Country report: Cyprus

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SUMMARY – Cyprus fisheries are based on the declining capture fisheries and a fast growing marine aquaculture industry. The system of statistics collection and processing for the fisheries sector is explained. The production of each fishery sector is analysed for the 1988-1998 period and information on their prospects and constraints for further development are given. The local aquatic food market exhibits a senior deficit and about 70% of the products consumed have to be imported to meet the increasing demand. The imports are analysed and commented. Information on aquatic food consumption is given. Cypriots are heavy meat eaters, although signs for new dietary habits are noted. The consumer preferences as regards species from capture fisheries and aquaculture are given. The pricing and distribution system of fish are studied and information on the constraints as well as the recent developments on their structure is cited. The role of the flourishing tourist industry as regards aquatic food consumption is outlined. Aquatic food production and trade will be greatly affected by the changes taking place in view of the accession of Cyprus as a full member of the EU in the near future. Socio demographic information is given in an effort to explain the changes noted in aquatic food consumption. Finally general conclusions are reached and suggestions are made aiming at the market expansion, especially as regards aquaculture products. The lack of relevant market surveys is highlighted and the need for closer cooperation among the Mediterranean and EU countries on the production and trade of aquatic food is stressed.

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

RESUME – *"Rapport national : Chypre". La pêche à Chypre est basée sur des pêcheries de capture qui se réduisent et sur une industrie d'aquaculture marine qui grandit rapidement. Le système de collecte et de traitement des statistiques est expliqué pour le secteur de la pêche. La production de chaque secteur de la pêche est analysée pour la période 1988-1998 et des informations sont présentées sur les perspectives et les contraintes pour un développement ultérieur. Le marché local des produits aquatiques montre un fort déficit, 70% environ des produits consommés devant être importés pour répondre à une demande croissante. Les importations sont analysées et commentées. Des informations sont données sur la consommation de produits aquatiques. Les habitants de Chypre sont de forts consommateurs de viande, quoique l'on perçoive des signes de nouvelles tendances diététiques. Nous indiquons les préférences des consommateurs concernant les espèces de la pêche de capture et de l'aquaculture. Le système de fixation des prix et de distribution du poisson est étudié et des informations sont présentées sur les contraintes ainsi que les récents développements structurels. Y est souligné le rôle que joue une industrie touristique florissante quant à la consommation de produits aquatiques. La production et le commerce d'aliments aquatiques seront fortement affectés par les changements qui se font en vue de l'entrée de Chypre au sein de l'UE comme membre de plein droit dans un proche futur. Des informations socio-démographiques sont fournies dans un effort pour expliquer les changements observés quant à la consommation de produits aquatiques. Finalement des conclusions générales sont dégagées et des suggestions sont émises visant à l'expansion du marché, spécialement pour ce qui est des produits aquacoles. Le manque d'études de marché dans ce domaine est souligné, ainsi que la nécessité d'une collaboration plus étroite entre les pays méditerranéens et les pays de l'UE concernant la production et le commerce des produits aquatiques.*

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

Statistical methodology evaluation

Sources of information

This study is based mainly on data, statistics and information provided by the government Departments of Fisheries and Marine Research and of the Statistical Service. Additional information has been secured from other sources like the Department of Veterinary Services and the Cyprus Tourism Organisation.

Department of Fisheries and Marine Research

The national system of domestic fisheries production statistics is based on data collected and processed by the Department of Fisheries and Marine Research which is the competent authority in fisheries and the primary source on fishery statistics in Cyprus. The Department has the responsibility for the transmission of fishery statistics to all international organisations and agencies. The collection of fishery statistics is based on the Fisheries Law Cap. 135 and subsequent amendments of 1961 and 1964 as well as the Fisheries Regulations of 1990 to 2000.

Domestic fisheries production refers to fish caught by the capture fisheries and to those produced by aquaculture.

Statistics on capture fisheries

Statistics on capture fisheries refer to trawl fishery, inshore fishery and pelagic fishery (swordfish fishery) which are the three main sectors of Cyprus fisheries. Trawl fishery refers to fish caught by trawlers registered in Cyprus that fish both in Cyprus waters and in international waters (mainly off Egypt) which are landed to the island's ports, after securing special landing permits from the Department of Fisheries and Marine Research. The inshore fishery fleet (fishing boats) operates exclusively in the territorial waters of Cyprus.

Collection of data on trawl fishery is carried out by daily return of logbook sheets which all skippers are required to keep and to hand in, prior to landing their catch, to the fisheries inspectors of the Department of Fisheries and Marine Research who inspect their catch to ensure that they are weighted and recorded accurately. The same practice is applied to the swordfish fishery boats which usually fish off Cyprus, in international waters. As regards the inshore fishery, the relevant data are collected from a representative sample of inshore boat owners, who are required to fill monthly coastal fishery reports which, among others, state the daily and monthly total catch broken down to species or group species. The booklets are collected every month by the fisheries inspectors.

Aquaculture statistics

The collection of statistics on aquaculture is based on the data given by the aquaculture companies on special forms referring to fish production, fish food consumption, prices and personnel. The forms are provided by the Department of Fisheries and Marine Research at the beginning of each year and returned to the Department within three months. The data refer to the previous year. The production report includes detailed information, broken down to species, on the production of table size fish, fish fry and eggs which were used locally or exported, as well as the number of fry stocked in each farm. The data are verified by the personnel of the Department of Fisheries and Marine Research who regularly visit the farms and monitor, consult and supervise their activities and by cross checking with the export declarations that the farmers complete for the issue of the veterinary certificate accompanying exports of their products.

All data referring to fisheries and aquaculture are computer processed and analysed at the Central Offices. The Aquaculture Research and Development Division of the Department of Fisheries and Marine Research operates an Aquaculture Data Bank which is used, among others, for the monitoring of the aquaculture Industry for control and planning purpose. Also Cyprus is a member of SIPAM, the Information Network for the Promotion of Aquaculture in the Mediterranean, which operates under the umbrella of FAO/GFCM and exchanges statistics on several aspects of aquaculture with the other Mediterranean member countries.

Methods employed for calculating the average fish prices

The fisheries inspectors interview the firsthand buyers and the skippers/fishermen ad hoc in order to collect the prices of the fish catch of trawlers and of the inshore fishery. Estimations on the quantities, fish quality categories and species breakdowns are not necessary, because they are reported on the logbook sheets for the trawl fishery; for the inshore fishery the above data are estimated from the monthly coastal boat reports.

The prices of the aquaculture products are stated on the price reports submitted to the Department

of Fisheries and Marine Research every year by the fish farmers. Price reports include the following data: maximum-minimum wholesale and retail price of table size and fry fish for every species sold in the local market, maximum-minimum prices and the total values for exported table size fish, fry and eggs (by species). These are cross checked with relevant data provided by the exporters of aquaculture products for the issue of the veterinary certificates accompanying each consignment and with data collected from the local market by the Department of Fisheries and Marine Research.

There exists margin for further improvement of the fish prices collecting system.

Reliability of the fisheries statistics

The sport fishery catch does not show in the statistics, although it is roughly estimated to account about 15% of the total catch. Also in the Inshore Fishery fish taken home by fishermen are not declared. The latter is estimated to represent about 5-10% of their production. Production data of amberjack (*Seriola dumerili*) is understated by fishermen who use to fish them by other methods than nets. Significant biases have been observed to trawl catch of certain species which characterise certain category (price) groups, like data on picarel (*Spicara smaris*), which are overstated. This could be partly due to the fact that young fish of other species are mixed with picarel.

The Cyprus system of fishery statistics is very detailed. The Department of Fisheries and Marine Research prepares each year "The Statistics on Cyprus Fisheries" which gives statistical data on the various components of the fishery sector.

In general the fisheries statistics system is considered reasonably accurate and highly reliable in comparison with other similar systems that exist in the Mediterranean. Its reliability could be further upgraded by improvements to the collection and recording system, especially if a fully computerised reporting system between the District Offices of the fisheries inspectors and the Central Offices of the Department of Fisheries and Marine Research will be established.

Statistical service

The Statistical Service belongs to the Ministry of Finance and it is the competent authority for the provision of statistics on Cyprus (all aspects). It is well organised and the methods employed undergo continuous refinement and upgrading.

The Department of Fisheries and Marine Research provides the Statistical Service with the Fisheries Statistics on Domestic Fisheries (including aquaculture). The Statistical Service is processing those together with imports-exports data on fish and fish products received from the Exports and Excise Department. The commodity classification used is based on the Harmonised Commodity Description and Coding System (HS). Close co-operation exists between the Statistical Service and the Department of Fisheries and Marine Research as regards Fisheries Statistics. The latter are published annually, since 1969, with crop and livestock production, forestry and hunting statistics in the "Agricultural Statistics Series" of the Statistical Service. The Statistical Service carries out surveys on special topics and the results are also published. The publications of the Statistical Service are generally accepted as highly reliable sources of statistics.

Exports-imports data

Exports-imports data are collected by the Customs and Excise Department of the Ministry of Finance and are based on the declarations made by the importers, exporters or their agents.

After 1987 Cyprus has adopted the Common Customs Tariff (CCT) of the European Community. The weights recorded represent the net weight of the goods. The customs value of imported goods is determined according to section 159 of the Customs and Excise Law No. 82 of 1967 as amended by Law No. 98 of 1989 and the rules laid down by the Agreement on Implementation of Article VII of the General Agreement on Tariffs and Trade (GATT) which was put into operation in Cyprus as from 1989. The CIF value of goods is being recorded for imported goods and their FOB value for exports. The export-import data are forwarded by the Customs and Excise Department to the Statistical Service for processing and publication. In general, the data provided by the Customs and Excise Department on fish and fish products are considered reliable.

Other sources

The Department of Fisheries and Marine Research also gets from the Department of Veterinary Services, which participates to the hygiene and quality control of fish and fish products at the airport, monthly data on the species and quantities of fresh fish imported in Cyprus by airfreight as well as on the fry, table size fish and other fish products exported from Cyprus.

The Cyprus Tourism Organisation carries out specialised tourists surveys on annual basis for the purpose of estimating the changes and trends in the level and structure of tourists expenditures. The data are considered reliable.

Production and total supply of aquatic food

Fisheries, including aquaculture, is a very small sector of Cyprus economy, which contributes only about 0.3% of the GNP and about 4% to the broad agriculture sector, but its products have high added value. Production from fisheries is relatively small, as Eastern Mediterranean is poor in fishery resources and almost all the Cyprus fishing grounds are fully exploited, while some fish, the most popular ones, are overfished.

Aquaculture is a new sector of fisheries which started with rainbow trout (*Oncorhynchus mykiss*) culture in 1969. Marine aquaculture was initiated as early as mid seventies and its growth rate accelerated during the last 10 years. On the contrary, freshwater aquaculture, which refers mainly to trout culture, with the exception of a small production of ornamental fish, has limited prospects for development, due to freshwater shortage.

