriculture, in the "Fishery Operational Plan 2000-2006", provides information on the consumption of fresh/chilled, processed and frozen aquatic-food products (Table 3). The figures provided, if added, are significantly higher than the estimation provided earlier in the current report. The latter is due to the fact that the production data used are from the NSSG, which generally overestimates the total annual production, particularly for the years prior to 1998. Nonetheless, these figures provide a good indication of the ratio between the consumption of fresh and processed "aquatic-food". It should be stressed, once more, that the decline exhibited for the consumption of fresh aquatic-food in 1998 is mainly attributed to the decreasing production from the capture fisheries, as well as on a change of the recording system of the National Statistical Service of Greece).

Table 3. Apparent per capita consumption of fresh and processed "aquatic-food" in kg (source: National Fisheries Operational Plan 2000-2006)

	1993	1997	1998
Fresh/chilled	19.03	19.55	15.79
Processed	1.89	2.63	2.26
Frozen	4.27	6.47	6.84
Total	25.19	28.65	24.89

National aquatic-food market information

Marketing and distribution of aquatic-food

The legal framework under which the distribution of aquatic-food operates is set by the European Union through the regulation 2406/96, which determines, amongst other things, the categories of freshness and size sorting, aiming towards the enhancement of the quality and the facilitation of the marketing for the benefit of the producers and the consumers. Aquatic-food products in general are considered as delicate items for marketing, being prone to spoiling if not adequately preserved. It is therefore essential that trade of such products is fast and efficient and under strict sanitary condition or the products run the danger of loosing part of their qualitative characteristics, and inevitably their value.

The aquatic-food market chain

There are three main "sources" of supply of aquatic-food products within the Greek market, below-which a distribution network stems out. The complexity of this distribution network is evidently illustrated in Fig. 15, through an expanded system of interconnected intermediaries form the initial stage to the final consumer. Unfortunately, the "specific weight" of each intermediary within the Greek aquatic-food market chain is not being systematically recorded, hence any evaluation of market characteristics, and trends within it, can only be obtained from a small number of ad-hoc studies.

As illustrated at the top part of Fig. 15, the three "sources" of supply are separated according to the different direct and indirect connections from the intermediaries to the consumer. The major differences amongst them are being briefly described below:

(i) Landings from the capture-fisheries are being auctioned at the 11 certified national landing sites. It is mostly the medium and large-scale fisheries that sell their catches through the auctions, before the landings are directed to a variety of intermediate levels. It is noteworthy however, that for a large number of vessels which landing their catch in ports with no auction site available, the catch has to be shipped, or transported otherwise, to the Pireus landing site, the largest national landing site. The existing system of auctions and the infrastructure of the landing sites is far from efficient and adequate to the modern standards of trade and aquatic-food distribution. The distribution and marketing network is being indirectly but practically controlled by a small number of wholesalers who have dominated the market at the expense not only of the producer but of the consumer too. Prices are not easily controlled nor regulated as in more than many cases the wholesalers act as representatives of the producers and can largely manipulate the prices for the retailers. In the auctions the catch is sold through intermediaries which charge a commission for their services as most producers are not able to be present at the auction site, specially when these producers are in distant areas. It is believed that the greatest problem within the current system of marketing and distribution of the "wild" catch is the strong dependence of the producer to the wholesaler/representative. The fishing boats do not always form economically viable enterprise entities, and are usually burdened with loans apart from their high running expenses. Such loans are often provided by the wholesalers, who in return "demand" the sale and marketing of their catch. The wholesalers can even distribute the unsold catch from one auction site to another if the catch is not sold in the first place. It therefore becomes evident that the wholesalers have become, in large, the regulators of the aquatic-food distribution network and that the whole process is not exactly transparent, as the demand of the wholesalers for under-valued invoices and lower-recorded quantities is always met. It has been also observed that when the producers sell their catch directly, they too issue under-valued invoices in order to keep their taxable income low. As regards the marketing of the landings of the high-seas fisheries, mainly operating and landing their catch in the ports of western Africa, these products are shipped or transferred by cargo planes to Greece for the satisfaction of the national demand. Finally, it is the catch of the small-scale coastal fisheries, which comprise a significant part of the national production, as Greece has – by far – the largest fleet on this category. Such fishermen sell their catch mainly to the local markets, either through the coastal wholesalers or directly to restaurants, hotels, taverns and even to household consumers. The quantities landed are generally very low, but the species caught are mostly high-valued and the local markets, particularly so in the tourist season, command satisfactory prices. The importance of this channel is evidently an important one, alas a poorly recorded one.

