SCIENTIFIC COOPERATION TO SUPPORT RESPONSIBLE FISHERIES IN THE ADRIATIC SEA

MiPAF

Food and Agriculture Organization of the United Nations

Italian Ministry of Agriculture and Forestry Policies

AdriaMed

GCP/RER/010/ITA

Aspects of Fish Markets in the Adriatic Sea

Report of the AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea

Ancona, Italy 27th - 28th June 2002

AdriaMed Technical Documents No.10
GCP/RER/010/ITA/TD-10

Termoli (Italy), December 2003

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Preface

The Regional Project "Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea" (AdriaMed) is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Italian Ministry of Agriculture and Forestry Policies (MiPAF).

AdriaMed was conceived to contribute to the promotion of cooperative fishery management between the participating countries (Republics of Albania, Croatia, Italy and Slovenia), in line with the Code of Conduct for Responsible Fisheries adopted by the UN-FAO.

Particular attention is given to encouraging and sustaining a smooth process of international collaboration between the Adriatic Sea coastal countries in fishery management, planning and implementation. Consideration is also given to strengthening technical coordination between the national fishery research institutes and administrations, the fishery organizations and the other relevant stakeholders of the Adriatic countries.

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For bibliographic purposes this document
should be cited as follows:

AdriaMed. 2003. Aspects of Fish Markets in the Adriatic Sea. Report of the AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea. FAO-MiPAF Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea. GCP/RER/010/ITA/TD-10. *AdriaMed Technical Documents*, 10: 152 pp.

Preparation of this document

This document is the final version of the report of the AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea, organised by the FAO-AdriaMed Project (*Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea)* in Ancona, Italy 27th - 28th June 2002.

Acknowledgements

The kind hospitality provided by the University of Ancona, in particular by the Faculty of Agriculture, DIBIAGA, Area di Economia ed Estimo rurale is gratefully acknowledged.

AdriaMed.
Aspects of Fish Markets in the Adriatic Sea. Report of the AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea. Ancona, Italy 27th - 28th June 2002.
AdriaMed Technical Documents. No.10. GCP/RER/010/ITA/TD-10, Termoli, 2003: 152 pp.

ABSTRACT

The AdriaMed Meeting on Aspects of Fish Markets in the Adriatic Sea was held in Ancona, Italy, on the 27th – 28th June 2002. The meeting was attended by experts from Albania, Croatia and Italy. The main objective of the meeting was to gain a better understanding of the fish markets through the collection of relevant information available at national and international (Adriatic Sea) level. The development of research on economics related to the fish market sector was highlighted. A review on the involvement and increasing interest of Italian agricultural economists in the fishery sector was presented, and some methodological considerations were given on the main areas of interest for agricultural economists dealing with fisheries. In particular, the issue of which methods and approaches of agricultural economists are most useful to analyse the economics of fisheries was addressed. The importance of reliable fishery statistics and the constraints often imposed by their unavailability was pointed out with reference to all Adriatic coastal countries. The general issues concerning fish markets in the region were underlined through working papers reviewing the macroeconomic information on Albanian, Croatian and Italian fish market and trade. Some case studies on specific aspects of fish markets in the Adriatic Sea were presented: a) the case describing the market strategic choice made by the Ancona Fishery (Italy), which is based upon the quality certification of the fish product, with quality being a major economic support and incentive to reach sustainability within the sector; and b) the case study of the Termoli fishery (Italy), which was given as example of how production costs and market aspects can affect relatively small local fisheries. References to the EU directive n.493 of 1991, which gives new tasks to the functioning of fish markets, were made: the importance of not dismantling fish markets but instead rationalising them was underlined. Among the various and diverse aspects influencing the fish markets in the Adriatic Sea region, the most relevant were identified. First of all, fish marketing and trading systems in the Adriatic are very different. They are more developed in some countries and less developed in others, where they are currently being improved. There was general

agreement on the fact that without a fish market system and a related proper legislation framework, there is little chance of rationalising fisheries in the Adriatic basin.
As most fishery resources in the Adriatic Sea are shared by the fleets of coastal countries, it emerged that trade is also somewhat shared, as resources are the same both from the point of view of their distribution and exploitation, and that of trading. Import and export dynamics are particularly important for the region: this aspect should be increasingly investigated because it is very complex. The absence in some countries of fish markets from an institutional point of view is to be particularly stressed. Another issue that emerged from the meeting was the need to invest in quality as a positive effort. Lastly, it was concurred that the development of a common strategy not only for fishery management but also for fishery product marketing and trading would be highly desirable. Moreover, the necessity to foster the participation of the Adriatic socio-economic experts in an international context such as the Sub-Committee on Social and Economic Sciences of the GFCM-SAC was underlined.

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Opening of the Meeting and election of the Chairman (Agenda Item n. 1)

1. The Meeting on the Aspects of Fish Markets in the Adriatic Sea, co-organized by the FAO-AdriaMed Regional Project and the Faculty of Agriculture of the University of Ancona, was held in Ancona (Italy), from 27 to 28 June 2002.

2. The Meeting was attended by 14 participants from Albania, Croatia and Italy, the Secretariat was made by the FAO Staff. The list of participants is given in Annex A. Due to unexpected circumstances Slovenia experts could not participate in the Meeting. The Agenda shown in Annex B was adopted with no changes.

3. Roberto Petrocchi Professor of the University of Ancona opened the meeting and welcomed all participants to the Faculty of Agriculture of the University of Ancona. He wished to inform the participants that fishery economics and politics has been the subject of study at the local Faculty of Agriculture for some years, also adding that technical and scientific institutions of the agricultural and animal breeding sector often carry out research on fishery. From a conceptual, theoretical and technical point of view, the management of natural resources such as fisheries is comparable to that of forest ecosystems, like aquaculture is comparable to agriculture.

4. Participants were also welcomed by the Chancellor of the University of Ancona Prof. Marco Pacetti who commented that hosting such a meeting which is the best expression of a scientific cooperation that is already underway. The University of Ancona – notably the Faculties of Agriculture and Marine Biology – have long been working on fishery issues as also shown by the recent execution of a master course on the economics of fisheries, which has been of remarkable importance at a national level. The Chancellor believes that these initiatives allow the whole sector to have better and longer prospects of development.

5. Stjepan Jukic from the Institute of Fisheries and Oceanography of Split (Croatia) was nominated as Chairperson. He took the opportunity to comment that in his opinion the FAO-AdriaMed Project is effectively encouraging all stakeholders (research institutions, associations of fishermen, etc.) to strengthen the scientific cooperation. The current meeting related to socio-economic aspects of the fishery sector will surely give an important contribution to the fishery sector in the Adriatic Sea.

Objectives of the Meeting (Agenda Item n. 2)

6. Before highlighting and discussing the objectives of the meeting, a brief overview of the AdriaMed organizational structure and state of implementation was given to the Meeting

participants by the Project staff. AdriaMed is a FAO Regional (Albania, Croatia, Italy and Slovenia) Project which has been operational since 1999, aimed at promoting and fostering scientific cooperation to support responsible fishery in the Adriatic Sea. The central tenet of AdriaMed is the Code of Conduct for Responsible Fisheries adopted by the Twenty-eight Session of the FAO Conference in 1995, which states that cooperation is compulsory whenever there are shared stocks. AdriaMed involves at present more than 12 scientific institutions and more than 15 Working Group (WG) meetings have been organized on topics encompassing fishery resources appraisal, fishery socio-economics, fishery statistics and fishery stakeholders. One of the WG's main aims has been to summon national experts to share knowledge on a particular topic regarding fisheries and identify the activities to carry out. Thanks to this way of working, many research activities are now already being carried out in the Adriatic basin. The cooperation with and support provided to the Sub-Committee of Social and Economic Sciences (SCSE) of the Scientific Advisory Committee (SAC) of the General Fisheries Commission for the Mediterranean (GFCM) were also recalled.

7. Most of the activities and research programmes under implementation were briefly outlined. The range of AdriaMed activities includes all the main components of the fishery system such as those related to the resources study and appraisal, social and economic characteristics of Adriatic fisheries, stakeholders, national fishery legislation frameworks, and fishery management planning. Particularly, it was underlined the standardization effort and common methodology approach pursued by AdriaMed in the implementation of all the scientific activities carried out within the Project framework.

8. Also, the landing pattern in terms of resources category composition (i.e. small pelagics and demersal) was presented as example of how socio-economic changes and market forces contributed in the early 1990s to determine the characteristics (the recent pattern) of fishery exploitation in the Adriatic Sea region. This would substantiate that responsible fishery management process should necessarily take into account both biological (i.e. resources) and socio-economic factors (i.e. market dynamics and demand).

9. A first FAO-AdriaMed meeting on socio-economic aspects, which was held last year and whose main target was to start creating a network of international experts to work in this field, represents the background of these two days' meeting. Some important issues were identified on that occasion: the need to improve knowledge on fisheries; the need to set variables and precise indicators; the need to identify each single country's priorities on socio-economic aspects in the field of fisheries; and eventually the possibility to create a socio-economic network for fisheries. The follow-up of this first initiative was a second meeting, organised last year in Salerno. On that occasion four tasks were identified: 1. Preparation of a technical document on the Adriatic fleet; 2. Preparation of a technical document on "Source accessibility of socio-economic data in AdriaMed member countries"; 3. Definition of socio-economic data characteristics and sampling requirements; 4. Fish market aspects in the Adriatic Sea.

10. These initiatives were then discussed on the occasion of the 3rd Meeting of the AdriaMed Coordination Committee, held in Tirana, Albania, last November. The Coordination

Committee represents AdriaMed's institutional framework, i.e. it is the Coordination Committee, which must approve AdriaMed's programme. It is particularly important because it sees the participation of each single country, of the GFCM, as well as representatives of the EU.

11. Further, the current Meeting attempts to answer the questions raised during last year's first AdriaMed meeting of the Adriatic Fishery Association held in Split. The objectives to purse are to:

- Gain a better understanding of those scientific topics, which are linked to socio-economic aspects of Adriatic fisheries.
- Discuss a number of relevant aspects, such as the national and international framework of the sector's macroeconomic aspects, distribution system, import/export, prices, etc.
- Outline the development of research on economics related to the fish market sector also with the presentation of case studies on specific aspects of fish markets in the Adriatic Sea
- Try to identify some of the main features of the fishery markets in the Adriatic Sea
- Identify and discuss of relevant issues related to market aspects.

The development of research on economics related to the fish market sector (Agenda Item n. 3)

12. Giovanna Trevisan, Coordinator of the research sector of the Italian Society of Agricultural Economists (SIDEA), made a review of the involvement and increasing interest of Italian agricultural economists in the fishery sector (Trevisan, this report) also referring to the work promoted by Prof. Mario Prestamburgo, the SIDEA President.

12.1 In 1994-1995 just few projects were going on economics and politics of fishery and aquaculture. At present, many more projects are underway, involving experts who work at more than 40 Italian universities. These initiatives all started during a first congress held in Venice in 1998; on that occasion agricultural economists were able to show some first results of their work. This first conference was held under the title "The fish product: economic and statistical aspects" (Venice, 28-29 September 1998). Important issues emerged, and the conference saw the participation of a massive number of Italian researchers and people working in the field of fisheries; besides, as the fish sector is particularly important in Italy, the scientific community newly formed on this discipline was encouraged to carry out its research even further and asked for the contribution of professional associations.