Total production by capture fisheries

From 1988 to 1994 the total quantity of fish produced by the capture fisheries increased by about 11%, while onwards it declined yearly and in 1998 (1997) it was by 4% (8%) lower than that of 1988 (Fig. 1).

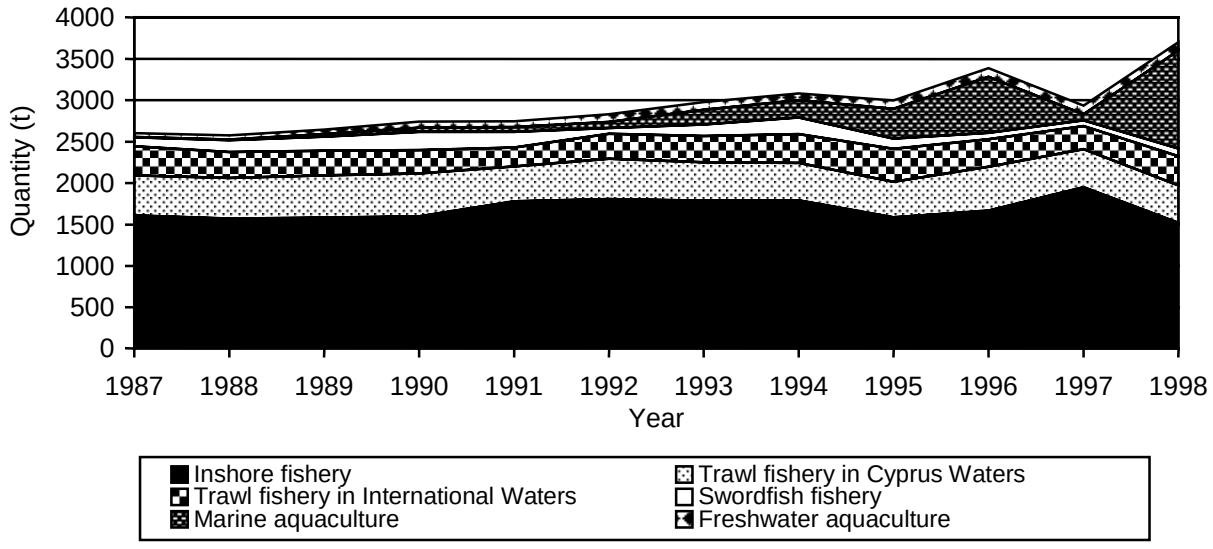


Fig. 1. Evolution of Cyprus domestic fisheries by source of production, 1987-1998.

The lower production was mainly due to the decline of the swordfish fishery. In 1988 Capture fisheries represented in quantity about 98% of the total domestic fisheries (capture fisheries and aquaculture), while in 1998 (1997) its contribution dropped to 67.2% (70.3%), because of the dramatic increase of marine aquaculture production. As regards value of production, capture fisheries in 1998 (1997) represented about 64% (66%) of the total domestic fisheries. All fish are landed in fresh form.

The main source of supply of Cyprus capture fisheries is the inshore fishery which represented in 1998 (1997) about 42% (46%) of the total domestic fisheries catch, while trawl fishery in Cyprus and in international waters comprised about the 13% and 10% (14% and 8%) respectively.

Pelagic fishery

Swordfish fishery was, until recently, the only organised pelagic fishery on the island. In 1999 started operation on experimental basis the first commercial purse seining unit, for the fishing of small pelagic fish, mostly by light fishing. The economic viability of this pelagic fishery in Cyprus has to be proved, due to the unknown size of the stocks and the low price that most of its catch fetch in the local market, with the exception of bogue (*Boops boops*). Swordfish fishery production is fluctuating between 100-200 t/year. The recent decline is due mainly to marketing problems of its catch. Some bluefin tuna (*Thunnus thynnus*) are also caught by swordfish fishermen and are exported, since the local market potentials for this species are minimal.

Some other pelagic fish, like the amberjack, are caught by fishermen and sport fishermen in small quantities by trolling and spear gunning. Trolling off the coast of Cyprus for pelagic fish, mostly albacore (*Thunnus alalunga*), has become a popular sport in the last 2-3 years. The catch which originates from sport fishing is not allowed to be sold.

Total production by aquaculture

This refers mainly to marine aquaculture fish and, to a much lesser extent, to trout (Figs 2 and 3).

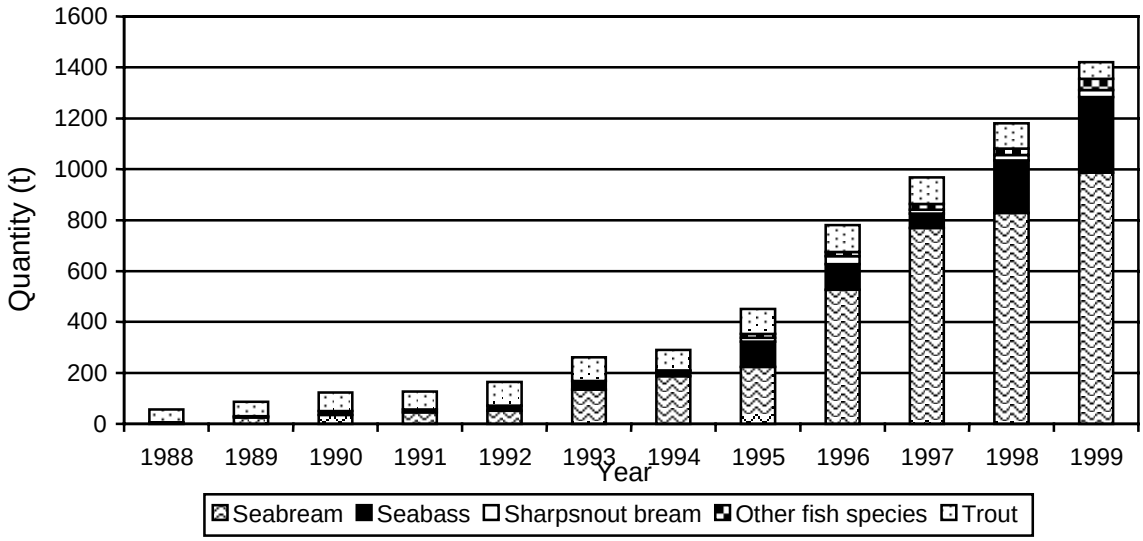


Fig. 2. Aquaculture production for human consumption (in quantity), 1988-1999.

Marine aquaculture production

Since 1990-1991 the culture of seabream (*Sparus aurata*) and seabass (*Dicentrarchus labrax*) is undertaken in offshore cage culture installations placed along the exposed southern part of the island. This technology allowed the exploitation of Cyprus sea for the fattening of fish, in addition to marine fish fry production which started as early as 1997. Open sea mariculture was undertaken for economic and environmental considerations and was proved very successful, allowing the increase of production of sea fish by 15,000% in 12 years (from 10 t in 1988 to about 1500 t in 1999). The development of the production of marine aquaculture in quantity and value and by species is illustrated in Fig. 4. A general trend for increasing production from marine aquaculture exists and its rate has been accelerated as from 2000 for reasons analytically explained in the marketing sector.

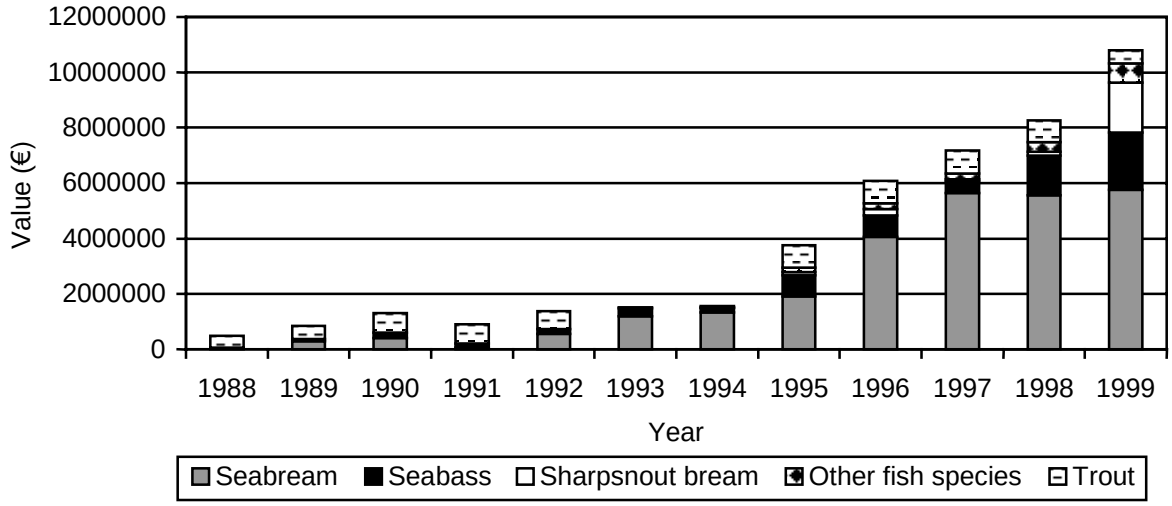


Fig. 3. Aquaculture production for human consumption (in value), 1988-1999.

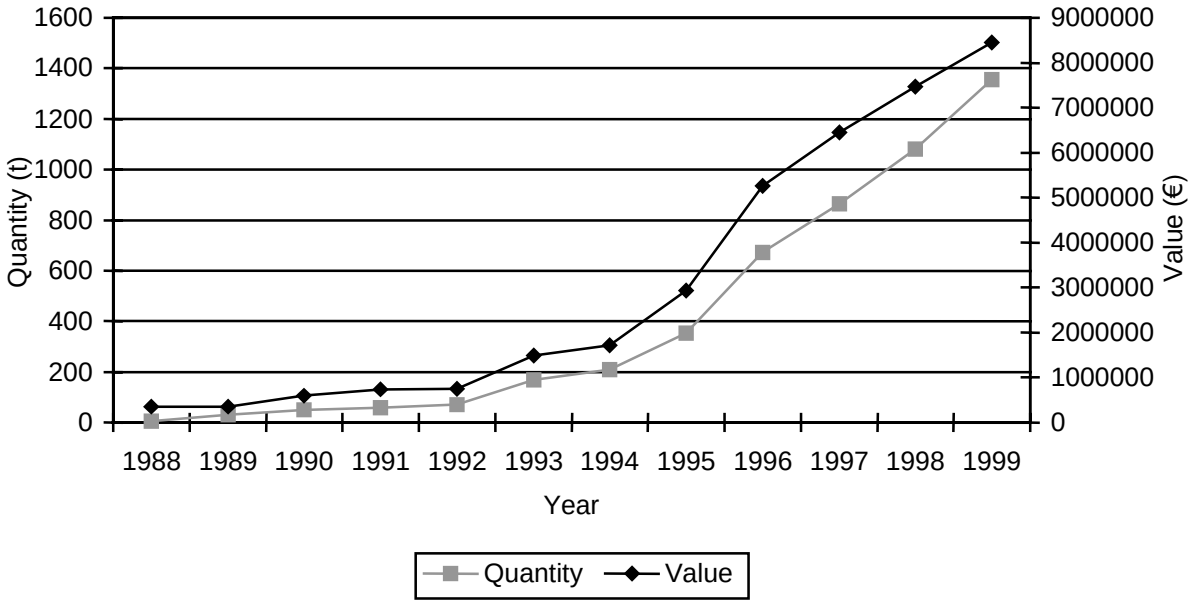


Fig. 4. Development of marine aquaculture table fish production (in quantity and value), 1988-1999.