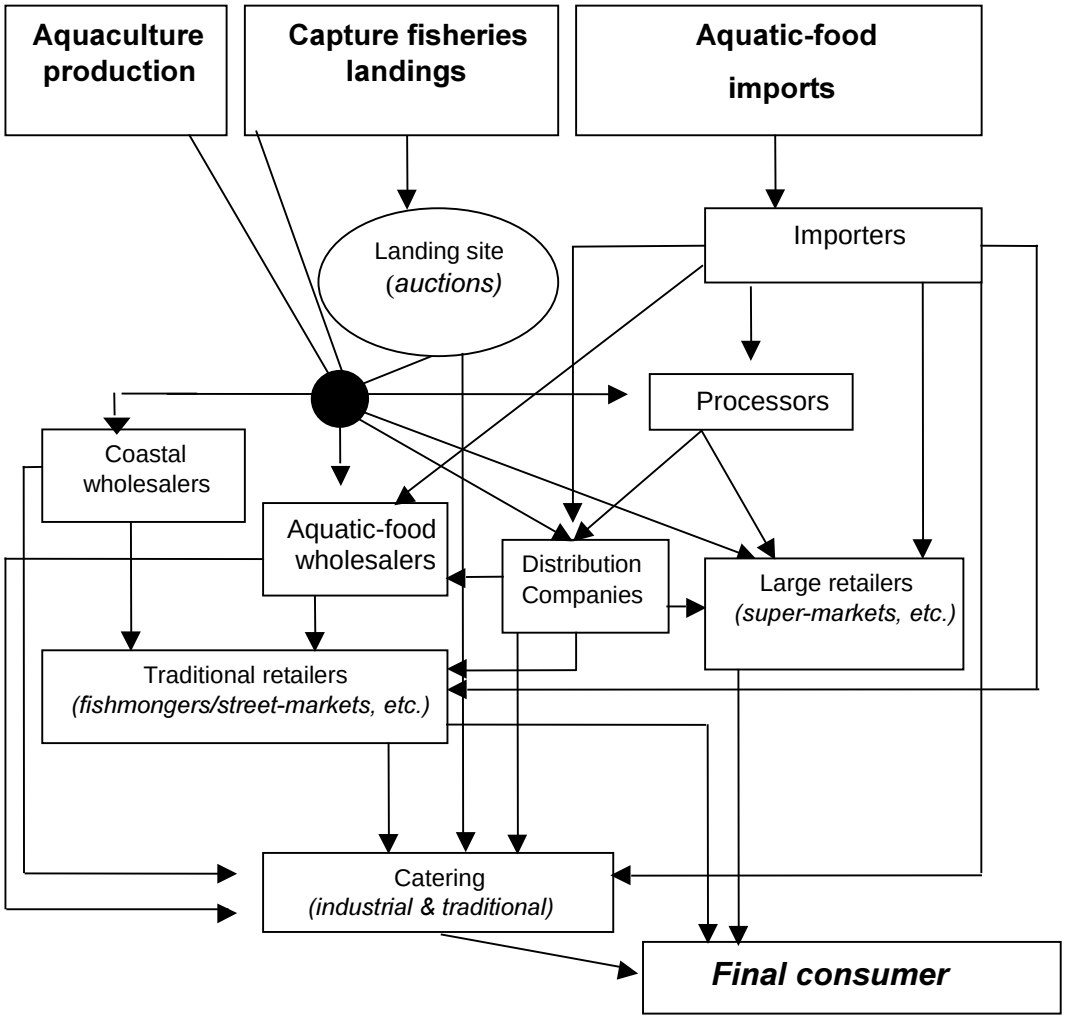


Fig. 15. The aquatic-food market chain in Greece.

(ii) The imported aquatic-food follows a somewhat different entry pattern than the landings, as these are subject to the network of the importers, which nevertheless seem to supply most parts of the market chain. In general, negative aspects towards the improvement of the marketing and distribution system are the low financial status of the producers, the delicate nature of the products and their short "shelf-life", and finally the ignorance of the forces that shape the market (demand-supplies). Wholesalers and retailers are not willing to see their profits decrease and for that reason they burden the consumer with any additional cost. The wholesalers take advantage of the system they have created themselves, which does not allow the entrance of new wholesalers in the network, and also step on the inability of the producers to distribute their catch directly to the consumers. Moreover, the wholesalers for the satisfaction of their demand apply practices that largely distort the free-market forces, creating conditions of monopoly or oligopoly, in such a way as to create a significant increase from the price paid to the producers for services which do not justify such an increase. In turn, the retailers then "transfer" the demands of the wholesalers to the consumer. The lack of organised and efficient "Producer's Associations" at all levels of the sector diminishes the ability of the producers to intervene in the market and regulate the supply, through an efficient resource and product management plan.