12.2 Until 1983, the EU Common Fisheries Policy (CFP) was included in the Common Agricultural Policy (CAP), as the Treaty of Rome clearly stated under Article 38 that fish products are to be intended as agricultural products. Later on the rising awareness of problems affecting fisheries, the impoverishment of fish resources, as well as the need to restructure the whole fish sector led to a separate fisheries policy. Yet there

are still some common problems to be tackled. As the CAP requires the implementation of different policies between the North and the South of Europe, the same applies for the CFP, which requires separate policies for different European regions and on many different aspects. In this respect, the EC Green Paper on Fisheries does not take all these issues into adequate consideration.

12.3 As agricultural economists have to carry out analyses of the very complex issues affecting the field of fisheries, they need better knowledge and cooperation with experts of other disciplines. In all the projects currently underway, attempts have been made at trying to adopt a multi-disciplinary approach, allowing agricultural economists to be supported by colleagues who are experts of other disciplines – statistics, mathematics, and econometrics. But also the support of other researchers is needed: sociologists, economists of the tourist sector (within the more general framework of the law on "*pesca-turismo*"), researchers of territorial planning, biologists, environmental economists, nutrition experts, etc. This means that each project must see the cooperation of a large number of experts, each contributing for his or her discipline. This is necessary because only in this way can it be possible to support public decision-makers, identify the sector's main objectives and suggest future planning measures. In the future there will be to deal with a global fishery, i.e. a global fishery market requiring to act locally but think globally.

12.4 A second conference was then held in Venice (11-12 October 1999) under the title "The fish product: consumption, quality, commercialisation". The title clearly shows that the network had in that time grown and started to address the issues of consumption, quality and commercialisation too, and that it had become clear that cooperation and coordination between researchers are of fundamental importance. A third conference was devoted to sustainable development and economic efficiency in the fish sector. As the new concept of sustainable development was introduced into the researchers' work, a number of analyses on bio-economic models to support environmental studies have been carried out too. Since then attempts have been made to implement innovative information systems, as well as to define the common elements necessary to have a common analysis framework

13. As comment to the above, it was observed that fisheries can largely profit by the creation of a scientific network of agricultural economists dealing with the economics of fisheries, like the one that has been created by the scientific community gathered at this meeting. This is the first time that attempts are made to build a network of fisheries economists: in other European countries there are single institutes or universities, but no networks of researchers. For these reasons the added value of this network should be particularly highlighted, as it can be extremely helpful both for the committee and for the profession.

14. The focal point for the social and economic committee is that the network should be used as much as possible within the various international committees – and not only within AdriaMed, because there is the strong need of having these research energies coming into the sector. For example, economic tools are strongly needed for the cooperation between economists and biologists, as one important problem lies in the fact that the tools used by

economists and biologists are not always the same. It is plenty of examples in this respect. One of them is that economists prefer to work by fishing segments, whereas biologists prefer to work by stocks: as in the Mediterranean it is problematical to talk in terms of stocks and the identification of the proper management tool thus becomes very difficult, economists can give a remarkable contribution in this respect. At European level and within the GFCM this network is much more important than it was thought at the beginning, as nothing comparable to it can be found e.g. in Spain or in the North of Europe. That is why it is something that should be particularly stressed.

15. Some methodological considerations were presented on the main areas of interest for agricultural economists dealing with fisheries (Gallenti *et al.*, this report). Particularly it was addressed the issue of which methods and approaches of agricultural economists are most useful to analyse the economics of fisheries. The approach adopted is a microeconomic one. The reason for this is that agricultural economists have realized that within the framework of the Common Agricultural Policy macroeconomic choices do not often take into account the choices made by small operators. Quantitative economic models try to be in line with those offered by formalized sciences and underestimate the importance of microeconomic decisions. The aim is therefore to see the microeconomic analysis's critical aspects of single operators in the fishery sector, compared to those of a macroeconomic analysis.

15.1 Such economic analysis has to be carried out on the following aspects: demand; production and firm management; fish chain organization (i.e. organization of the agricultural-food chain; market organization). Studies concentrating on demand have mainly focused on the following aspects: changes in lifestyles, growing number of working women within the families, new family characteristics, seasonal or temporary fluctuations in the demand itself. All these long-term variations have consequently led to a quantitative and qualitative modification of consumption. Examples of this modification are the growing tendency to consume fish outside home (e.g. in restaurants) or to consume processed fish, as in the case of ready-prepared food. Also a diversification of fish demand has emerged: there is now a larger demand of high quality products, as well as more attention to environmental or sanitary problems, as shown by the BSE crisis.

15.2 In analysing production, four focal points should be highlighted: production function and fishing effort; district or local system organization (rural districts); multi-product and multi-service productions (e.g. services and the environment); risk management. As for production analysis the aim was to study associations within the economics of fisheries, in which the fishing effort is evaluated on the basis of two interchangeable parameters. The study in Gallenti *et al*. (this report) pointed out how the fishing effort depends on various parameters. By concentrating just on one of these parameters it is possible to see that the fishing firm modifies its behaviour on the basis of just this parameter; in this respect it is therefore important to check how the different inputs, i.e. the different parameters, can be replaced one with the other. As example two elements were analysed, boat days and horsepower, and the various combinations

between the two outlining iso-product curves. The ideal situation is reached with those combinations of parameters allowing to obtain the same production-cost ratio.

15.3 As for district or local systems' organization, the following elements have to be particularly stressed: district analysis tools (e.g. agricultural-industrial district, rural district, learning by doing, learning by interacting); conservation of production processes; conservation of local communities; differentiation and valorisation of production (e.g. PDO, PGI, eco-labelling, organic products). Another important aspect to consider is that of the production possibility curve, which refers to the possibility to replace one production resource with another. If the fisherman is unable to do it by himself for technical or organizational reasons, the only opportunity left to him is to increase the fishing effort.

15.4 Moreover, it was observed that the issue of risk management applies much more to fisheries than to agriculture. Hence the need to have multi-risk protection instruments like insurance tools, in order to guarantee profits from any kind of risk (e.g. on the basis of a portfolio analysis). Lastly, the fish chain analysis stresses the need to have a vertical integration, in order to have more bargaining power on the market. There are different forms of markets and a system of perfect competition seems to prevail in this sector, with many fishing firms present on the market that are all price-takers, as they are forced to accept the price imposed by the market. An important task lies in the identification of the market. In this respect a number of elements need to be analysed: market organisation (i.e. market power); the law of one price and co-integration (i.e. type of product delimitation), space delimitation; market segmentation and arbitrage, and the subsequent margin for the fishing firm (fishermen organisation); differentiation policies.

16. With reference to boat-days and engine power as two effort parameters as two important parameters influencing the iso-product curve (see Gallenti *et al.,* this report), it was observed that this reflects the reality of the fishery sector just for one fishing method, i.e. that of trawlers, yet it cannot be applied to fisheries in small quantities, for which other more selective parameters should be considered. This is the case of fishery with encircling nets or with hydraulic dredges.

17. The given study is a classical example of the difference between the economics of fisheries and the use of the various economic models. Many economic models are available. The difference between theoretical models and the practical use of these models for management aims lies in the fact that from the point of view of management there are different automatic mechanisms which are difficult to control with theoretical models (e.g. the possibility to replace one factor of production with another is in reality strongly limited). In choosing the model's variables it is therefore necessary to eliminate all automatic mechanisms or to apply operational variables, e.g. by introducing figures referring to stocks in the production model. In this specific case the study aimed at considering all those variables of the production function that can be controlled by the fisherman. All exogenous variables cannot of course be introduced in the production variable.

18. Through the discussion the importance of reliable fishery statistics and the constraints often imposed by their unavailability was pointed out with reference to all Adriatic coastal countries. Particularly Eastern Adriatic countries used to have rather reliable fishery statistics until the 1980s while their quality has been deteriorating during the 1990s. The collection of reliable statistics in Italy is a key problem for fisheries, both from an economic and a biological point of view – with a range con confidence between 80 and 300-400%. Some efforts have been done in Italy since the 1970s. One pilot initiative was the PESTAT project. Later on another system for the collection of statistical data was developed and introduced by IREPA. This has been used in Italy for the past 20 years and it yet shows some slight margins of error.

Overview of the general issues concerning fish markets in the Adriatic Sea (Agenda Item n. 4)

19. The Chairman introduced this Agenda item making reference to the working papers reviewing the macroeconomic information on Albanian, Croatian and Italian fish market and trade (Flloko; Fredotovic and Misura; Finco *et al.,* this report).

20. **Albania** (Flokko, this report)

20.1 The potential sustainable catch from inland, lagoon and sea waters has been assessed to range from 14000 to 17000 t of fish and shellfish annually (corresponding to approximately 8000 – 9000 t of marine fish; 3000 t of fish harvested from lagoons, inland waters and aquaculture; and 3000 t of bivalve molluscs). The Albanian fisheries economy can be roughly evaluated on the basis of the estimated current landings of 2000 t of mixed marine species and 1000 t of mixed freshwater species. With average first-hand sale prices of about US $ 2.80 (lek 400) / kg for marine fish and US $ 1.90 (lek 270) / kg for freshwater species, the total first-hand sale value is US $ 7.5 m. Two-thirds of marine landings, including the most valuable size, qualities and species, are primarily exported to Italy, thus contributing for an additional 50% of first-hand value to GVP (about 1340 t at US $ 3.50, equal to US $ 2.35 m). The remainder of the marine catch, together with most of the freshwater landings, is distributed and consumed in Albania, contributing for a further 30% to GVP (US $ 0.70 m). The total direct economic value of Albanian fish landings thus amounts to approximately US $ 10.55 m.

20.2 Albania also imports a sizeable amount of fresh and frozen fish for domestic consumption. Import figures for the year 2001 suggest 2,048 t of fresh, frozen and processed fish was brought into the country (presumably for domestic consumption), for a total value of about US $ 1.68 m (at an average price of US $ 0.82 / kg). In 2001 average per capita fish consumption was 1.5 – 1.7 kg.

20.3 Concerning the national policy and the legislative framework, the privatisation of small and medium sized enterprises can now be considered completed in Albania and, though with some delay, privatisation of larger companies is also progressing.

Important progress has been made in securing government revenues through the reform of the customs and tax services. In this respect, Albania's trade regime has been modernised and liberalised, and the country became a WTO member in September 2000. Consequent to this, customs duties for all fish species and other fish products became zero on 1st January 2002 (down from the previous 2%, 10% and 15% levels), thus bringing about considerable advantages to all fishing firms both in terms of quality and in terms of the range of fish products offered on the market.

20.4 In the last few years lots of infrastructures have been created in Albania, with the aim to offer better quality and better access to the Italian and especially the Greek market, which is considered to be particularly important. A prime objective of fish marketing development should be to ensure that fish are quoted at the highest price possible. This will be achieved by ensuring that quality is as high as possible and by providing the best access to the market. The best markets for Albanian fish require fresh whole fish; as a consequence the best handling requirements are that the catch is sorted, adequately and properly iced and boxed at sea, and then stored at temperatures just above the freezing point.