The existing government policy for the further development of marine aquaculture provides for a production target of 10,000 t per year to be achieved by the expansion of the existing farms and the setting up of new offshore cage farm units. The sector is very active and there exists high demand for the setting of new farms by the private sector. Constraints to further expansion are posed by the limited number of suitable sea sites, which are due to the exposed character of the sea, as well as the extensive use of the coastal land and adjacent sea area for tourist development. The latter is the main industry on the island on which Cyprus economy is based. Marine aquaculture is still trying to establish its own niche among the well accepted users of the sea resource, i.e. tourism and fisheries.

Cyprus is self-sufficient as regards marine fish fry, which are produced by 4 private commercial hatcheries. A considerable number of fry is exported, about 6.3 million in 1998 and about 13 million in 1999. Fry production exhibits an ongrowing trend.

The main species under culture in the existing 8 private offshore commercial cage culture units are

the seabream and seabass and, to a much smaller scale, the sharpsnout bream (*Puntazzo puntazzo*). Other fish species which were tried in the past or are being presently experimentally fattened are the Japanese red seabream (*Pagrus major*), the common seabream (*Pagrus pagrus*), the shi-drum (*Umbrina cirrosa*), etc.

The Indian shrimp (*Penaeus indicus*) is being hatched and fattened in a shrimp farm on hyperintensive scale, in earth ponds covered with a plastic film where seawater is pumped. The farm started production in 1995 and its production reached in 1998 (1997) 35 t (22 t) and 43 t in 1999.

No shellfish exist in quantities in the Cyprus sea and no shellfish culture is undertaken on the island, due to the low productivity of the sea which is mainly attributed to its high temperature and salinity combined with low nutrients content.

Trout culture production

There exist 6 landbased small trout culture farms on Troodos mountain, which operate on intensive basis, applying flow-through systems and 2-3 seasonal cage culture units in irrigation reservoirs. Half of the production comes from the cage farming, which allows double use of water. Total trout production increased from 51 t in 1988 to 100 t in 1998. The largest production ever achieved was 105 t in 1997. Further expansion of trout production is hindered by the drought and the limited water supply of suitable water, which also restrict the scale of operations and contribute to increased production costs (Fig. 5).

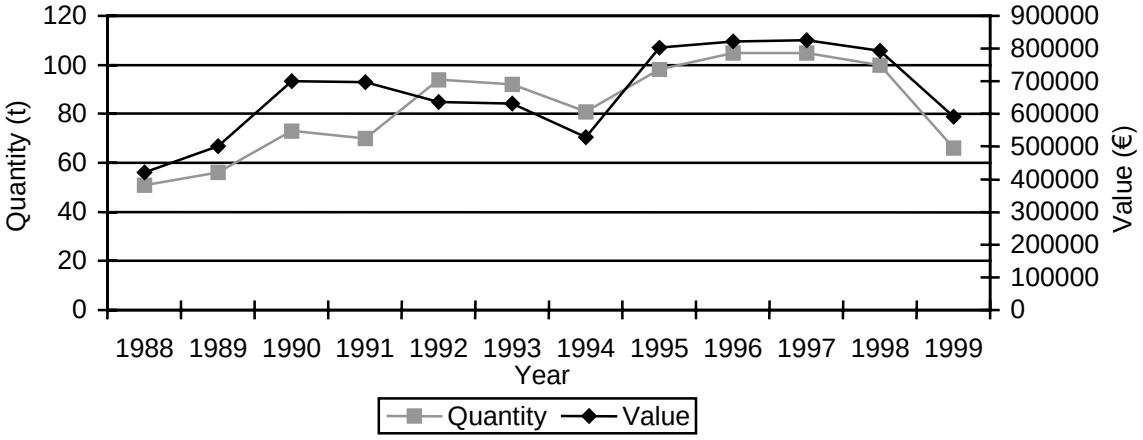


Fig. 5. Development of trout culture production (in quantity and value), 1988-1999.

Total imports-exports of aquatic food

Imports of aquatic food

Cyprus aquatic food market exhibited a serious deficit over the examination period, despite of the increase of fresh marine fish supply from aquaculture. Imports covered the gap between local production and consumption which ranged from 4415 t in 1988 to 8384 t (7195 t) in 1998 (1997). An increase amounting to 90% and 137% (63% and 108%) in the imports quantity and value respectively was noted from 1988 to 1998 (1997). The trend is increasing (Fig. 6).

It is interesting to note that from 1988 to 1998 (1997) there was noted a large increase, by 130% (84%), to the imported quantity of prepared or preserved fish, which is larger than the one incurred during the same period to the imports of fresh, chilled or frozen products (Fig. 7). The latter continue to represent the greatest part of imports.

A more detailed analysis of imports of aquatic food in 1998 is given in Table 1.

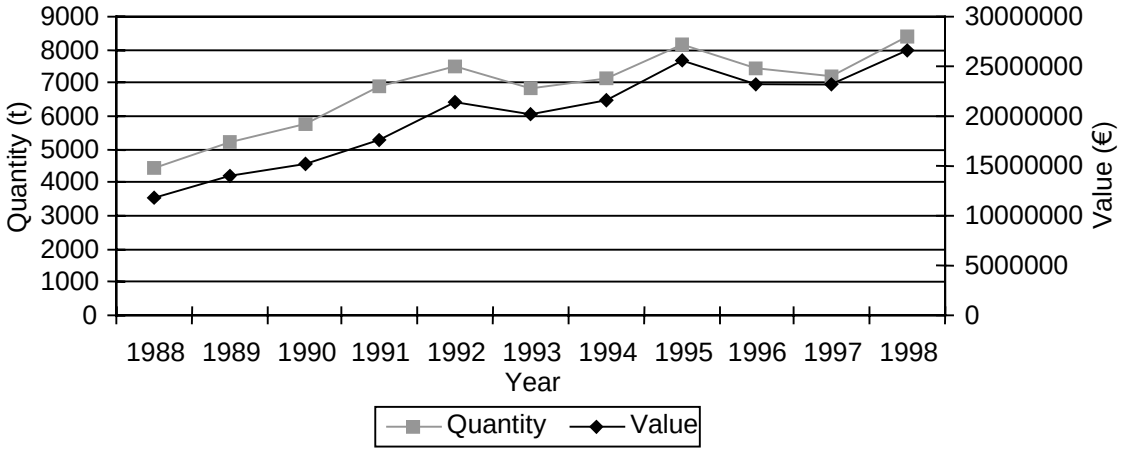


Fig. 6. Imports of aquatic products (in quantity and value), 1988-1998.

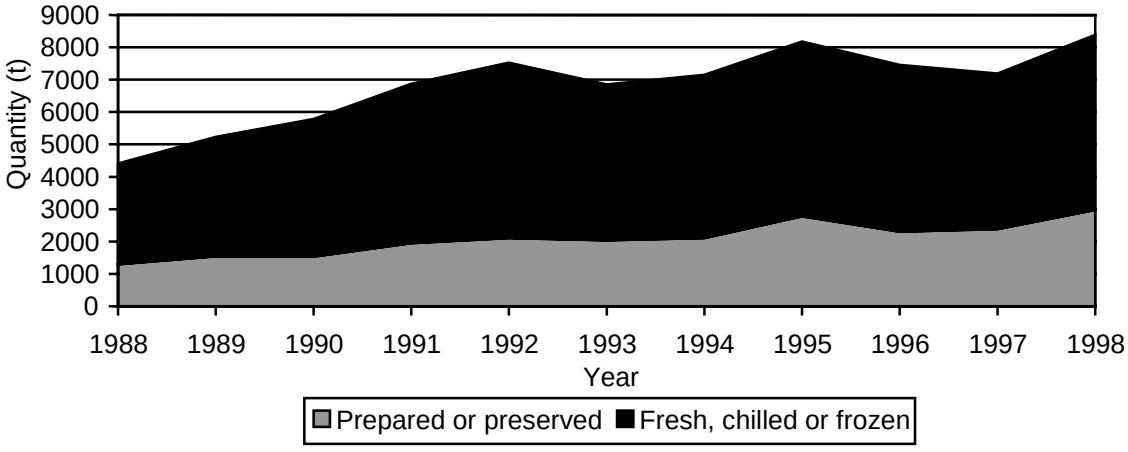


Fig. 7. Evolution of the imports of aquatic products (in quantity), 1988-1998.

Table 1. Cyprus imports of aquatic food (in quantity), 1998

Aquatic products	%	Quantity (t)
Fish, fresh or chilled, excluding fish fillets and other fish meat	1	97
Fish, frozen, excluding fish fillets and other fish meat	14	1154
Fish fillets and other fish meat (whether or not minced, fresh, chilled or frozen)	16	1321
Fish cured, smoked fish, w/n cooked, fish meal fit for human consumption	1	97
Crustaceans, w/n in shell, live, frozen, etc. in shell, cooked in water, w/n chilled, etc.	6	440
Molluscs, w/n in shell, live, aquatic invertebrates other than crustaceans and molluscs, live fresh, chilled, frozen, cured	27	2303
Prepared or preserved fish, caviar and caviar from fish eggs	34	2920
Crustaceans, molluscs and other aquatic invertebrates prepared or preserved	1	56

Regulations on imports and their repercussions on the fisheries sector

Up to 1996 Cyprus applied a fish import licensing system based on fish species and size aiming at

protecting the local production (both from Capture Fisheries and Aquaculture). After the introduction of the GATT philosophy on fish imports this system was replaced by the imposition of a flat sum as import duty on fresh fish imported into Cyprus, while all other restrictions were abolished. The import duty was by 35% lower for fish of "EU origin" (preferential duty) than the one imposed to goods from "other countries". No duty was imposed on frozen fish and fresh or frozen cephalopods, crustacean and shellfish. Import duty was also imposed on trout, salmon and swordfish (fresh, frozen, smoked).