(iii) As regards the aquaculture products, these comprise a category of their own, as they seem to supply the various stages in a somewhat different pattern than the previous ones, especially at the initial stages of the market chain. The marketing of these products is done directly by the producers or specialised trading companies. The greatest market for the Greek aquacultured products remains the Italian one, followed by the French, the Spanish, the British and the German. As the greatest part of the national aquaculture production is being exported, and the national market is still being exploited,

the flow of aquacultured products within the market chain is expected to become subject to significant changes, particularly as regards the importance of each intermediate stage. So far, the uncontrolled increase in the production volumes without the parallel expansion of the consumers has resulted in sharp reduction in the prices fetched in the markets, while low production costs and prices from Third countries created a competitive environment within which the regulation of the prices seems very hard to be applicable.

In addition to the above, it is important to elaborate on the selling of the processed aquatic-food products to the final consumer, as this is done through a system which despite the specific differences inherent to the characteristics of each species or product type and form, exhibit a homogeneity in the practical issues of marketing and distribution. This way, if the final product is in the salted, smocked or canned form, it is forwarded from the processing companies directly to the final retailers, mainly the supermarkets. If on the other hand the product is in a frozen form, they are stored in large freezing rooms which normally belong to import companies. These companies address two different type of customers and are not concerned with the distribution of the products. Their customers are: (i) the wholesalers who absorb the main bulk of the frozen catch, many of which have packaging facilities; their clients, in turn, are the supermarkets, the frozen-food department stores, and the catering industry, through which the products end to the consumers; and (ii) the processing units that use the imported frozen aquatic-food as raw material for subsequent processing; the marketing and distribution of these products is done either through the same processing companies or through a system of wholesalers and representatives.

Primary-level trading infrastructure facilities

Fish landing sites (auction)

As stated earlier, in Greece, there are 11 state-established and operated fish landing sites. These are located close to the cities of Piraeus, Thessaloniki, Kavala, Halkida, Alexandroupolis, Patra, Chios, Preveza, Messolongi, Kalymnos and Chania. These landing sites are located in ports where exclusive rights on specific parts of the dock have been allocated and usually consist of areas for the landing, the preservation and the auctioning of the catch.

Most of the infrastructure facilities were constructed during the 1960's and efforts for their modernisation have been hindered by the inability to extend the pre-specified limits of the areas occupied. As a result, the modern requirements for landing, storing and auctioning are not met efficiently and satisfactory. The majority of these sites do not comply with the regulations set in the Directive 91/493, therefore the need for their modernisation has become an imperative one. The landing sites are being operated by the state-owned company "ETANAL" and only nine species account for over 60% of the distributed landings (Fig. 16). It should be stressed that while the volume of aquatic-food products distributed through these fish-landing sites has increased by 25% from 1993 to 1998, it nevertheless accounts for only 30% of the total national production.

Packaging units

The fisheries-products packaging units have been established for compliance with the EU Directive 91/493 so that the traded products undergo through the necessary sanitary process. Most of the packaging units have been established in areas with extensive fish-farming activities. They are of small to medium operating capacities and serve almost exclusively the landings of the fish farms (which own the packaging units)

Shellfish distribution centres

The shellfish distribution centres aim at the hygienic distribution of shellfish, mainly oysters and mussels, of wild and cultivated origin. These centres have been constructed for the controlled preservation, sorting, packaging and distribution of such products in accordance to the modern hygiene and sanitary standards in order to preserve their freshness and attributed value, according to the Directive 91/492. At present, for the greatest part of the farmed shellfish there is no need to undergo through the purification process as the sea-water medium in which they are being farmed is considered of high quality.