20.5 Another priority of fishery policy should be to optimise fish marketing, especially because wholesale markets are not present in Albania. Moreover, there is no specific legislation regulating fish marketing and trading in Albania. A gap this which should be filled as soon as possible. As for exports, the optimisation of fish marketing could be done through the development of a world-class single national auction facility. While Albanians have not been major traditional consumers of fish products, experience elsewhere in the world has shown that this is usually because of lack of exposure, rather than because of unchangeable market preferences. More market promotion should be undertaken to encourage fish consumption, particularly of small freshwater and fresh marine pelagic species, so as to eliminate the need for canning or other preservation or processing activity. Such a domestic marketing campaign should be included in the next initiatives to be undertaken.

20.6 Immediate goals in the fisheries sector in Albania are to harmonize the national fisheries legislation, to monitor and control the level of the fishing effort in both marine and fresh waters in a sustainable way, to monitor and control the quality of fish products, to provide some physical infrastructures (e.g. ports, fish markets, etc.), to undertake the necessary marine and freshwater stock assessment work required to manage the fisheries concerned, to create an information and statistical fishery system, to set up organizations of producers, etc. All this possibly supported by the necessary education and training noting that, for instance, no Albanian faculties of agriculture offer courses dealing with the issues of aquaculture, thus testifying to the fact that much progress still has to be done especially in the field of university or postgraduate education.

20.7 As for fishery production, the first thing is that there is a general lack of research in Albania, furthermore fishery management plans are hampered by financial constraints. Currently, an important factor affecting the Albanian fishery production is

the high fuel price, amounting to about 0.5 US $ per litre. This has repercussions on costs for fisheries and small-scale fisheries. As a consequence, the Albanian fleet is often inactive.

20.8 The Albania marine capture fishery is characterised by two main facts which gradually took place since 1990: the almost doubling of the bottom trawl fishing fleet (from 72 vessels in 1990 to 131 in 2002) and the drastic reduction of the purse seiner fleet (from 38 to 8 in 2002) targeting on small pelagics. This latter was due to the fact that Albania lost its sardine canning industry – it had five factories in 1990, they all shut down. Albanians still consume sardines, but they import them especially from Greece. Also the anchovy sector should be improved: in 1990 there were five companies processing anchovies along the southern coast of the country, today there are only three left.

20.9 Overall fish production from marine, lagoon and freshwater fisheries (including aquaculture) would indicate that production trend is more or less the same between 1992 and 2001, yet these data are on average 25% less than the levels registered in the 1980s because of organizational problems, financial difficulties affecting the sector after the beginning privatisations, and changes in the governmental structure.

20.10 Commercial freshwater aquaculture in Albania started at the end of the sixties. Warm water freshwater species (originally the common carp and later on the Chinese carp, introduced by a group of Chinese at the beginning of the 1970s) represent the major aquaculture production in Albania. Cold water salmon ides, mainly *Oncorhynchus mykiss* and *Salmo letnica* are other important species of the Albanian aquaculture production. Owing to the economic and political transition period the country went through, production declined sharply, yet the last two years show a positive trend.

20.11 Bivalves farming (especially *Mytilus galloprovincialis*) are very recent in Albania and register an average yearly production of about 2000 tons, with a peak of 5000 tons registered in 1990. In 1994 Albanian exports of molluscs had to be stopped following a EU decision, because of a case of cholera detected in the country. With EU funds it was then possible for the sector to start off again. Shrimp culture is still a new activity. Currently, there is only one shrimp culture farming in Albania. As for marine aquaculture, there are three small cage culture fish farms in the Saranda region for sea bream and sea bass. Marine aquaculture sector in Albania is believed to be as plenty of possibilities for development.

20.12 The fish processing industry in Albania is mainly concentrated in areas around the main harbours, namely Shengjin, Durres, Vlore and Sarande (from the north to the south of the country). There are thirty-four companies active in the sector, which receive, process and export fresh fish products, mainly to Italy and Greece. There are also three companies producing salted anchovies (canned or bottled) for export. Raw material is imported, mainly from Italy, Spain, Morocco and Argentina, and it arrives either in the form of frozen blocks or already salted in barrels. The domestic market

also consumes some imported fish and fish products. These imports were initially destined to domestic consumption and later on, as already mentioned, to processing.

20.13 Data concerning the fish catch distribution system are of questionable reliability, and following the assistance from AdriaMed the situation is going to improve in this respect and the country will hopefully get more reliable statistical data on this aspect in 2002. Before the economy's liberalization exports were minimal. At the beginning of the 1990s, after political and economic changes began in the country, exports of fish and other aquatic organisms started to grow, particularly in the private sector. Exports made up about 50% of the total production between 1992 and 1998, and they were all made by the private sector (50% in 1995). Exports were mainly targeted to the Italian and Greek markets. The last few years have been characterized by a declining trend, with exports representing on average 10 – 15% of total production. There are no limits on the fish products exports from Albania and Albanian traders carry out fish exports mainly on a daily basis, yet exports of fishery products to other countries has become less important for the Albanian fishery sector. The figures referring to Albanian fish exports have declined in the last few years because Albanian consumers have started to ask for more fish for domestic consumption.

20.14 The Albanian domestic market thus consumes the major part of the marine fish, all the freshwater fish and the imported fish. As Albanian consumers are poor, fish species sold on the domestic market tend to be of lower quality and therefore to have a low price. No fish imports were registered until the beginning of the 1990s. With the liberalization of the economy in the early 1990s the right conditions for the import of fish were created. Only starting from 1994 – 1995 have fish imports gradually developed and they are now becoming increasingly important. Such imports are for domestic consumption, but imported fish are also used as raw materials in the processing industry. Fish is mainly imported from Italy, Greece and Spain. The most popular species imported are fresh sardines and mullets from Greece, salted anchovies from Italy and Spain, and recently frozen hake from Greece. For example Albania imports sea bass and sea bream from Greece and exports its sea bass and sea bream to Greece; the same applies to molluscs.

20.15 Fish distribution channels in Albania do not generally have intermediaries between producers (fishermen or fish farmers) and consumers. The distribution channel for fresh fish shows the following stages: fishermen – processors (and wholesalers) – retailers, hotels and restaurants – consumers. This is the normal fish catch distribution system in Albanian marine fishery, yet sometimes other distribution methods outside the traditional channel can also be used. Some producers are able to sell their production locally directly to retailers or restaurants, but in many cases it is more profitable not to sell directly to retailers. At present there are fish processing plants establishments, which are authorized to carry out exports to the EU and carry out marketing activities for fish and fish products. They are all private companies, which receive, process and sell fish products to retailers and restaurants. Sometimes the owners of these companies are also vessels' owners. At present there are no wholesale markets in Albania.

20.16 As far as fish prices are concerned, these are never stable. Their trend is linked with that of the Italian or Greek markets, which are Albania's major export and import markets. Information available on the marketing system is limited, inadequate and not complete and that no real effective studies have yet been carried out on the market. Nevertheless, it is possible to draw some general conclusions. The present situation of the Albanian fish market development shows evident changes that characterise the market structure and organisation, although these changes are limited. The following remarks can be made on recent years' developments.

- The production system has changed in the last few years;
- The increase in domestic fish consumption is the result of an increase in the market capacity, as well as of a growth in production;
- Production exports towards countries such as Italy and Greece represents a good income in foreign currencies, which is mainly connected with high-value groundfish species;
- Imports of fish products have affected domestic consumption; this mainly refers to low-value species (small pelagics, grey mullets, etc.)
- A considerable production of inland freshwater species with low economic value is registered. These species are destined to the domestic market and make up a low-cost proteins source;
- The structure of the distribution network is very simple: producers – processors – retailers – consumers. This structure is quite weak, and in the present situation it is very difficult to improve and qualify the system in the most proper way.

20.17 On the basis of the above it is possible to make some considerations which could serve to cope with the problems affecting the present developments of the Albanian fish market. The legal framework should be improved in order to provide sector operators and public institutions with more effective tools to operate the export and import of fish products. The quality of production, both in terms of hygiene and advertising should be ameliorated. This should be achieved throughout the whole commercial chain, up to the sellers, so as to make Albanian production more compatible for the export of high-value products to markets like Italy and Greece. A better knowledge of the national distribution system should be achieved, in order to optimise national production as well as identify potential areas for market expansion. Moreover, possibilities should be investigated for market expansion in neighbouring countries such a Montenegro, Kosovo, FYROM, etc. Some progress are expected also thanks to a 6 m USD project of the World Bank for Albania, through which infrastructures are being built in the four Albanian ports, and which is providing strong support to the national fishery organisations.

21. **Croatia** (Fredotović and Mišura, this report)

21.1 Fishing has always been an important economic activity in the coastal area. However, the position of fishery in the national economy as a whole has not been as important as one might expect. In addition, due to the transition from the socialist to the market-oriented economy and consequent reform processes (privatisation, restructuring) as

well as attempts to join the international market (especially EU), fishery sector has experienced profound changes.

21.2 The average annual contribution of the marine and freshwater fishery sector to the national economy amounted to US$ 180 million over the last decade. The Croatian fishery sector suffered a serious downfall during the years of war until the beginning of the second half of the 1990s. By the end of the 1990s it started to recover.

21.3 Nowadays the great majority of the fishery enterprises are of private ownership; something very different compared to the early 1990s. The bulk of active registered fishery enterprises is made up by small firms with up to nine employees. Official statistics would indicate that employment in Croatian fishery sector is low although its contribution to the national total employment was stable over the last few years. The fishery sector would appear rather unattractive due to the average salaries which are little more than 70% of the national average.

21.4 Data on investments in the fishery sector indicate that it is self-dependent relying only on own assets or through financial credits. Investment analysis shows that the fishery sector has attracted investments from the trade and food processing industry and, viceversa, fishing companies has shown signs of expansion towards the trade industry.

21.5 Currently, the Croatian Parliament is about to enact the Strategy for the Development of Marine Fisheries in Croatia. The new strategy, once endorsed, will consider all the fishery sectors, including the establishment of the fish trade and distribution system, probably in the form of organized fish markets and auctions.

21.6 The history of Croatian marine capture fisheries during the 1990s is characterised by the remarkable growth of the fishing effort targeting on demersal stocks, and by the drastic decline of the small pelagic fishery.

21.7 Only seven fish processing plants are still operating out of the fifty-seven which had been functioning during the last decades since the Second World War. Although traditionally the processing industry has been based on canning of small pelagics (particularly sardines), the production is now being diversified to meet the market demand which is increasingly preferring fresh (mostly low price fish) rather than canned fish.

21.8 It is noteworthy that fishery is the only sector of the national food industry which succeeded to maintain a positive balance of trade. At the same time, import too has been increasing consisting of low-value fish unlike export which is based on high-value fish species. Main exporters to Croatia are Italy, Spain and Argentina. Export from Croatia is made up of fresh high-value demersal fish mainly to Italy and Slovenia, and of canned small pelagics to CEFTA countries. Export of products from tuna caging is also very relevant. Although some quotas and import duties are still applied, the joining with WTO will imply the phasing out of such measures.