Up to 1996 the annual quantities of air freighted fresh fish from the Gulf countries, the major suppliers of fresh fish to Cyprus, had reached about 500 t. The introduction of the tariff protective system resulted in the replacement of these quantities by seabream and seabass produced by aquaculture and the expansion of marine farming on the island (Stephanou, 1996). The tariff system for imports of fish and fishery products into Cyprus is presently under study for revision. Negotiations with the European Union (EU) for bilateral trade concessions for fish and fishery products in the framework of the Association Agreements are under way. It is anticipated that import duties will be gradually decreased and/or be abolished so that the tariff system is gradually aligned with that of CCT. The abolition of the existing system is expected to result to the change of fish imports as far as quantities, species and products are concerned.

Exports of fish

Exports refer mainly to products of marine aquaculture, i.e. live fish fry for fattening and table size fish for human consumption. Exports of other fish species are minimal and refer mainly to swordfish, tuna and, recently, some small pelagics, like sardines. Exports of fresh marine fish from aquaculture were undertaken in parallel to the expansion of the local market for seabream and seabass up to 1996. The fish were exported almost exclusively to the Italian market. Exports were considered as a mean for securing the recycling of the working capital of the farms until the local demand catch up with the supply. As from 1998 table size seabream and seabass are exported in increasing quantities, mainly to countries other than those belonging to EU (USA, Central Europe, Near East, etc.) (Fig. 8).

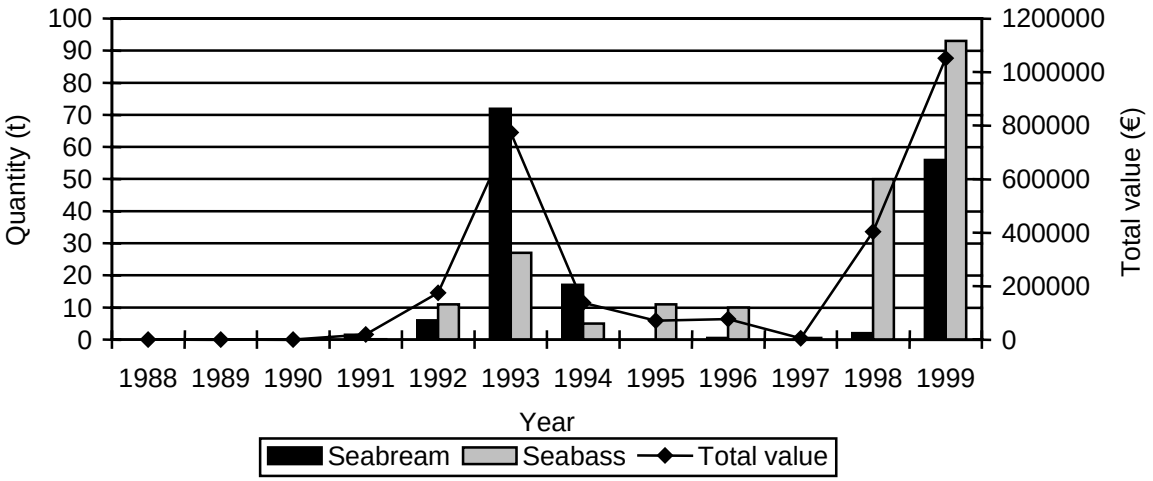


Fig. 8. Exports of fresh marine aquaculture fish for human consumption (in quantity and value) 1988-1999.

Further intensification of exports is anticipated with the expansion of the farms. The export prices to some countries, mainly for seabass, are higher than those of the local market.

Apparent consumption of aquatic food

The consumption of aquatic food during the period 1988-1998 (1997) increased by about 72% (51%) in quantity and by 126% (102%) in value (Fig. 9).

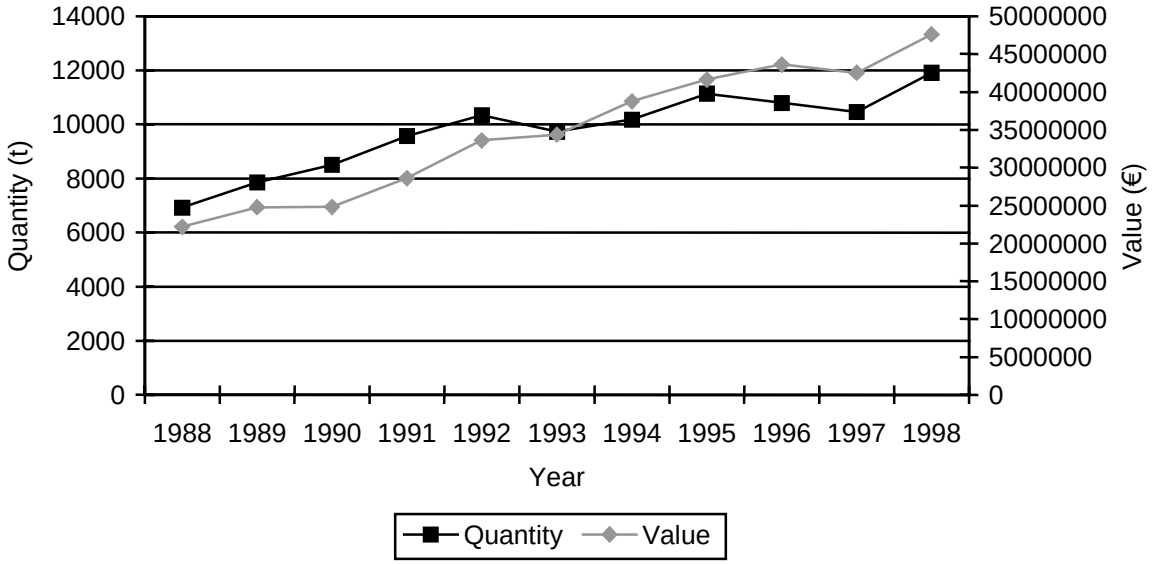


Fig. 9. Total consumption of aquatic food (in quantity and value), 1988-1998.

The average annual per capita consumption during the same period increased from 12.4 kg to 18.1 kg (16.1 kg), i.e. increased by about 46% (30%) (Fig. 10).

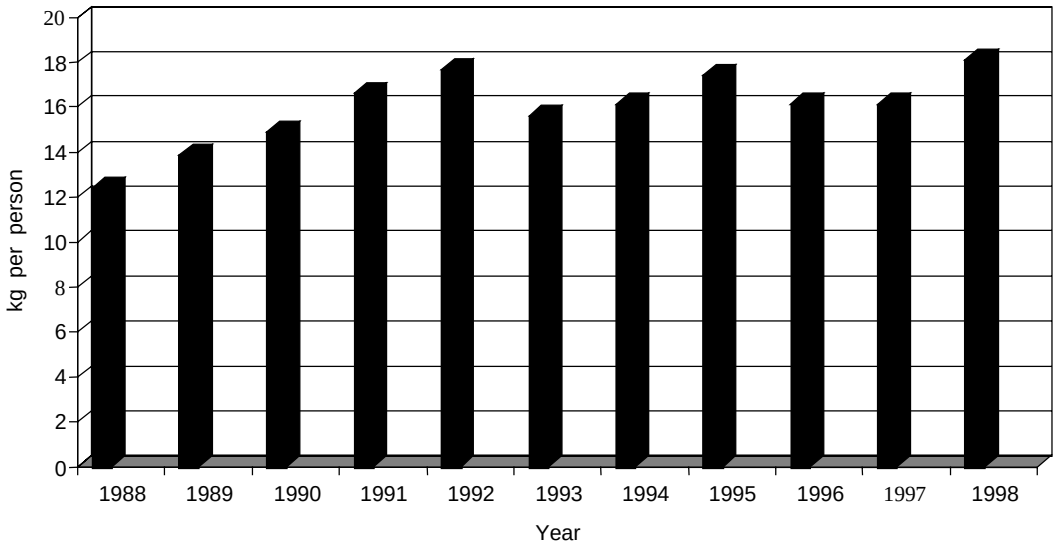


Fig. 10. Apparent per-capita consumption of aquatic food, 1988-1998.

The larger quantity of fresh fish from capture fisheries consumed in Cyprus consist of small size, low quality fish, belonging mainly to picarel (Fig. 11).

Fish produced by marine aquaculture (seabream and seabass) are consumed in increasing quantities. During the last years both species became the main fresh fish of good quality that are found in ample quantities in the local market and sold at reasonable price. Aquaculture fish represented in 1998 (1997) about 33% (30%) of domestic fisheries in quantity and 34% (36%) in value. It is estimated that during 1998 (1997) each Cypriot consumed 1.7 kg (1.5 kg) of aquaculture fish which came by about 90% from marine aquaculture. The contribution of aquaculture to the consumption of local fresh fish of good quality is estimated to be more than 60%. This percentage is increasing continuously with the increase of marine aquaculture production.

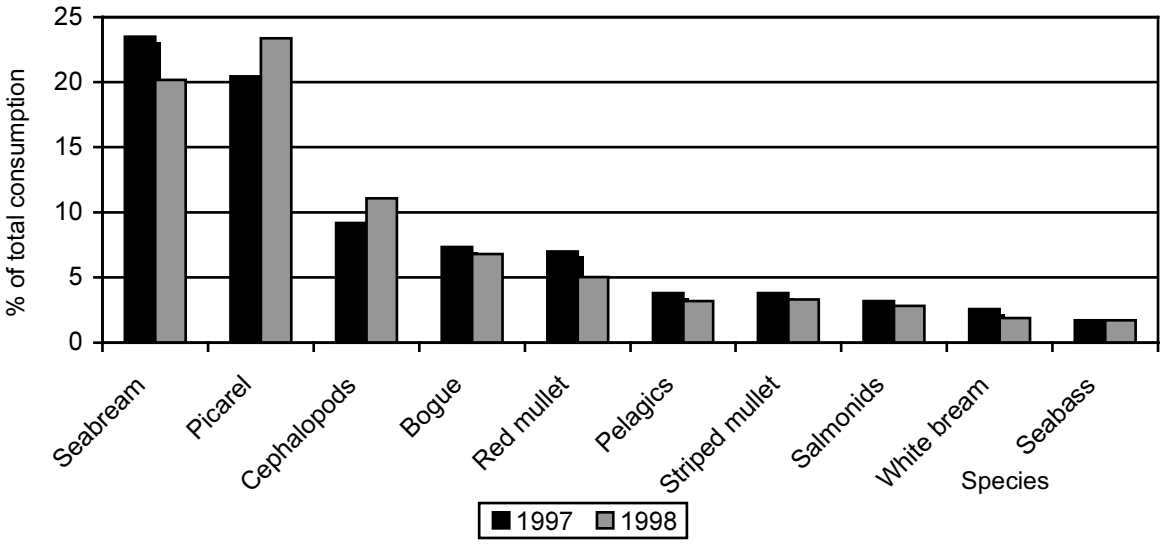


Fig. 11. Consumption of aquatic species produced locally by Fisheries and Aquaculture, 1997 and 1998.