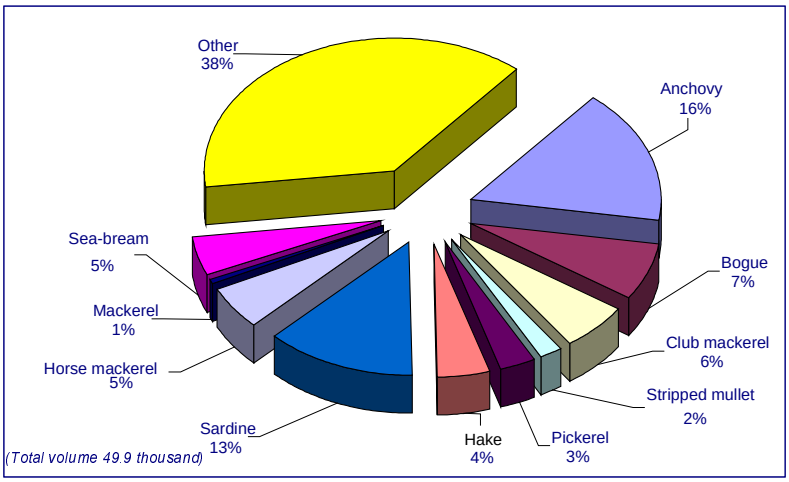


Fig. 16. Share of the main species distributed through the fish-landing sites for 1998 (source: Ministry of Agriculture).

Fishing port infrastructure

Many of the fishing vessels that do not have access into the landing sites, are being served by small "fishing-centres" within the ports with very basic infrastructure and facilities, while there are more than many cases where such ports lack even the basic storing, ice-producing, and selling infrastructure facilities. Moreover, it is being often observed that fishing vessels land and sell their catch in the existing commercial and tourist ports of the country.

Conclusions

The inefficient recording of the national aquatic-food production by a number of data-collecting bodies, along with the inherent differences in the methodologies adopted and the different purpose for the data collection by these sources, render the evaluation of the consumption of aquatic products a problematic one, certainly when attempting to evaluate the volume of the market and certain characteristics of it. Nonetheless, apparent consumption can be grossly evaluated and has been found to be increasing over the last decade or so. Seafood products, in their fresh/chilled form seem to be the most favourable among the product types/forms, a finding that supports the notion that the Mediterranean countries still exhibit strong preference towards the fresh and largely the whole-fish concept, despite the fact that processed and frozen products seem to be playing an all-the-more important role. The market trends of the "western" and "westernised" world are already affecting the national market of aquatic food products. The pace of the modern lifestyle, the need for healthier food-products, the convenience sought as well the increased retailing power of the supermarkets have all contributed to the increase in the consumption of seafood by the Greek consumers. At the same time, imports of frozen and processed products, improvement of the existing processing infrastructure and the development of mariculture which can ensure quality, constancy of supplies and lower prices, are all inter-related reasons for the upward trend in consumption of such products.

It should be noted that there have hardly been any marketing efforts from the side of the producers and or retailers. Any such efforts have been limited to a brief and "generic" campaign by the Federation of the Greek Mariculturists, as well as a number of "selling" and promoting actions, mainly within the retail stores.

In addition to the above, there is scarcity of qualitative information concerning consumer preferences and/or habits, as is information regarding consumers attitude towards such products. A limited number of *ad-hoc* studies can be identified, which do provide the elements for the drawing up of a picture, the latter however is far from complete for the development of an efficient and pragmatic marketing plan that would enable the better penetration of the market.

Moreover, the lack of an on-going consumer panel survey, does not allow the monitoring of the market with regard to the food products of aquatic origin, and no correlation can be made in relation to other food products at times when "external" factors affect the market.

Aquaculture products have certainly played a significant role in the increased rate of apparent consumption, for a number of reasons, the price and the place of selling being two important ones. The "product" in itself is also important, and it should be stressed that while 15 years ago fresh bass and bream (cultured) were considered as a delicacy, the production volumes achieved have listed these products in the "commodities" list.

The urbanisation of the population, and several other socio-demographic, economic and life-style related issues, if evaluated accordingly and assessed with a number of efficiently planned marketing and/or consumer studies would most certainly provide the basis for strategic marketing actions that would enhance consumption of products of aquatic origin. The national market of such product seems to have been left on its own to determine its demand on the oversupply of products. The potential for such an unexploited market is great and actions are required not only in acknowledging such issues but also in acting promptly and efficiently for the better penetration and exploitation of the market. Information collection mechanisms need to be established and subsequent marketing and promotional activities need to target specific population groups that would seem "ready" for accepting such products, while the industry should also try and identify the national and international (tourism) consumer needs and attempt to satisfy these.