21.9 Fish prices mostly reflect the trend in supply of the various species or categories. However, price data collection is difficult as not all the catch is sold at the purchasing stations and, presently, there are no organized fish markets in Croatia. Most of marine fishery catch are sold ex-vessel to wholesalers either at purchasing stations or directly through wholesaler facilities. Purchasing stations, however, do not have such requisites to be considered as wholesale market place. Domestic supply of fish products, from both the Adriatic Sea and outside it, is much affected by the overall fish trading system. Consequently, the supply of processed products is in better condition compared to fresh fish supply, this latter being poorly organized and unable to cope with the traditional consumer preference for meat.

21.10 In order to overcome the current weakly regulated and unorganized fish market and trading, the Croatian strategy for the marine fishery development is focusing and making efforts toward the establishment of a series of organized fish markets with auctions. This is expected to facilitate regulating supply and demand, reducing the dependence of fishers from traders and middlemen, ensuring fish quality standards, and also improving the monitoring of the landed catch and prices. A further priority would be also to have available legislation tools to specifically regulate the whole fish chain sector.

22. **Italy** (Finco *et al*., this report)

22.1 Macroeconomic aspects of the Italian fishery market and the relations between this market and East Adriatic markets are dealt with in the support paper given in Finco *et al*., of this report. The issue of price fluctuation is also taken into due account together with quality valorisation as this can contribute to safeguard market prices.

22.2 Price fluctuations represent a very serious problem, which affects market balance. In a system of perfect competition, the market is namely defined by the meeting of supply and demand, whose equilibrium determines market prices. Similarly to agriculture, the fishery sector is characterized by a huge dispersion of supply and the presence of many offerers, who cannot influence the final price – the so-called price-takers. A crucial aspect is believed to be how to let operators of the fishery sector become price-makers, rather than price-takers. One way could be to establish an oligopolistic market, i.e. a market where operators aggregate and cooperate, in order to be able to influence market prices. In an oligopoly the market is structured as a system of sellers who offer fish products, which are slightly differentiated (e.g. marine or aquaculture products) but replaceable.

22.3 As for production/supply, the Italian marine fishery sector in 1999 shows a production of about 416000 t. In the same period aquaculture registers a production of 217000 t. The Italian total fish production thus amounts to 603000 t. About 50% of the total fish available is imported. Total consumption in 1999 is 1300000 tons and per capita consumption is 22,3 kg, thereby registering a remarkable increase in the last 20 years. Production of marine fish has also increased in the last 20 years. Aquaculture production is lower than marine fish production, yet it has experienced a substantial

growth in the latest years, whereas marine fishery has decreased from 1990 and 1998 due to a number of different factors ranging from natural stocks fluctuations and heavy exploitation to the effects of the war in the Balkans. The 1992 – 1999 variation in Italian fish production was a variation both in terms of quantity and of value. Among the main species offered in Italy in 1999 we find anchovies (14%), sardines (10%), clams (8%), molluscs (14%), crustaceans (8%); the percentage of other fish is 46%.

22.4 Most of the Italian fishing is carried out in the Adriatic. The Adriatic Sea fishery production in 1999 made up for 56.4 % of the total Italian production and for the 44% of its value. Considering the Adriatic percentage value per species, shellfish represent the most important quota of the total national quantity (72%) and they play a major role also in terms of value (65%).

22.5 The import of fish products in Italy from EU countries and also from other countries increased until the year 2000. Similarly also exports, especially towards European countries, increased. As for imports, Italy's main trading partners are Spain (tuna fish), Denmark (demersal fish) and Greece (aquaculture fish products, with a rising import trend). When considering imports per species, the following data were shown: tuna fish 24,3%; demersal fish (29%). Figures referring to exports are slightly lower and refer to the same fish species.

22.6 As for trade with the Adriatic partners, the role played by Croatia is fundamental, even though variations were registered in terms of both quantity and value. In particular, a 23% reduction in imports from Croatia was registered, whereas the corresponding value increased. This is the only negative variation registered in trade with Adriatic partners: both imports and exports with all other Adriatic countries have grown in the last few years in terms of both quantity and value. As for trade with Croatia in particular, exports are much lower than imports. In 2000 Croatia made up for more 80% of imports in terms of quantity, as against other Adriatic countries. Conversely, Slovenia is Italy's main partner for exports and it covers 50% of exports in terms of value.

22.7 The analysis of production prices (particularly of hake, sole, squids and anchovy), which are imported and exported by Italy, from the main Adriatic wholesale markets allowed highlighting the price difference of imported species, which is then inevitably transferred to the production market. The presence of an oligopolistic market has proved the strategically ideal solution in price formation. The total positive and negative variations registered have shown that there is no homogeneous and coherent price system that could be applied to all countries of the Adriatic. Each Adriatic fish market is autonomous and is strongly influenced by the presence of oligopolistic structures.

22.8 It is believed that it would be necessary to develop a common strategy for the Adriatic by valorising those species that can be best marketed, also trying to introduce these products in northern Europe and in the Single Market when eastern Adriatic countries

join the European Union. There is also the need to differentiate the product, throughout the whole fish supply chain and to develop a common strategy with a proactive approach to the market, so that all countries can access the market using a label that can identify and valorize the products of the Adriatic Sea.

23. The issue of fishery statistics collection and of their reliability was raised and some participants commented that it is believed that in some Adriatic countries data collection could be extremely poor with up to 50% underestimate of production figures.

24. Admittedly the issue of statistics in the fishery sector has always been a critical one worldwide. In the Italian experience the first approach adopted was biological (i.e. PESTAT programme); it was an attempt to give an estimate of the number of catches by means of a rotating system and soon produced very high figures. After this experience another attempt was made in 1982 with IREPA's system of economic monitoring, which started with a first sample of about 300 vessels subsequently increased to the current 850. This system allowed identifying those who have the right information (e.g. the fish firm's bookkeeper rather than ship owners), i.e. the reliable people to address in order to obtain precise and credible information.

25. In Italy there were double standard statistics for the fisheries sector: the official statistics provided by ISTAT, which are generally 30 – 40% inferior than the real values and are not used for planning, and IREPA's statistics, which are disaggregated information and yet are used for planning. An agreement was eventually reached between IREPA, ISTAT and MIPAF, i.e. the Italian Ministry of Agriculture and Forestry Policies. This agreement allowed the outsourcing of statistical services to IREPA. The new system, which has soon become the official one, is aggregated and allows to collect information on important aspects such as fishing hours, fishing typologies, economic data, fishing effort, etc. It is constantly being extended. Data are daily gathered by approximately 60 operators who make use of the new information technologies and are organized on a weekly basis. The users of the same data, i.e. fishing communities, port authorities, professional associations, etc., have often testified to their reliability. This system is very much likely to be the most refined and reliable for data collection, also considering the large investments entailed by such monitoring scheme.

Presentation of case studies on specific aspects of fish markets in the Adriatic Sea (Agenda Item n. 5)

26. The case describing the market strategic choice taken by the Ancona's Fishery (Finco and Maurizi, this report) was presented to the Meeting, which is based upon the quality certification of the fish product, with quality being a major economic support and incentive to reach sustainability within the sector.

26.1 Fish can be seen in two ways: as a natural resource and in this case issues such as conservation and uncertainty of its availability should be considered, or as a product therefore dealing with issues like food safety, traceability, consumers' satisfaction,

etc. For example, the European Union sees in quality one possible instrument to achieve sustainable development. This concept is stated in two European regulations: no. 104 of 2000 and no. 2065 of 2001. These regulations stress the importance of fish markets in terms of increasing fisheries' sustainability, encouraging production planning, promoting producers' involvement in market management, looking for new ways to increase quality, and introducing labelling for fish products. This last item in particular contributes to increase information available to consumers and start traceability.

26.2 The experience of the "Consorzio Pesca" of Ancona is based on the establishment of a collective label for fish products through the setting of technical rules concerning fishing operations at sea, fish landing and transport. The system guarantees the product quality and consumer needs are taken into account. The final product is certified by a competent certifying body. Results show that "Consorzio Pesca" has greatly profited by the introduction of the quality label, and distribution itself largely requested it. The introduction of the quality label showed that quality is a strategic choice to make, as quality satisfies three main points: it provides for consumers' and producers' satisfaction, and it allows a sustainable use of fisheries resources. It was commented that this case is the perfect exemplification of Akerlof's economic theories.

27. The case study of the Termoli fishery in Italy was given as example of how production costs and market aspects can affect relatively small local fishery (Forleo and Di Nocera, this report). Termoli was thought to be just a little reality, which was not affected by price problems. It resulted that this is not the case. From the point of view of production and costs Termoli has turned out to be part of a global market and to be largely affected by the increase of costs, especially of fuel costs. Yet Termoli is a local market as far as demand is concerned. This means that Termoli is in a situation of real competition both for the purchase of production factors and for the sale of products. When the study was first started, Termoli was thought to have no problems linked to the market. It soon emerged that local operators do have a market, yet they need to find a better market than the existing one, because they are currently price-takers and they need to become price-makers. Consequently, it is believed that Termoli's Marineria is ready to participate in a project of valorization of the local fishery reality, for example through quality labelling for fish products. This is because small "marinerie" today act on a global market on the front of costs.

28. The ensuing discussion on the various aspects of fish markets as evidenced throughout the meeting gave the opportunity for a brief historical overview of the Italian experience which is most likely the oldest and better established of the whole Adriatic Sea region (see also Cingolani, this report). It is clear that fish market is of fundamental importance, because the creation of a fish market in Italy and in other countries has much contributed to the development of fisheries. Fish markets have slightly lost their function lately; there were 85 fish markets in Italy in the past, today this country has 60 officially registered markets, out of which only 50 are actively working. In 1926-1927 the motorization of the fishery sector took place and motor vessels replaced sailing ones. This immediately led

to a rapid increase in production and the realization that existing structures, conceived to host fishing vessels of the previous generation, were no longer adequate. Fishermen turned out with larger quantities of products and could not sell them to traders.

29. In 1926 a first initiative led to the drafting of a law, which allowed the regulation of sales. The first law establishing fish markets in Italy dates back to 1926, a second law was passed in 1929, and the official one to 1938. A very important aspect was also that the 1929 law gave fishermen payment guarantees: in order to have access to the market all traders had to leave a deposit, the amount of which was based on the trader's purchase intentions. In this way, payment to fisherman was guaranteed. A 1959 law provided for the liberalization of wholesale markets, including fish wholesale markets. The 1926 and 1929 laws also provided for the setting up of the so-called Market Bank: it gave loans to fishermen and held the money back from the sales of the following days. These two elements largely favored fishermen and put them on an equal footing with traders. From a fiscal point of view, fishermen paid on the basis of their vessels' horsepower and tonnage. It was cooperatives, which had to bargain with treasury officers over the amount of taxes to pay. But as they had to pay taxes, fishermen brought their products to the market anyway.

30. After 1959 fishermen started profiting by the fish market's structures for the general services it offered even though they did not bring there all the products they could. This greatly contributed to the development of fisheries, both in terms of services offered and in terms of policies formulation for fisheries planning. Today less products are sold on the fish market because taxes are paid on the basis of revenues and expenditure: the only disadvantage of the fish market today lies in its non-convenience from a fiscal point of view.

31. It was commented that fisheries can go on in a rational way only if it is organised around fish markets. Markets are important also because they are health presidiums, i.e. places of sanitary control and guarantee over the products sold. Therefore fish markets ought to be rationalized and not dismantled. This is important also within the framework of the EU directive no. 493 of 1991, which gives new tasks to the functioning fish markets.