Among the consumers there exists a distinct preference for seabream than seabass, which is characteristic for the Eastern Mediterranean, despite of the fact that both species are retailed at the same price in the local market. The taste of freshwater fish, including trout, is not yet appreciated by Cypriots, perhaps because of the lack of any freshwater species on the island before the start of trout culture and the stocking of 17 species of fish in the reservoirs for angling, about 30 years ago. On the contrary, the taste of smoked fish is liked by Cypriots who have a distinct preference for strong tastes, as the rest people of the Eastern Mediterranean.

As regards imports of fresh fish, it is noted that increasing quantities of mainly good quality fish, which are in high demand in Cyprus, are imported by air into the island, mainly from Mediterranean countries (mostly Egypt and Libya). The largest quantities in 1998 (1997) referred to common bream 28% (27%), groupers 20% (26%), red mullet 12% (16%) and cephalopods, mainly squid 9% (12%) (Fig. 12).

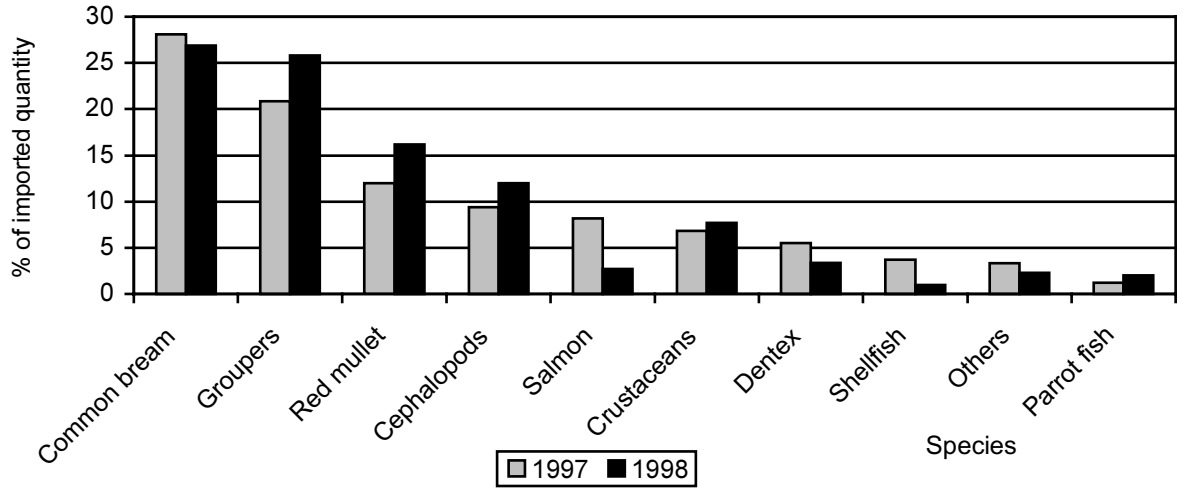
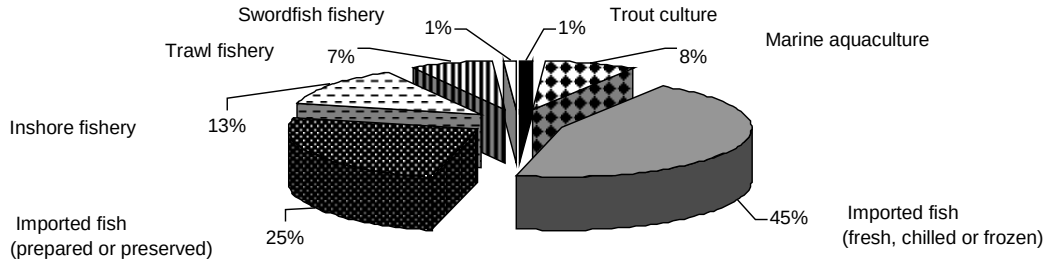


Fig. 12. Air freighted imports of aquatic species in fresh form, 1997 and 1998.

The imports of aquatic food during the period 1988-1998 (1997) increased by 90% (63%), while the

domestic fisheries production had grown by 40% (28%), which was mainly due to marine aquaculture development. In 1998 (1997) imports of aquatic food reached 70% (69%) of the total consumption in quantity and 54% (52%) in value (Fig. 13a,b).

(a)



(b)

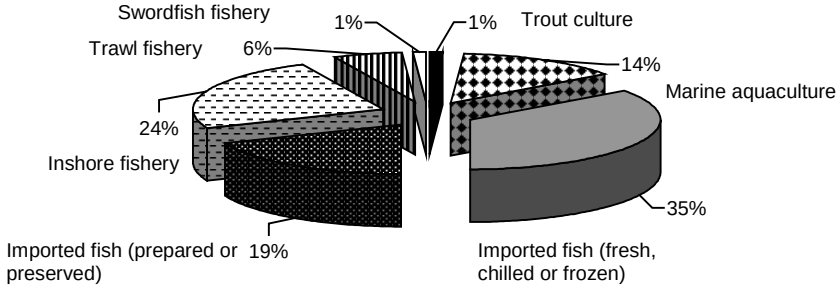


Fig. 13. Cyprus apparent consumption of aquatic food by source (a: in quantity, b: in value), 1998.

Generally there exists a trend for the increase of fish consumption and decrease of meat consumption, especially during the last decade, which is in line with the new, widely publicised dietary habits for low lipids, high unsaturated fatty acids diets and the promotion and adoption of the Mediterranean diet of which fish is one of the main components. Also towards this trend contributed the rise in the standard of living, as a result of the increase in the per capita income of Cypriots, the increased supply and expansion of the distribution system of aquatic food, especially into the supermarkets, the greater variety in prices, species and products, etc.

Consumption of aquatic food by tourism

According to the general practice, the apparent consumption of aquatic food (kilos of aquatic food per capita, per year) is based solely on the local population, despite of the fact that the island has a flourishing tourist industry (Fig. 14). This leads to somehow misleading figures as far as real aquatic food consumption by the local population is concerned.

In Cyprus tourism presents a main outlet of fish and fish products, especially of aquaculture products and most of the trout production is consumed by the tourist industry. As a result, a substantial percentage of the aquatic food consumption is consumed by tourists at restaurants, hotels and fish tavernas (Stephanou, 1998). Consumption varies according to the number of tourists and the average duration of their stay and was estimated to range from 7% of the total per capita consumption of aquatic food on the island in 1988 to 9.4% (9.3%) in 1998 (1997), i.e. each tourist consumed about 1 kg of aquatic food in 1988 up to about 1.7 kg in 1998 (1.5 kg in 1997) (Fig. 15).

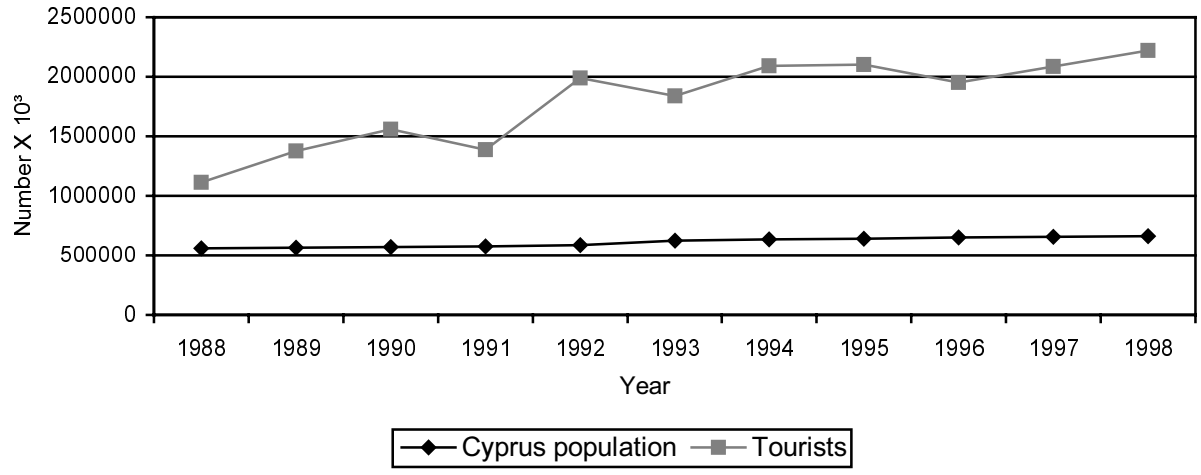


Fig. 14. Evolution of Cyprus population and number of tourists, 1988-1999.

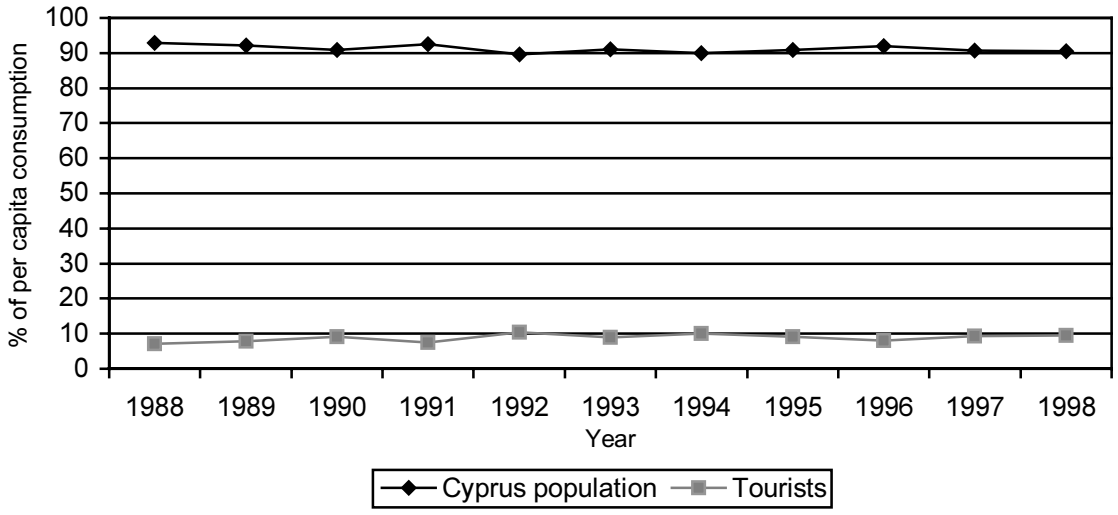


Fig. 15. Aquatic food consumption by local population and tourists, 1988-1998.

The estimations are based on the assumption that the tourists exhibit during their stay the same dietary habits as the Cypriots, which is not entirely true, since people coming from UK and Western Europe consume on the average more aquatic food per capita than Cypriots. The average annual per capita fish consumption in EU is around 22.6 kg. Nevertheless it is expected that the real aquatic food consumption by local population in all Mediterranean countries is lower than the officially declared one because these countries, as a whole, are the first tourist destination in the world. They attract more than 30% of the international and national tourists (250 million). A great part of the tourists is staying along the coasts enjoying the sea. Tourism contributes substantially to the economies of all Mediterranean countries where it represents 14% of their exports, 23% of the export of services, more than 6 million posts of direct employment and at least 14 million posts of direct and indirect employment.

The role of the tourist industry as far as aquatic food consumption is concerned has not been studied in deep. It is believed that general fish marketing surveys have been carried out in Cyprus by private companies that have commercial interests in the sector (especially recently, by aquaculture companies). The results were not given any publicity since they are of proprietary nature and have economic value.

National seafood market information

Fish marketing channels

There are no organised landing facilities for fish marketing in Cyprus. The bulk of the production is disposed locally, through the traditional marketing channels, i.e. through middlemen. Almost all capture fishery production is sold in fresh form (chilled on ice), without any processing. Scaling of fish is undertaken at fish shops as a service which is usually included in the retail price. Large fish species like swordfish, are usually kept in frozen form and sold gradually as fillets. Freezing cost is one of the reasons for the decline of the swordfish fishery, since the middlemen and/or the fish retailers are reluctant to cover it. The fish marketing system has a limited number of middlemen because of the small distances and the relatively small local capture fisheries production. Usually one person acts as middleman, from the landing of fish at the fishing shelters and the 3 main landing ports of Limassol, Larnaca and Paphos (Γεωργίου *et al.,* 2000). The middlemen buy the production of the trawlers and the fishermen of the inshore fishery and usually act both as fish mongers and retailers. The middlemen also undertake the supply of the hotels, restaurants and tavernas with marine fish, at prices which are by about 25-30% higher than the wholesale ones that they secure from the aquaculture producers and the fishermen.

Generally the marketing of marine aquaculture products depends on the traditional fish marketing channels. Aquaculture production is retailed at the same fish shops where capture fishery fish are sold. The marine fish farmers operate, each one separately, their own distribution system in order to supply the various fish middlemen. The operation of a common distribution system for all marine aquaculture producers, although tried several times in the past, was not successful and did not manage to survive.

Trout is sold by the producers themselves, mainly to restaurants, hotels, supermarkets and, recently, fish shops. Trout is sold gutted, fresh or frozen and smoked (whole or in fillets).

Fish prices and the main factors affecting them

There are not any common regulatory rules for the marketing of fishery products such as classification according to quality, size, weight labelling. No auction system is employed for the marketing of the fish catch either. A grading mechanism fixed by the fishing industry regulates the classification of all species of fish in four quality categories. This system is expected to be adjusted soon to the relevant EU Regulations and to operate under government control. Generally the fish pricing system and the fish prices are expected to change dramatically as a result of Cyprus accession into EU and the harmonisation with the Aquis Communautaire. Almost all of the species which are covered by the Common Market Organization for fisheries products (CMO) do not exist in Cyprus with the exception of the picarel and bogue. As regards imports, a relevant system for recording landing prices of imported products already exists.

Fish caught by the inshore fishery are considered of better quality than those of trawl fishery and fetch higher price than the same species which are caught by trawlers. Also organoleptic characteristics, justified or not, play a significant role in pricing, with fish species of inshore fishery coming from rocky bottoms and reefs being generally highly esteemed, mainly among Cypriots, while muddy areas are believed to influence the texture and the taste of the fish flesh.

The species caught by inshore fishery are priced according to species, size, and coloration (Table 2). Colour plays an important role in the price of fish, with red coloured species being the most expensive ones, like red mullet (*Mullus surmuletus*) and striped mullet (*M. barbatus*), common sea bream (*Pagrus pagrus*), pandora (*Pagellus erythrinus*). Less esteemed are the so called "black fish" which are caught mainly by inshore fishery, like the white seabream (*Diplodus sargus*), the two-banded bream (*D. vulgaris*), the saddled bream (*Oblada melanura*), the bogue. Large bodied fish like groupers and the stone bass (*Epinephelus guaza, E. aeneus, Polyprion americanus*) are usually priced each one separately, according to weight. Plant eaters, like the parrot fish (*Sparisoma cretense*) and the rabbitfish (*Siganus rivulatus*) have a clientele of their own. Inshore fishing boats are also catching the picarel, both the female which is small bodied, as well as its male which is fished in quantities seasonally and sold under a different name. Part of the catch refers to cephalopods: octopus (*Octopus* spp.), cuttlefish (*Sepia* spp.) and squid (*Loligo* sp. *and Ommatostrephes* sp.).

Table 2. Wholesale prices of fish, cephalopods and crustacean of inshore fishery (1998) (source: Department of Fisheries and Marine Research)

Price (€/kg)	Species
18.1	Common seabream, common dentex
18.1	Red mullet
18.1	Pandora
13.9	Parrot fish
16.9	Striped mullet
13.4	White bream, striped bream, saddled bream, two-banded bream
10.7	Grey mullets (*Mugil* spp.), rabbitfish
12.6	Amberjack
9.5	Groupers
6.5	Swordfish
	Cuttlefish and squid: 8.3, octopus: 4.5, slipper lobsters: 22.2, shrimps: 17.2

Fish caught by boats are sorted according to size for pricing purpose, i.e. red mullet and striped mullet are classified as A,B,C category, common seabream and dentex as A and B, bronze bream (*P. acarne*) as C and D. The white bream, the two-banded bream, the groupers, the parrot fish and the rabbitfish as sold as B category, while the bogue and cephalopods as C and the male and female picarel as D.

The main fish species caught by trawling are the red mullet, pandora, striped mullet, bogue, picarel, octopus, squid and various other small bodied or young fish which are classified with picarel as D category fish. Red mullet and pandora are classified as A,B,C category, according to their size, striped mullet as B,C, and bogue and octopus as C. The trawl fishery is landing fish of mainly low quality (D grade) which represents about 80% of catch are consumed by the lower income classes of the population. The percentage of picarel and low quality fish in the catch has increased during the last years as a result of the decline of the Cyprus fisheries. The fish caught by trawlers are also classified into 4 categories with different prices, according to the species and/or the size. The fish of the same category which are fished by trawlers in Cyprus waters fetch sometimes slightly higher price than those coming from trawling in international waters (Table 3, Fig. 16).

Table 3. Wholesale fish prices of trawl fishery (1998) (source: Department of Fisheries and Marine Research)

Category	Cyprus waters Price in €/kg	% of total quantity	International waters Price in €/kg	% of total quantity
A	13.8	1.1	13.8	1.7
B	10.3	2.8	10.3	3.1
C	6.7	16.8	6.7	18.4
D	2.2	79.3	2.2	76.8

Although there exists a correlation in the market between the fresh fish from capture fisheries and those of aquaculture, the latter fetch lower prices than those of similar species of capture fisheries. Wild fish come first in the consumers preferences and dictate the price ceilings.

Aquaculture species are sold at prices which, in some cases, are half the price of "wild" sparids. The wholesale prices of aquaculture products are comparable to those prevailing in other Mediterranean countries. Any decrease in the wholesale price of aquaculture fish does not reach the consumer at the same scale of magnitude because in such a case the middlemen maximise their profit (Fig. 17).

As a result, retail prices decrease at a much slower rate and a price stability is thus secured in the fish market. Generally wholesale pricing of marine aquaculture products could be attributed to the

forces of the market (supply and demand). As regards trout, the prices are quite high compared to those prevailing in other countries, due to the high production cost.

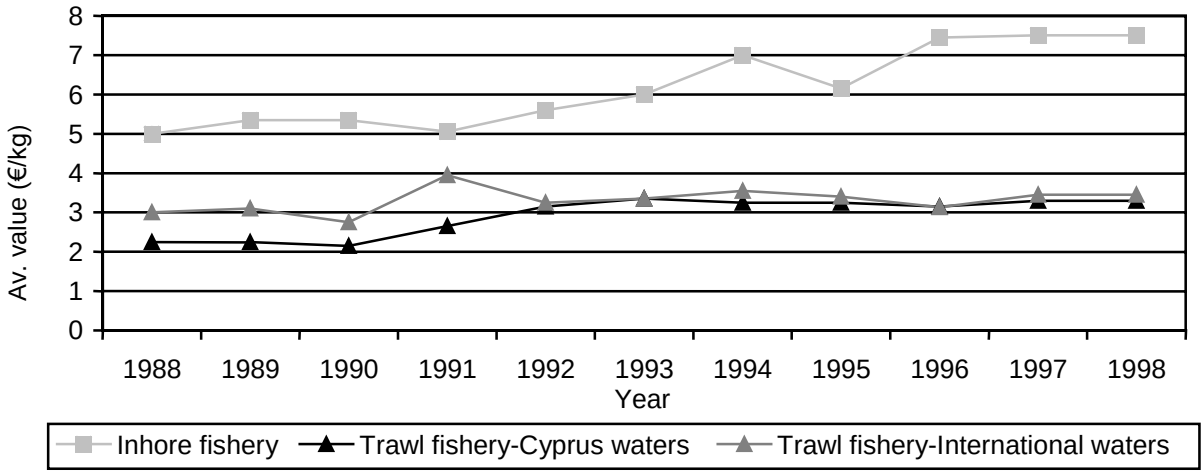


Fig. 16. Evolution of the average wholesale value of fish, 1988-1998.

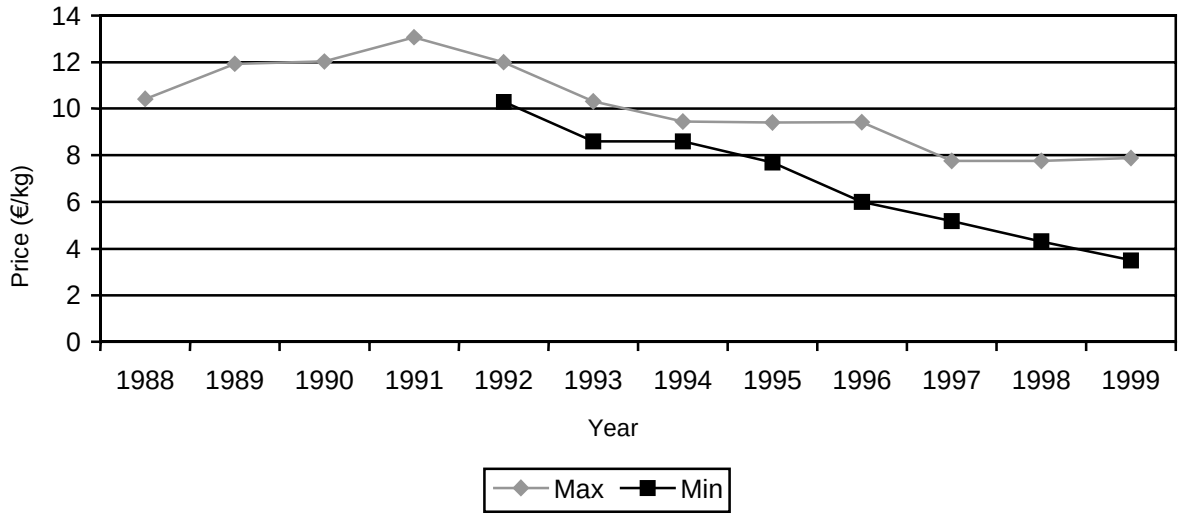


Fig. 17. Evolution of the wholesale prices of seabream, seabass (local market), 1988-1999.