Identification and discussion of other relevant themes related to the aspects of fish markets and identification of main priority topics (Agenda Item n. 6)

32. Among the various and diverse aspects influencing the fish markets in the Adriatic Sea region, the most relevant were identified. First of all, fish marketing and trading systems in the Adriatic are very different. They are more developed in some countries and less developed in others, where they are currently being improved. There is general agreement on the fact that without a fish market system, and related proper legislation framework, there are little chances to rationalise fisheries in the Adriatic basin.

33. The Adriatic is a semi-enclosed area with relatively shallow waters particularly in the northern and central parts; this implies that most fishery resources are shared by the

fleets of coastal countries. It emerges that also trade is somewhat shared, as resources are the same both from the point of view of fishery resources distribution and exploitation, and from the point of view of trading.

34. Import and export dynamics are particularly important for the Adriatic Sea also because of the aforementioned characteristics. These dynamics should be increasingly investigated because they are very complex. The absence in some countries of fish markets from an institutional point of view is to be particularly stressed. This is shown by the fact that continuous import/export links have always characterized the whole Adriatic basin, even if these links have not been identified or regulated by the presence of real fish markets.

35. Another issue emerging from the meeting is the need to invest in quality as a positive effort. Investments in quality need of course resources, but seemingly they pay back. Lastly, it was concurred that the development of a common strategy not only for fishery management but also for fishery products marketing and trading would highly desirable. This should also include fish product valorization and limiting as much as possible fishery resources waste.

36. It should be also highlighted that the same FAO's Code of Conduct for Responsible Fisheries deals with the issue of use and trade of fish under Article 11. Hence the need for all countries to do their best to protect fish catches and minimize discards. The problem of discards is critical for some countries, with discard rates being above 50%. For some fish species, i.e. hake, the problem of discards is not simple to manage (although possible), but for others, i.e. sardines, it could be successfully addressed thanks to cooperation and a common strategy.

37. The relevance of such meetings, as the present one, making the opportunity for the effective exchange and updating of information on specific aspects of the fishing sector was stressed by the participants. Moreover, the necessity to foster the participation of the Adriatic socio-economic experts in international context such as the Sub-Committee on Social and Economic Sciences of the GFCM-SAC was underlined.

Other matters (Agenda Item n. 7)

38. The paper on "Source and Accessibility of Socio-Economic data in AdriaMed member countries" prepared within the framework of the AdriaMed Working Group on Fishery Socio-economics was presented and distributed to the Meeting participants. The paper reports the results of a survey carried out in Albania, Croatia, Slovenia and Italy to list and review the available sources of socio-economic data related to the Adriatic fishery sector. The full paper is available at http://www.faoadriamed.org/pdf/OP-07.zip

Annex A

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Annex B

Agenda

1. Opening of the Meeting and election of the Chairman
2. Objectives of the Meeting
3. The development of the Adriatic fishery market
4. The main indicators of the general fishery market aspects in the Adriatic Sea.
5. Presentation of case study case on specific market aspects in the Adriatic Sea
6. Identification and discussion of other relevant issues related to market aspects and identification of main priority topics.
7. Other matters

The agricultural economist and research in the fisheries sector

Giovanna Trevisan*

Abstract

An historical review of economic research in the Italian fisheries sector is reported, starting from an analysis of the study of markets and production industries as well as sustainable development and economic efficiency in the fishery sector. The role of agricultural economists in research on fisheries and aquaculture is underlined and the importance of the periodic comparison of experiences between the academic world and workers in the fishery sector, particularly at international level, is emphasized.

1. Introduction and background

As professor in economics and agricultural policies at the Faculty of Economics of the University "Ca' Foscari" of Venice, for several years I have been involved in studies on the economics of fisheries and aquaculture and I have coordinated some research projects financed by the Ministry of Agriculture and Forestry Policies, Directorate General for Fisheries and Aquaculture.

It has certainly been the case in the past that the economics of the fisheries sector have not been widely studied by agricultural economists; there is no shortage of colleagues who have shown an interest in aquaculture and fisheries, but research on the economic aspects of the sector and market analyses have proved to be somewhat limited.

This is in part due to non-uniformity in the sources of fishery statistics in addition to the scarcity of elementary data and specific studies of the sector. IREPA, ICRAM, ISMEA, FAO, producers' associations and a few other research institutes at national level provide the only sources to which we can refer.

In occasion of a conference held in Rome in December 1998 ("Le ricerche sulla pesca e sull'acquacoltura nell'ambito della L. 41/82"), stock was taken of the situation regarding research on fisheries and aquaculture; it was highlighted that in fact for a long period of time research in the fisheries sector has been scarce, casual and rarely coordinated. The idea that agricultural economists could be able to study economic processes related to the fisheries sector came to Professor Mario Prestamburgo, currently the President of the Italian Society of Agricultural Economics, one time State undersecretary to the Ministry of Agriculture. I began this work and later involved many colleagues from several other Italian Universities. Thus from the nine research projects on the economics and sociology of fisheries admitted to the financing scheme of the third three-year programme, currently 20 projects have been put forward, involving 40 operative units with the contribution of an ever-increasing number of economists.

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Discussion of the implications of the fishery sector, and in particular aquaculture, for the economy of Italy has begun in recent years, therefore studies of the sector are clearly relevant. Through the Projects sponsored, an attempt has been made to create a theoretical and analytical picture, typical to economic studies, in order to understand the workings of the fisheries-aquaculture system and the structure and organisation of the markets it embraces. Theoretical and methodological studies by teachers and researchers from the academic world have been supported by the contribution of sector workers thus comparing and consolidating results.
This study path has been possible through the involvement of fishery associations invited to participate in the work of conferences periodically organised to present research results.

2. Economics and Policies of fisheries and aquaculture

Research on the "economics" of fisheries and aquaculture, in its many aspects, uses analytical tools and methods that have much in common with agricultural economics, agricultural policies and the economics of the agriculture/food industry systems and territorial economics. It is without doubt that fisheries and aquaculture are part of the agricultural–food industry economics, just as the importance of the fishery sector is beginning to emerge in the rural development of many areas, both those which depend on fisheries and those which do not. Until 1983, The European Commission (EC) agricultural policies included fisheries, given that the Treaty of Rome states *"that the products of fisheries and of the first stages of transformation (directly connected with the products of fisheries) should be considered agricultural products*". Subsequently, the awareness of several emerging problems that distinguish the fisheries sector, such as the impoverishment of fishery stocks and the consequent necessity to revise and reorganise the sector in general terms, above all through the promotion of fish farming activities, as is well known, brought us to separate EC policies which are currently under further revision. In spite of this, some common problems emerge. As in EC agricultural politics, it is becoming increasingly urgent to adopt different measures and policies between the countries of the North of the European Union and those of the Mediterranean area, therefore in the common fishery policy, it is necessary that the characteristics of the Mediterranean area emerge strongly in order to distinguish them in terms of COM, structure policies, conservation and management of resources, relations with countries other than those of the North Europe area. The differences and environmental complexity of fisheries in the seas of Europe are significant; even concepts such as coastal fisheries within three miles or small scale fisheries take on substantially different meanings from the Adriatic to the Atlantic or the seas of the North, and it would seem that the Green Book on fisheries does not take these aspects sufficiently into consideration, even in the presence of adequate scientific data.
In the recent orientation law of 2001 and specifically with the legislative decree 226 of 2001, Italian legislation put the fisheries entrepreneur on equal terms with the agricultural businessman.

Fisheries, like agriculture, is productive activity, however it may be much more than this if we consider that the fishers are "delegated" to take collective resources, and need continuing regulation in the fisheries sector in order to manage these resources properly.

From 1850 to 1950, until the Gordon model on bio-economic equilibrium was proposed, the most significant contributions to the solution of fisheries problems came from the world of forestry and from modelling and theoretical processing, from the joint work of biologists and schools of economics and from quantitative modelling (Cataudella, Venice, 1999).
From this moment the role of agricultural economists in research on fisheries and aquaculture became more important and this importance is destined to increase, so much so that in the recent revision of legislation governing the scientific sector, this necessity was fully recognised; the declaratory for the scientific sector AGR 01 states that "*the sector brings together research topics concerning economic, political, management and assessment aspects of production, transformation, distribution market and consumption of the products of the primary sector: agriculture, forestry and fisheries and agricultural bio-technology, with their relation to the other components of the socio-economic system and the economic aspects of the evaluation of environmental impact".*

Aquatic production is placed in an extremely complex "fisheries system" in which the various ecological, economic and social dimensions need to be considered when producing rules on which the action of the Administrations is based. As with agricultural economics, fisheries economics is also closely correlated with other subjects for the study of markets and production industries; the same is true for fisheries policies, which increasingly affect rural development, the search for greater territorial integration "touches" fields typically related to other topics and with which it can't avoid cooperating. This is the method followed in the organisation and establishment of the research units that are part of the projects on the economics of fisheries and aquaculture, which it is my pleasure to coordinate.

Since the agricultural economist, when studying complex issues such as those related to the fishery sector, needs to interweave relationships of knowledge and cooperation with researchers in other fields, it becomes essential to create multidisciplinary units in which for theoretical studies the agricultural economist receives support and reassurance from statistical quantitative models, mathematical analyses and econometric processing. Where multifunctionality is concerned (which is applicable to the fishery sector in the same way as it characterises agriculture), there is collaboration with researchers in the fields of sociology, tourism economics, territorial planning, biology and environmental economics as well as with nutritionists. The results of these complex analyses can provide support for public Administration in the identification of the fundamental principles of the sector. In addition it can propose the related planning tools, which should allow fisheries to progress from its condition on the fringes of the agricultural/food industry and environmental policies, where it was until recently, to the milieu of the global market, of sustainability and greater participation of Society in the choices concerning the sector.

3. Market

Initially, an attempt was made to study in greater depth the most relevant aspects concerning the level and type of demand which it is necessary to satisfy for fisheries products, with an awareness of the importance of the recent consumer dynamics in directing the development of the entire system of fisheries and aquaculture. However, another aim was to gather current

critical development factors against which the fisheries and aquaculture sector will necessarily be measured. It is well known that, with the relatively unchanged growth rate in food consumption, demand for fishery products is continually rising. Consumer awareness of an ever more varied supply and high quality of service, together with an image of healthy and nutritionally valid food are all factors which contribute to an increase in consumption of fishery products.

The study of several topics dealt with by the research group aimed in the first place to define and qualify the determining factors relative to demand for fishery products, by means of theories and statistical methods that are chiefly translated into the quantification of the effects of alterations in income and the consequent changes in prices. The definition of the technical and analytical environment, useful for an understanding of the working of the fisheries-aquaculture system and the markets of which it is composed, aims to offer some practical indications on the policies to draw up to manage and organise the most appropriate structures for the development of the fisheries sector, bearing in mind the increasingly urgent income requirements of the fishers and fish farmers.
However, in the study of fishery products, it has proved indispensable to widen the analysis beyond economic and quantitative aspects relative to consumption, to the more complex topics that progressively characterise the contemporary economic/agricultural scientific debate. The central topic of the first conference ("Il consumo del prodotto ittico. Aspetti Economici e statistici"), held in Venice in September 1998, was the consumption of the fishery product.
Analysis therefore turned to the market for fish products, in the widest possible context of the food market and to the specification, both theoretical and empirical, of the demand for fishery products with particular attention paid to local perspectives.