Fish outlets

Fish is being retailed in special fish shops and at the supermarkets where they are usually sold at special stands by retailers who are also middlemen. In such a case the supermarkets are not involved in the supply of the fresh fish that are sold from their premises or have whatsoever control on their price. Nevertheless, aquaculture fish, mainly seabream, are often offered by supermarkets at low special offer prices in an effort to capitalise on the increased number of customers.

Fish is being retailed mainly in urban areas and, to a much smaller scale, the rural ones. A small number of special fish shops started operation in the larger rural centres during the last 5-7 years. Fresh sea fish are retailed at the rural communities, especially the mountain remote ones, by special cars, usually during cases of overproduction of certain low valued species like picarel.

As regards imported frozen aquatic food the various importers keep that at their premises in cold storage for onward distribution directly to supermarkets, fish shops, etc.

Publicity as a tool for market expansion

Seabream and seabass do not exist in large number in the wild and were almost unknown to the consumers because they were fished by the capture fisheries in very small quantities before the large scale fattening of marine aquaculture fish in 1992. Since then the local market for seabream and seabass has been expanded significantly. To this effect significant role played the publicity campaigns undertaken by the Department of Fisheries and Marine Research and the fish farming companies, which included TV emissions on marine aquaculture production and its products, the preparation-distribution of relevant recipes, articles in the local press which highlighted their nutritive value and the Mediterranean diet, etc. The campaigns expanded to the visitors of Cyprus, through the inclusion of information on the production, preparation and consumption of seabream, seabass in the publications of the Cyprus Tourism Organisation, magazines of airways companies, etc. The information and publicity campaigns were intensified during "crisis periods", as, for example, during the dioxin case which affected temporarily aquaculture fish consumption.

Recent structural developments in aquatic food marketing

All fish farming companies that entered or are preparing themselves to enter the Cyprus stock market have formed "group of companies" of related activities in an effort to expand and diversify their activities, products, sources of supply and outlets. The developments include the acquisition or participation as shareholders in companies which possess trawlers, in fish retail companies which operate fish shops and act as middlemen, etc. Also fish tavernas and restaurants have been bought by marine aquaculture companies in order to increase their fish outlets. Some of the fish farming group of companies started the upgrading-setting up of new fish processing units. The raw material is either imported, like salmon and mackerel (*Scomber* spp.) or produced locally by aquaculture. The fish are imported usually by the processing companies or the group of companies where the latter belong. The processing activities refer to the filleting, freezing, smoking, marinating, pre-cooking, etc. of fish which are intended for the local market and export. Their products are found mainly in supermarkets and delicatessen shops.

The fish farming companies started the upgrading of the fish shops concurrently with the increase of their direct or indirect control over the sale of their products. So the entrepreneurship spirit is expanding to traditional fisheries and fish marketing systems. Such developments are expected to lead to advantages to the consumer, like better products quality and prices, greater and constant variety of products and to the further increase of aquatic food consumption.

Hygiene and quality control of aquatic food

The hygiene and quality control of the aquatic food which is intended for the local market is undertaken jointly by the Health Inspectors of the Ministry of Health and the Veterinary Services Department of the Ministry of Agriculture, Natural Resources and the Environment. As regards exports, the certification and control of their hygiene and quality is undertaken by the Veterinary Services Department according to the provisions of the same law which regulates the local market, the Food (sale and control) Law 54(I) 1996.

Cyprus government is in the process of taking the necessary measures (including legislative ones) in order to get harmonised with the Aquis Communautaire as regards hygiene and quality control of fish. Special attention is being paid to the upgrading and setting up of fish packing facilities which conform with the European standards. Presently three fish packing facilities and one fish processing unit are registered in EU for fish export purposes. Also fish keeping premises, including fish retail shops, are being modernised.

Fish consumption vs. meat consumption habits

Animal protein consumption increased during the period under study, especially as regards fish

consumption, which is also reflected in the households relevant expenditure. There exists a distinct increase in the expenditure for fish (fresh and frozen) which could be explained by the increase incurred in the price of fish and the fish consumption.

The expenditure for food, beverage and tobacco by Cypriots, expressed as a percentage of their income, has a decreasing trend. Such a trend is in line with other countries and is the result of the increase of the per capita income; in 1990/1991 the relevant expenditure represented 21.8% of their income and in 1996/1997 only 18.6%, despite of the fact that during the same period the average consumption expenditure increased by 55% in nominal terms and 21.2% in real terms.

Fish as food is well appreciated by Cypriots, although meat is much cheaper: a kilo of seabream in the local market equals the cost of about 4 kg of chicken or 3.3 kg of pork meat. The 1996/1997 Family Budget Survey carried out by the Statistical Service revealed that meat represented 24.3% of the average consumption expenditure for food per household, while fish only 4.2%. The relevant data in 1990/91 survey were 21.1% and 2.6% respectively, i.e. there was a much larger increase in the expenditure for fresh and frozen fish (62%) compared to that incurred for meat (15.2%) although expenditure for meat was far higher than the one for fish (Fig. 18).

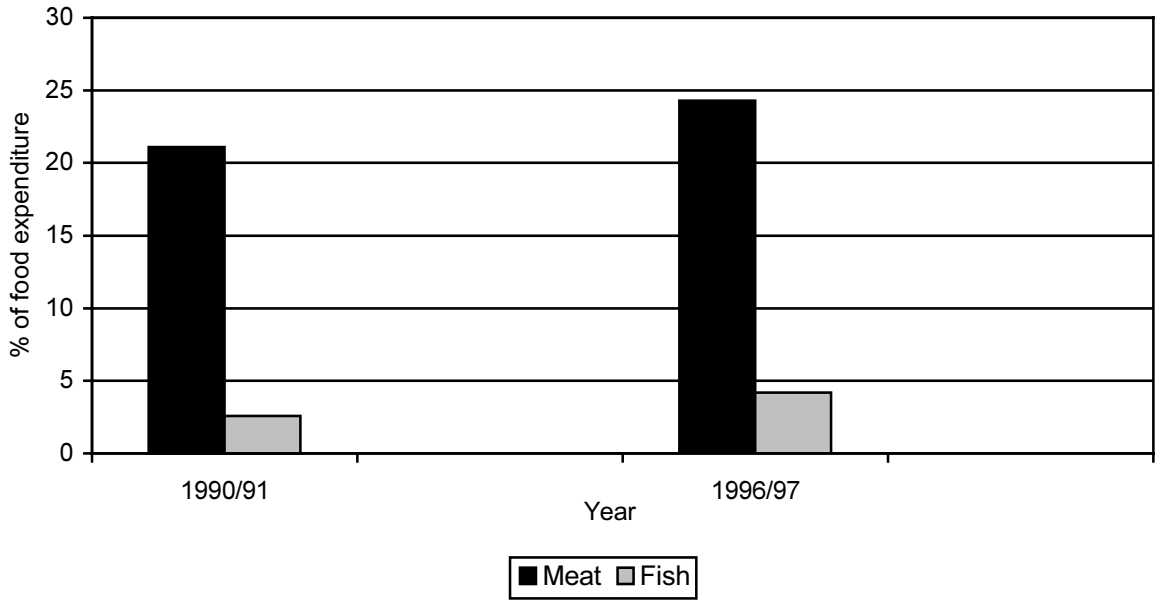


Fig. 18. Comparison between household expenditure for aquatic food and meat, 1990/91 and 1996/97.

Also changes were noted to the meat bought by households. There was a distinct preference for white and less expensive meat like chicken and pork while the consumption of beef dropped dramatically (Table 4).

A decrease in fish prices is anticipated as a result of a combination of parameters related both to fish production and marketing, like "economies of scale" of farms and achievement of better productivity, abolition of the duties for fish imports, forces of the market (fish supply and demand), etc. An increase of the consumption of aquatic products could thus be expected.

Despite of the general trend for increased consumption of aquatic food the scale of meat consumption places Cypriots among the higher meat consumers of the world (Fig. 19).

The analysis of the types of aquatic food purchased during 1996/1997 (Table 5) reveals that most of the fish are consumed in fresh and frozen form. Crustaceans and shellfish are not popular, since they are not well known and do not exist in quantities in the Cyprus sea.

Table 4. Apparent consumption of meat by kind (in % of quantity) in 1990/91 and 1996/97 (source: Statistical Service)

Type of meat	1990/1991 (%)	19967/1997 (%)
Lamb and goat meat	29	20
Pork	22	25
Poultry	22	26
Beef	11	2
Meat preparations	11	13
Other meats	5	14

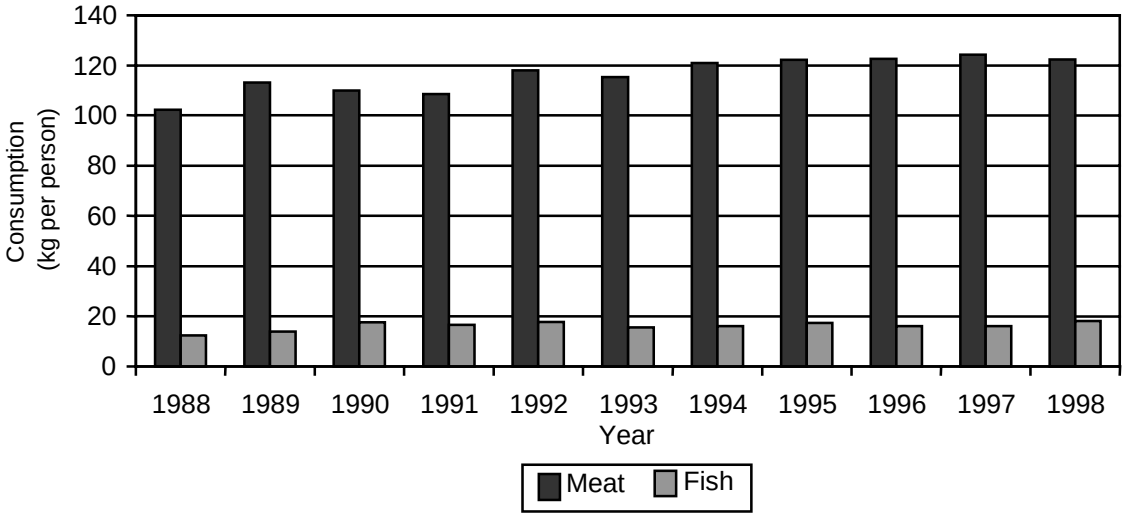


Fig. 19. Per capita consumption of meat vs. fish, 1988-1998.

Table 5. Aquatic food in household purchases (in % of quantity) in 1990/1991 and 1996/1997 (source: Statistical Service)

Type of seafood	1990/1991 (%)	1996/1997 (%)
Fish fresh and frozen	82	77
Fish smoked and dried	2	2
Crustaceans and other seafood (fresh or frozen)	2	2
Other fish products	14	19

General characteristics of the population

Socio-demographic information

The last census of the population was carried out in 1992 and since then the estimates on the population are based on it. The population of Cyprus in 1998 (1997) was estimated to be 660,400 (654,500). The population increase during 1988-1998 was estimated to range between 1-2.7% (Fig. 14). About 1500 persons are directly employed by Cyprus fisheries and aquaculture, while at least about 1000 more are involved in the relative supporting infrastructure and fish marketing system. During 1998 114 persons were registered as being exclusively engaged in the retail sale of fish.

There is a trend for the concentration of people in the urban areas. The countryside is gradually

abandoned, especially by young people. It is estimated that during 1998 69% of the population lived in urban areas and only 31% in the rural ones, while the number of households were 69.5% and 30.5% respectively.

As regards the size of households (number of persons), there is an increasing trend of the small ones (1-2 persons) as compared with the large ones (5+ persons) (Table 6). Such a trend could be partly explained by the mass enter of women into the labour market which occurred during the last years. The participation of women to labour force has an increasing trend, from 45.2% in 1980/1981 to 52.8% in 1996/1997. The increase is noted mainly in the age group 25-64: labour force participation rate of women of this age group in 1980/81 was 46.5% and reached 63.3% in 1996/97, with increasing trend in recent years. It is interesting to note that in 1997 this age group represented almost 50% of the total population (Table 7).

Table 6. Percentage distribution of households by size 1982-1992 (source: Statistical Service)

% of total	No. of persons				
	1	2	3	4	5+
1982	10	21.7	17.3	25.6	25.4
1986/87	11.6	23.5	16.7	25.6	22.6
1989	9.6	23.8	17	27.2	22.3
1992	12.6	24.8	17.4	25.5	19.7

Table 7. Cyprus population de jure by age and sex (end of the year), 1996-1998 (source: Statistical Service)

Sex	Age group								
	0-14			15-64			65+		
	1996	1997	1998	1996	1997	1998	1996	1997	1998
Men	83	82.3	81.4	210	213.3	216.8	32	32.4	32.5
Women	77.4	77.1	76.2	208.9	211.7	214.7	40.5	41.1	41.7

As a result of the changes regarding women participation in the labour market less women have ample of time to devote to household activities, including cooking. Such a fact could explain the flourishing industry of fast food, of which fish is only a very small percentage and the increased trend for eating out in restaurants. The role of the catering sector in fish consumption is not well documented. It is a general belief that Cypriots are frequenting the restaurants much more often than in the past and that the number of fish tavernas (including other fish serving places) has increased considerably during the last 5 years. Generally, the number of restaurants and tavernas increased during 1988-1998 from 1223 to 1898, i.e. by 55.2%. Fish catering places are being frequented by an ever increasing number of customers, especially in summer. Young people usually avoid cooking fish for inconvenience reasons and fish tavernas are becoming a popular solution.

General economic information

The increasing economic affluence enabled Cypriots to afford the consumption of more fish, which is a relatively expensive food item. During 1998-1999 the Gross National Product had an increasing trend, which is reflected in the per capita income (Fig. 20).

As regards the distribution of income between the rural and urban areas it was found (Family Budget Survey 1996-1997) that in rural areas only 53.6% of the population was working as compared to 56.1% of the urban population, meaning that the average number of earners per household was lower in the rural areas. This reflected to the mean net income per household which was also lower:

€10,265 as compared to €19,912 in urban areas (mean net income per capita €12,660) (Fig. 21). The households in the rural areas have a lower buying power than those in the urban and this could partly explain the lack of demand for expensive fish species in the countryside.

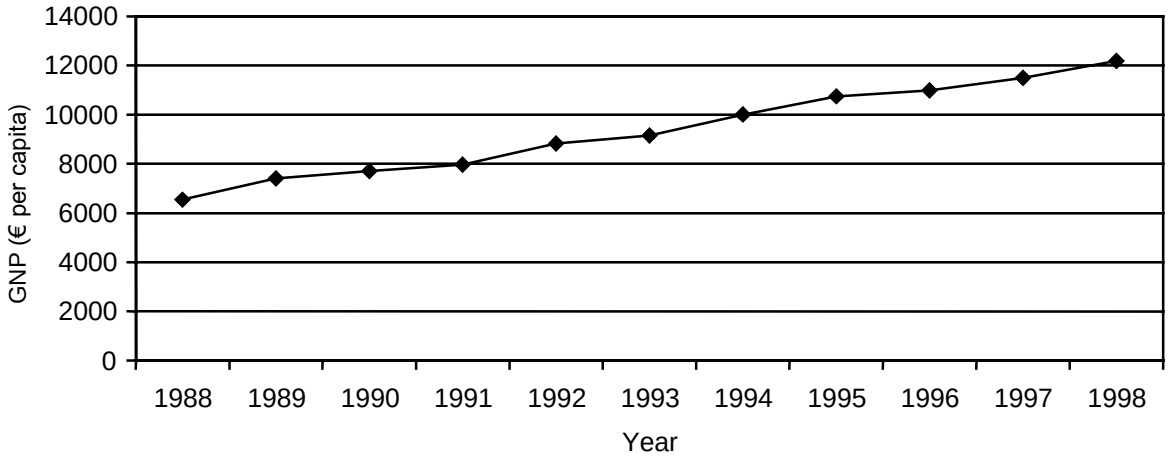


Fig. 20. Evolution of the per capita Gross National Product, 1988-1998.

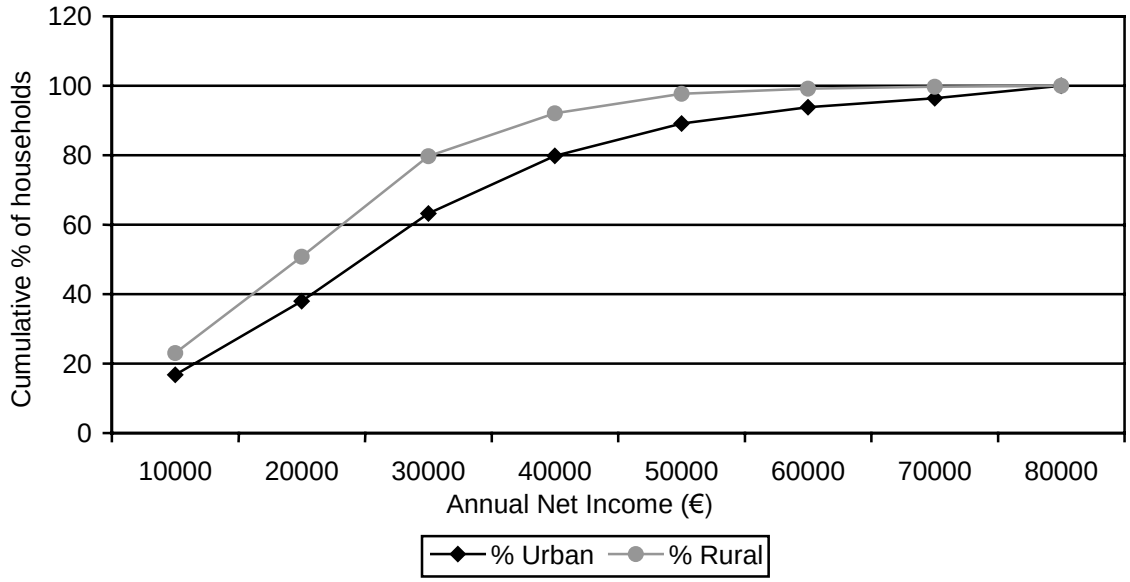


Fig. 21. Cumulative percentage income distribution for urban and rural households, 1997.

In the consumers price index fish carries a weight of 70 out of 100,000, while meat 389, i.e. 0.7% and 3.89% respectively (Table 8).

It is interesting to note that during the period 1992-1998 fish prices increased by about 27%, while those of meat by 9% only (Table 9).

General findings and conclusions

Cyprus continues to be a net importer of aquatic food. During the examination period imports almost doubled, reaching about 70% of total fish consumption. Capture fisheries is not expected to

increase dramatically. Marine aquaculture offers the only prospect for increasing the supply of fish of good quality locally.

Table 8. Analytical data on consumer price index for fish and meat 1996-1997 (total weight 10,000) (source: Statistical Service)

	Weight		Weight
Fish fresh	31	Meat fresh	
Picarel		Beef	197
Bogue		Pork	
Seabream		Lamb	
Fish frozen	25	Poultry	108
Redfish		Delicatessen	46
Snapper		Processed	15
Fish preserved and processed	14	Other meats	23
Sardines		Total	389
Tuna			
Total	70		

Table 9. Consumer (retail) price index by category (base: 1992) (source: Statistical Service)

Category	Year						
	1992	1993	1994	1995	1996	1997	1998
Food	100.000	102.33	108.64	110.12	113.83	120.26	124.28
Meat	100.00	99.28	100.06	101.48	101.51	104.24	109.32
Fish	100.00	104.89	106.87	107.83	111.37	120.63	126.74

The composition of the species being imported is expected to change as a result of the adoption of the CCT, while the repercussions of this change on fish market could not be predicted. It is quite possible a shift in the imports from expensive species to cheaper ones for mass consumption and a decrease in the fish prices.

The marketing system of fish is also expected to be restructured mainly as a result of harmonisation with EU standards.

Fish farming companies are gaining control over the fish production, marketing and processing sector and upgrade and reform the fisheries sector in general.

Cypriots were and remain heavy meat eaters, partly because of low meat prices compared to fish prices, although there are signs that more hygiene dietary habits are gaining grounds. Fish consumption is expected to increase in the years to come because of the new trends and the anticipated lower fish prices as a result of the new tariff system and the expansion-improvement of the fish marketing system.

Diversification of aquaculture with new species and products could contribute to the further expansion of the aquatic products market in Cyprus. The per capita consumption of the "classic" 2 species, seabream and seabass is quite high in comparison with that of other countries with high aquaculture production, although the average per capita fish consumption in Cyprus is relatively low.

Special fish market surveys are indicated which could study in depth the potentials and strength of the local market, including the local population fish eating habits. The role of the tourist industry and the catering sector in the consumption of aquatic food needs further study.

The role of the supermarket as a convenient outlet for the promotion of new aquatic products has been important and needs documentation as part of a special market research.

Market campaigns are indicated for the further expansion of the local market as regards existing products and the introduction of new ones.

The needs of the consumer should guide the efforts for the production of new aquaculture species and aquatic products in general, while expansions towards processed and ready cooked aquatic food are indicated, since they conform with the new ways of life.

Cyprus has to concentrate on quality than quantity issues which could help aquaculture industry to grow, both for the internal as well as the export market.

The exchange of information and experiences on fish food supply and consumption is indicated, with the globalisation of trade, especially among the Mediterranean countries and those of EU.

Acknowledgements

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