Specific explorative investigations on the consumption of fish in defined territorial contexts and studies which aim to define our demand for fish products from foreign markets, complete research which primarily addresses a thorough examination of further topics related to the fishery sector, such as its interrelation with the local development of tourism, the role of financial incentives in promoting the innovative processes which distinguish this sector, the issues related to quality and food safety of fish products. In 1999 the Venice Conference took as its central topic "The fishery product; consumption, quality and marketing", positive research results were presented.

4. Economic and environmental sustainability

The third conference brought forward research results on "Sustainable development and economic efficiency in the fishery sector". From an analysis of the economic aspects, of quantitative data related to consumption and of the critical elements of the fish market, in the wider context of the agriculture/food industry in which problems related to quality and marketing stand out, the study of the more complex issues concerning supply has followed. This is in addition to the relative policies of the sector, scientific debate on this aspect is characterised by an approach privileging the principles of sustainable development, the key element on which other possible scientific contributions hinge.

Particular attention is therefore paid to an in-depth examination of the concept of sustainable development, which has been built up over time following several conceptual approaches. The idea of using suitably adapted bio-economic models to support the analysis of the economic-environmental dynamics of fisheries and the impact of the policies applied to the sector, takes it for granted that innovative information systems must be used to make data and information available which are currently scarce. In addition fishery sector workers still have a weak and indefinite perception of the problem of sustainability.

In this context, the use of analytical tools which are able to assess productive activity in terms both of income and of protection of natural resources would take on particular significance; among these it is opportune to nominate the environmental accountability approach as well as the multi-criteria assessment models to support the development of the fishery sector in the context of improved sustainability. In this framework, the analyses allow the effects on the environment to be measured directly using real data.
From the perspective of economic analysis, the consideration that the sustainability of the fishery sector is tied to the management of fishing capacity leads one to reflect that the balance of maximum profit does not coincide with the maximum sustainable yield, therefore if profits attract new businesses into fisheries, we will arrive at a situation in which these profits disappear. If appears logical to reduce fishing effort, giving a strategic role to quality allows us to unite the fishers' objectives in terms of income with those concerning the environment by increasing the value of the product. Awarding a value to the fishery resource, which is compatible with a balanced solution, allows the harmonisation of environment requirements with economic issues.
In the context of biodiversity, the study of the interaction between the various components of the system takes on particular significance. The ability to comprehend the cause-effect relation between the development of the various species allows for a definition of the management policies which could enhance the value of the sector's many functions and activities.

The issues relative to economic efficiency are particularly relevant, they represent the conditions for any development policy and lead to the assessment of the economic impact of the fishery sector at national level, as well as the examination of economic results for specific segments of aquaculture. The fact that the economic stability of many businesses is precarious means that it is necessary to investigate the specific, critical factors which condition the evolution of whole sectors of fisheries.
Thus the necessity emerges to implement an appropriate system of incentives (which can also be financial), and to give due importance to the strategic relevance of the sector's policies, which should cover all interactions with the local socio-economic circumstances in addition to marketing, management and environmental issues.
Given this perspective, the complexity of the fishery system highlights an increasing scientific interest in the subject for the relevance of the coastal environment with Italy's geographical characteristics and fishery resources, for the variety of processes, products and services involved, its economic dimensions which, as for the environmental considerations, see the sustainable use of aquatic resources as the most pressing issue, thus suggesting a wide range of topics for study and collaboration with research institutes at international level.

The opportunity to enter into greater depth where studies on the fishery sector are concerned and broaden the relative research topics, while demonstrating the increasing cognitive necessities which are still to be fully satisfied, reveals the importance of the periodic comparison of experiences between the academic world and workers in the fishery sector, which should occur at international level.

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Economic analysis tools and fisheries management: some methodological remarks

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Abstract

An analysis is given of some policy aspects in the fishery sector, with particular attention to the European Union situation. The possibility to adapt some traditional economic tools to fisheries management problems is dealt with, in particular the instruments usually used in agricultural economics (concerning demand analysis, production analysis, fishery supply chain analysis and market analysis). In particular some problems of fish production are considered: the problem of production function used to estimate fishing effort, with particular attention to multi-catch activity, typical of the Mediterranean and Adriatic Seas.

1. Introduction

The aim of this paper[**] is to analyse, from an economic perspective, some important aspects of the whole policy in the fishery sector with particular attention to the European Union situation. The core of the paper concerns the possibility to adapt some traditional economic tools, in particular the instruments usually used in agricultural economics, to fisheries management problems.

The economic analysis of fisheries concerns a wide range of aspects: (1) first of all the fish demand analysis on one side and the productive problems on the other side; and then (2) the analysis of market and the organisation of the entire fishery supply chain (See Table 1).

These fields of study are connected with the identification of the more efficient policies to improve the interaction between fisheries and the environment (natural resource in general and fish stock in particular) and to sustain the fishery sector.

This paper points out how, in many cases, the problem of sustainability of the fishery sector is approached mainly from a biological point of view, with the objective of fish stock conservation. However, there is a strong interaction between the social situation, fishing activity, market organisation on one hand and the environmental situation on the other; therefore each policy determines some answers of fishermen, market operators and consumers, which adapt their choices (fishing choices, market distribution choices, consumer decisions). These produce some feedback effects on the ecological situation. Therefore the importance of economic tools to predict operators (in particular fishermen) decisions should be highlighted.

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**The authors are jointly responsible for the overall paper, however Gianluigi Gallenti wrote paragraph §. 3 (sub-par. 3.1, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.3, 3.4); Marta Cosmina paragraph §. 4 (sub-par. 4.1, 4.2, 4.3, 4.4), Sonia Prestamburgo paragraph 2 (sub-par. 2.1, 2.2, 2.3); introduction (§. 1) and conclusion (§. 5) was jointly written by the authors.

First of all this paper analyses the justification of public management in fisheries and the main common objectives of fisheries management, with particular attention to the European Union situation; then a overview of some critical aspects concerning the management measures are considered; finally some problems and strategies for market value enhancement of fisheries products are analysed.
The paper points out some instruments for economic analysis, developed in the agricultural sector, those can be adapted for the fishery sector, concerning demand analysis, production analysis, fishery supply chain analysis and market analysis.
In particular some problems of fish production are considered: the problem of production function used to estimate the fish effort, with particular attention to multi-catch activity, typical of Mediterranean and Adriatic Sea. Another problem considered is the risk management in the fishery sector, where the fishermen seem to have particularly strong risk aversion behaviour. Moreover some strategies to improve fish product value are emphasised. Implementation of these strategies requires a market integration analysis: in fact, it is necessary to know the integration degree of a market with regards to fish species, different products and geographical areas, to improve fishing revenues without increasing fishing effort.

Table 1. The economic fields of analysis for fisheries management

DEMAND ANALYSIS	Trade organisation: GATT/WTO, EU markets legislation Social and economic factors influencing fish consumption: a growing number of women in the employment market, new lifestyles (with less time for shopping and cooking), new family characteristics (increasingly elderly population, fall in the average number of members per family, increase in the number of people who live alone, etc.) Evolution of consumers' demand: shopping takes place on a limited basis both in space and time, increasing food consumption outside the home, growing demand for ready-prepared meals (frozen foods, pre-cooked food, etc.), food expenditure is following a downward trend in favour of non-domestic consumption (mainly the restaurant trade), diversification of fish demand (market segmentation), increasing demand for high quality products, increasing general attention to sanitary problems concerning food (BSE, animal feed systems, dioxin contamination, etc...) increasing attention to environmental protection
PRODUCTION AND FIRM MANAGEMENT ANALYSIS	Production function and fishing effort analysis Multi-product and multi-service productions: fisherman with/without possibility to control the species to catch District or local systems organisations development: - District analysis models (agricultural-industrial district, rural district; learning by doing, learning by interacting) - Conservation of traditional production process and local community - Enhancement of positive interaction between fishing activity and the environmental system Product differentiation on the market (PDO, PGI; Eco-labelling, organic products)

	Risk management: risk aversion analysis; portfolio analysis; the adoption of insurance instruments
ORGANISATION OF THE FISHERY SUPPLY CHAIN	Market organisation effects Transformations of food distribution chains Consolidation and growth of new marketing strategies for distributing foodstuffs (supermarkets, hyper-markets and discount stores) at the expense of the traditional retailers The functioning of companies in the food distribution sector brings substantial changes to commercial chains (alliances, mergers and take-overs of distribution companies; commercial concentration of retail distribution,…)
MARKET ORGANISATION	Market organisation analysis (market power) Market delimitation: type of product delimitation; space delimitation (geographical area); the market segmentation and arbitrage margin for fish firm (fishermen organisation); product differentiation strategies

2. Objectives and policies in fisheries management

2.1 Justification of public management in fisheries

Theoretical justification of public management in fishing activity is built on biological and institutional aspects of marine resource stocks that are both renewable and common. As for living resources, fishing resources are also renewable, and in the long run the scarcity of a resource is defined by the biological capacity of renewal with regard to the exploitation rate.
In general, since fish stocks are regulated by *res nullius* rules they are not appropriated before their exploitation by fishing firms whose activity determines the marine renewable resource allocation (Le Gallic and Le Floc'h, 2000). With reference to these aspects it is necessary to note that the introduction of exclusive individual fishing rights is unusual and the allocation of mobile fish stocks between several fishing boats appears very difficult to manage. Therefore, fish stocks can be defined as non-exclusive (absence of individual fishing rights) and rivalry (competition in the exploitation): each additional unit of species for a fisherman must be subtracted from the exploited stock by a group of producers. In other words the individual production functions are interrelated in that each fishing effort affects, through the flow of catches, the total production obtained from this stock for a given global fishing effort. In this situation common properties determine negative externalities between fishermen exploiting the same stock and scarcity of fishing stocks is a basic parameter in the characterisation of marine renewable resource as a "common resource". As in the other industries, in the fishery sector negative externalities create a deviation between private and social benefit. *Ceteris paribus*, a part of private profit, create by a single fishing firm through the increasing of its fishing effort, determines a profit reduction for the other fishermen. In this context a rational individual fisherman will increase his own fishing effort up to a point considered as too high for the entire fishery (Le Gallic and Le Floc'h, 2000). So the existence of negative crossed externalities and the absence of legal individual fishing rights for the resources are the fundamental incentives for each single fisherman to increase his fishing effort with consequential problems of overexploitation and overcapitalisation and related problems concerning equity issues. In this situation, the resource rent, which is a measure of the social wealth, can be dissipated with free entry to the fishery that determines a negative

impact on the revenue of other fishermen exploiting the same stock and is an important source of related conflict.
As a result of this analysis is possible to point out how an unmanaged fishery is inefficient with a sub-optimal exploitation of the fish stock and the public management is justified with the main objective, assigned to the decision-makers, of restoring the social wealth or the resource rent (Clark, 1985; Hannesson, 1993).

2.2 The objectives of fisheries management

Most fisheries management policies around the world have almost identical overall aims, e.g. the FAO (Food and Agriculture Organization of the United Nations) Code of Conduct for Responsible Fisheries, the US Magnuson-Stevens Fishery Conservation and Management Act and the Common Fisheries Policy (CFP) of European Union (EU) (Mardle *et al.* 2001).
Generally in natural resource management cases, objectives are categorised under three main headings: environmental (including biological and conservational), economic and social[1]. Some of the most commonly declared objectives in fisheries management are: (i) resource conservation; (ii) food production; (iii) generation of economic wealth; (iv) generation of reasonable income for fishers; (v) maintaining employment for fishers; and (vi) maintaining the viability of fishing communities.
It's evident that these objectives determine a multi-disciplinary approach: so the fisheries management needs environmental (usually biological), economic and social analysis to describe the problem, identify the specific objectives, to pursue the target levels to achieve and, consequently, to choose a coherent set of measures to adopt. It is important to remember that the theory for optimal management of the renewable fishery resource includes several species and analyses different types of interactions as: (1) biological interactions; (2) harvest technological interactions; (3) market interactions. Despite of this multi-disciplinary scenario, we can note that in several instances, research on the biological and studies on the interaction between harvest technologies dominate the market interaction analysis.
In addition, as in almost all policies, when there is a multiple objective context, some of the objectives may be naturally conflicting and cannot be simultaneously optimised, so there is a trade-off between them[2]. In practice the most evident conflict concerns jobs and catch, especially where overcapacity is an issue.
In other words there is a decision problem that in many cases decision makers do not face it in the correct way. In fact the decision makers often do "not set priorities or trade-offs between the various objectives nor do they set measurable targets for individual objectives". This makes it difficult to determine whether the objectives have been achieved or not. They do not understand the concepts of objectives and accompanying goals and targets, which lead to broadly defined goals without substantial justification. Hanna and Smith (1993) concur that different goal orientations are a major source of conflict in fisheries management, as well as structural effectiveness, biological changes and cultural (i.e. interest group) characteristics. In particular, there is a sort of "basic" conflict between objectives in fisheries management definable as long-term biological or conservation objectives versus short-term economic

[1] Some authors considered a fourth objective category of political objectives (Mardel *et al.,* 2001)
[2] Many studies have considered the multiple objectives of fisheries management and the potential incompatibilities and inconsistencies associated. See Mardle *et al.* (2001) for a survey.

objectives (Lane, 1989)[3]. It represents succinctly the main issues faced by fishery managers and therefore the goals to be achieved derive directly from this.
If these conflicts are not recognised then one main objective is pursued. Currently, one of the most important objectives in the "green" debate is to safeguard sustainable fish stocks that usually leads to the concept of Maximum Sustainable Yield (MSY)[4]. Some authors (Cunningham, 1980) make the distinction between MSY and Optimum Sustainable Yield (OSY), the level used by ICES[5]: OSY is a level of fishing below MSY, with the aims of reducing risk of stock depletion and reducing fluctuations of yearly catch. But even though there is now the recognition of multiple objectives, MSY still appears as a prominent objective[6].
The objective is peculiar, viewed from a socio-economic angle (at microeconomic level), because it is not an objective but rather a restriction for the activities of the fishing fleet. In general, the consequence could be that the whole fishing activity should stop or alternatively be carried out using the vessels in an inefficient way.
The restrictions for fisheries can be physical, biological or economic: the kind of restriction determines the options for the decision makers and the values of the endogenous variables in a economic model. As is well known, among the most important restrictions are (Andersen and Frost, 2000):

- The yield from the stocks (implicit quotas) must not be exceeded
- A certain number of fishing days per month must not be exceeded
- Economic restrictions e.g. minimum contribution to the margin or minimum profit
- A certain fleet structure be maintained for income distributional reason

The type of restriction depends on the time period: short term or long term. In the short term the natural capital (stock abundance) and vessel capital is assumed constant. So for example in the short term the decision makers have only the number of fishing days allocated to each vessel as an instrument when regulating the fishery; in the long term they have the number of fishing days and number of vessels at their disposal.
As answer to the restrictions adopted, the fishermen face a decisional problem consisting in maximising the fixed profit: a traditional microeconomic problem that can be well interpreted with a neoclassic model. The fishermen's behaviour and feedback effects, in many cases, are not sufficiently considered in the fisheries policy.

2.3 The Common Fishery Policy (CFP)

In accordance with overall management policy, the general objectives of EU fisheries management are clearly stated in the CFP. Article 2 of Council Regulation (EC) 3760/92 embodies these key objectives with respect to the resource conservation and management system:

[3] Data or information may not be available in all instances (e.g. species mortality or ecosystem dynamics) or even crucial to an individual management problem (e.g. pollution or enforcement).
[4] This is not surprising as at the International Law Commission Conference on Sea Law in 1958, MSY was recognised as the basic objective in fisheries management.
[5] International Council for the Exploration of the Sea, Copenhagen, Denmark.
[6] For example, in the FAO Code of Conduct for Responsible Fisheries (1995), Article 7.2 on Fisheries Management states that measures should be adopted that are "capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors".

As concerns the exploitation activities the general objectives of the common fisheries policy shall be to protect and conserve available and accessible living marine aquatic resources, and to provide for rational exploitation on a sustainable basis, in appropriate economic and social conditions for the sector, taking into account its implications for the marine ecosystem, and in particular taking into account the needs of both producers and consumers.

But some relevant conflicts between the declared objectives clearly emerge. Moreover instruments to pursue CFP aims derive from a complex set of specific policies concerning fisheries. In fact, the whole CFP consists of a number of policy areas, mainly: Resource Policy, Structural Policy, Market Policy, Control Policy. On top of the main policy areas we have a number of policy issues, which are becoming more and more important for the fisheries policy and need to be treated within the fisheries policy framework. Issues such as sustainability, precautionary approach, discards, regionalisation of policy, just to mention a few key words already widely in play. In this situation is very difficult to identify a clear correlation between objectives and tools. Nevertheless the main objectives of the Common Fisheries Policy (CFP) can be summarised as follows:

- Stock conservation and socio-economic viability of fishing firms
- Relative stability of the situation (equilibrium)

To pursue these conflicting objectives the EU adopts a regulation system that includes catch limitation, effort limitation and incentives for definitive withdrawals, a range of tools that are correlated.

More precisely the initial fisheries policy, agreed in 1970, dealt primarily with allocation issues, providing for equal access to all Community waters (except within existing national 6-mile and 12-mile limits). Then a more comprehensive policy, agreed in the early 1980s after prolonged negotiations on the definition and allocation of national fishing rights, established two types of quota systems.

- following similar lines to landings restrictions already agreed by international organisations (such as the North Atlantic Fisheries Organisation (NAFO)) catch quotas were introduced under EU Conservation Policy. This system deals the allocation of output production rights, specifying the maximum permissible weight of fish that could be landed within a Total Allowable Catch (TAC) set for a specific stock.
- in addition a Multi-Annual Guidance Programmes (MAGPs), licensing, "effort" and "capacity" controls introduced under EU Structural Policy, allocated input exploitation rights restricting aggregate engine power, tonnage and other factors influencing catches such as time at sea, in an attempt to achieve a balance with fishing opportunities.

In this context of regulation it is relevant to consider the effect of CFP on production systems, pointing out some methodological instruments of economic analysis that can be adopted.

3. The effects of fisheries regulation management system on firms: a brief overview

In this paragraph, we give a brief overview of the main critical aspects of the fisheries regulation management systems (with particular attention to CFP), without attempting to achieve a systematic analysis of this complex problem.

First of all, we should point out a methodological problem: the conflicting definitions and measures of fishing capacity often prevail as a result of economic, biological and technical impartiality. These definitions and measures have also often been adopted to agree with objectives of fishery managers[7]. Capacity has tended to be more often than not expressed in relatively simple and easily monitored technological (input) terms. These could include number of vessels, physical characteristics of vessels, gear and fishing methods used, and the time available for fishing. However, capacity has also been defined in terms of catch (output) or in economic terms (e.g. capital costs). Defining capacity in economic terms has been less widely used due to the relatively large demand for data collection. The use of an output definition may, however, be more applicable on a global basis. The current FAO initiative seeks national mangers and administrators to measures fishing capacity in output terms. "Fishing capacity is the maximum amount of fish over a period of time that can be produced by a fishing fleet if fully utilised, given the biomass and age structure of the fish stock and the present state of the technology" (FAO, 1998).

3.1 The TAC (Total Allowable Catch) system

Concerning the TAC system, it is useful to remark on the failure of the quota management system, or its near-inefficiency, as several authors have shown. An initial problem concerns the difficult to reach an agreement on quota share (i.e. country quota), with all the countries getting more demanding and the TAC getting smaller; moreover there is less than optimum implementation of the system (e.g. in the Mediterranean Sea for tuna). In particular Andersen and Frost (2000) point out that in some cases the objective to secure fish stock at some arbitrary level, in the case of quota management system, is carried out on an imperfect economic basis or in total absence of economic considerations. Therefore it could very easily be better for the society if no regulation was implemented at all. Of course, the economic results are very dependent on the fleet structure and the costs of fishing. Hence society could work with preservation of fish stocks but no one knows whether society would be better off in economic terms compared to a non-regulated system. As consequence general enforcement and control in terms of economic gains to society are very uncertain, given that these gains depend on the structure of the fleet. In addition the administrative costs of enforcement and control reduce the social benefit.

Some other studies show the possibility to leave the quota management system and introduce some sort of unrestricted fishery based on effort regulation (Andersen and Frost, 2000). The wish to move from quota management to effort management is based on three reasons: (1) Effort management is in accordance with the fishery's nature being a multi-species fishery; (2) Discard could be decreased; (3) Misreporting of landings could be avoided or reduced.

Moving from quota regulation towards effort regulation in the long run is affected by the quota systems' incentive to compose landings in a way that reflects the relative size of the quotas with little or no regard to costs of fishing (Andersen and Frost, 2000). In an effort management system no quotas exist, only guidelines for maximum catches, but it is very uncertain as to whether the catch composition would remain the same. A relatively strong and detailed management is needed to assure that landings of certain species are not reduced too

[7] In order to assist a global recognition of the fishing capacity issue, the FAO initiated an extensive consultation programme in 1998 with the aim to discuss the many conflicting definitions of fishing capacity and the possible means of measuring and managing fishing capacity.

much and others are not greatly exceeded. The most endangered species at the highest prices will be the most critical species except where cost of fishing for those species increases strongly with decreasing stocks. However the decision makers have the possibility to change fishing patterns through price incentives systems.
A detailed effort management system as a substitute for quota management reduces flexibility in terms of where the fishermen could fish, but it's very difficult to control when the fishermen can fish. Another problem concerns who determines the number of days at sea: in the quota management system it is the decision makers who does that, but in the case of distribution of fishing rights is to a large extent determined by the fishermen.
To analyse the effect of this management system at a fixed level and to predict the fishermen's reactions (in qualitative or quantitative way) it is possible to adopt some microeconomic models.

3.2 The fishing effort management system

The definition and consequently the determination of fishing effort is a basic question in bio-economic models, public regulation, relative resource assessment, and literature has given special attention to this matter (del Valle *et al* 2000). From a methodological point of view the concept of fishing effort has been subject to several theoretical analyses based on a production functions approach. First of all it is necessary to note that, in general, fishing activity is based on exploitation of fish stocks by fishing firms whose production functions can be interpreted as a combined result of the fish stock and the fishing effort.
Therefore the production function for each fishing boat is defined by the size of capital, labour and the abundance of resource stock that is exploited. But if the production of fishing effort is composed of many input factors, not all of them are equally important (two different technologies can exploit a fishing ground in different way and with consequently different productivity measured by catch rates). In addition, one problem that limits of the use of a production function concerns the estimation of the parameters: if the parameters are estimated for certain well-defined fisheries the results are not generally applicable (Andersen and Frost, 2000). Following this approach, the relationships considered will become a production function with Landings as dependent variable and Effort and Fleet Capacity as independent variables. This relationship must also include the stock size, because it affects the average and the marginal productivity of the effort and of the factors. This kind of relationship, between landing, effort and stock has been classified as catch effort model by fisheries literature[8].
Classic regulation programs based on directly limiting effort have shown to require the restriction of one or more of its components, which in turn demands empirical knowledge of the effort's internal structure, that is to say, the relationships between the individual production factors that make up effort.
In this context different analyses applying a traditional microeconomic approach can be adopted.

[8] Furthermore, it also can be useful to distinguish between short-term analysis and long term analysis. In the first case the analytic specification of the production function is developed. In this contest the efficiency of the analysis is also improved. In the long run analysis of the dynamics of each factor, stock included, have been considered. This kind of analysis can also be studied using the neoclassic Growth theory approach.

3.2.1 The optimal input mix

From the point of view of the traditional microeconomic analysis, the fish stock can be considered as an exogenous variable and therefore the production function for fishing effort determination is based on a mixture of different inputs factors. The dimension of these, that is the level of each input, can be expressed in terms of boat days, horsepower of boat, tonnage of boat, and so on; the fishing effort is the result of a combination of these factors that effects output (catch). It is possible to show this kind of relationship through the neoclassic approach to the optimal input mix, using the concepts of iso-cost and iso-production curves.

In Figure 1a, it is possible to see the optimal solution (point E) for fisherman that combines only two input factors: e.g. boat days and horsepower. Clearly this is a realistic example for a medium term analysis (horsepower can not change in the short term) and only for some types of fisheries; moreover the analysis concerns a situation with only one output (one species composition).

If the fisheries authorities put a constraint on inputs, e.g. a limitation on vessel horsepower, this restriction can be irrelevant for fishing effort reduction if the limit allowed is too high (Figure 1b), or can change the fishermen's optimal solution if the level of the constraint is sufficiently low (Figure 1c). In the later the original solution is not optimal after the input limitation decision and the fishermen change the input combination (Figure 1d), so the new solution (point E') derives from a partial replacement of one input with another: a horsepower reduction and an increasing of boat days. This example show how a limitation in vessel horsepower can lead to a reduction of this input but can induce the fishermen to increase the use of another input or change another dimension of the input used. There is also a reduction in output because the iso-production curves, that the fishermen can reach, are lower than the original (before input restriction). In other words an objective of fish stock conservation should be obtained, but there is also a revenue reduction for fisherman. The effects on costs are uncertain. Horsepower limitation determines some added costs for fleet reorganisation and in some cases a reduction of fixed costs (e.g. tax on boat correlated to horsepower). But horsepower reduction together with the increase of total boat days and of trips can determine higher variable costs (e.g. flue and boat upkeep). Therefore it is likely that the net profit will suffer a reduction. As a consequence the fisherman could probably use more inputs factor to obtain the original revenue level or a value very close to it (Figure 1e). In other words, the fisherman is induced to increase his fishing effort also forcing the legal limitations.

Figure 1a. Optimal input mix without input restriction

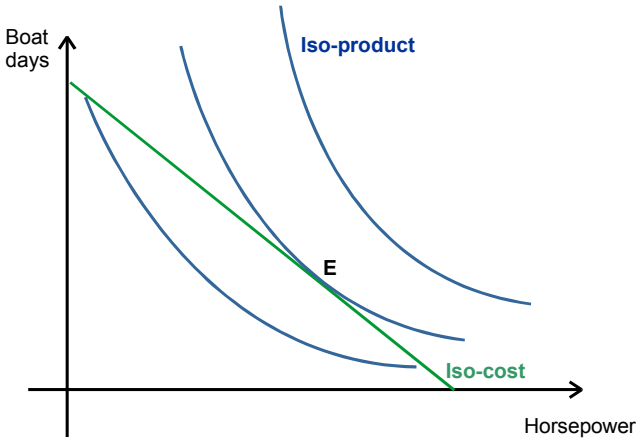


Figure 1b. The introduction of an input restriction without effect on fishing effort

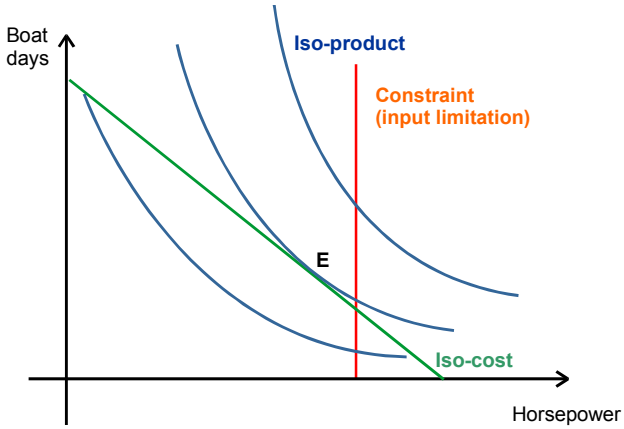


Figure 1c. The introduction of an input restriction with effect on fishing effort

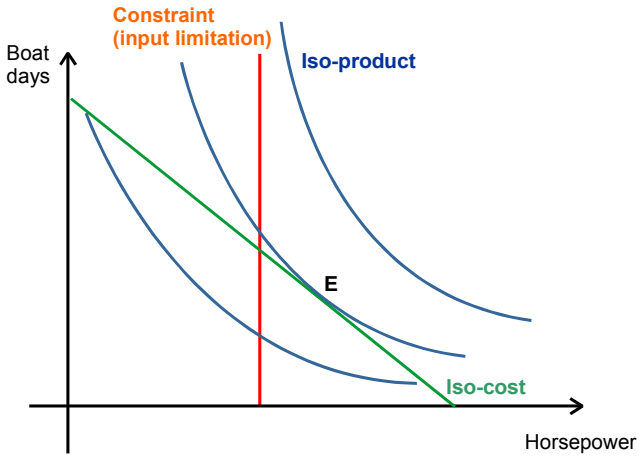


Figure 1d. The effect of an input restriction on fisherman optimal solution

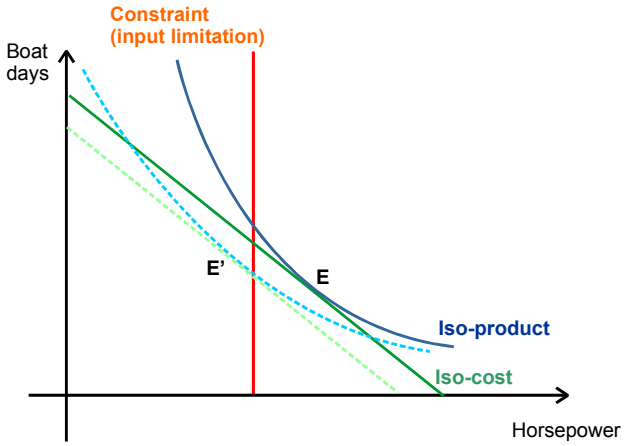
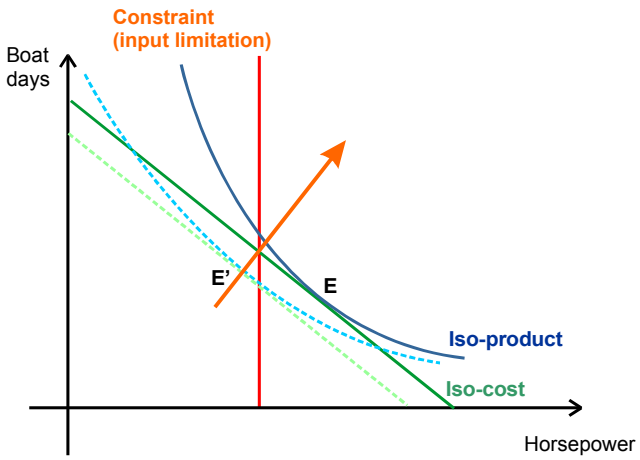


Figure 1e. The fisherman reaction to an input restriction



3.2.2 The optimal product mix

Another traditional approach used for analysis is the optimal product model mix. The fisherman can substitute in some cases the catch of one species of fish with another. With more than one output (species composition) the output is determined by the possibilities of the fisherman to control the species composition. We consider that the fisherman can catch two species on each trip and the mix depends first of all on the possibility to select the species of fish and then on the degree of substitution and on the prices of species. In Figure 2a the fisherman cannot choose which species to catch: the two species are caught in a fixed relationship and he can only decide whether to fish with a certain effort or not. In Figure 2b given a production technology and a certain effort level, the fisherman can choose which species to catch. If the fisherman has this option, effort regulation will have the unfortunate consequence that some species are only caught in lower quantities, even if it could be profitable for society to catch them without damaging the biomass (Andersen and Frost, 2000).

Figure 2a. The production possibility curve: fisherman without control on the species to catch

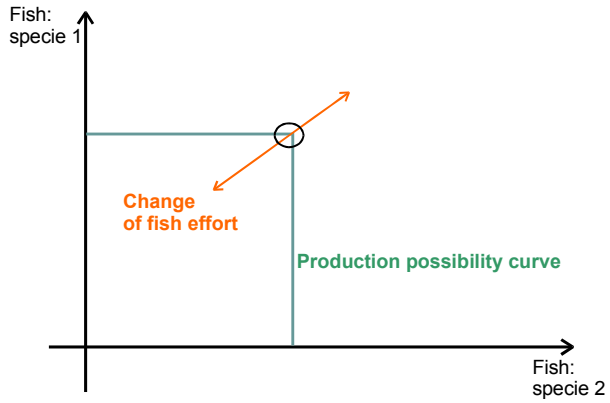
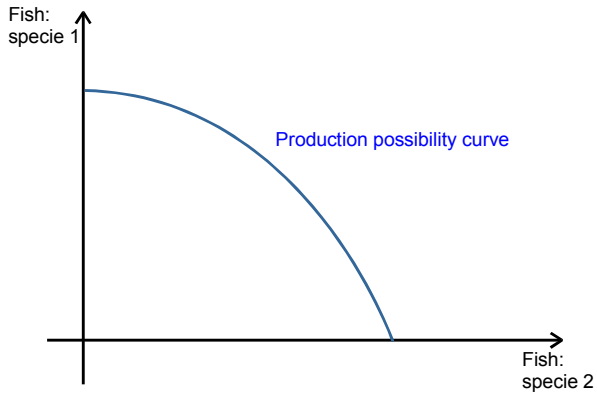


Figure 2b. The production possibility curve: fisherman with control on the species to catch



3.2.3 Fishing effort and production function: an alternative approach

Some authors suggest other approaches to estimate fishing effort and to manage it, in particular the calculation of the Allen Elasticity of Substitution (AES) could be valuable to predict inefficient expansions in response to a hypothetical input restrictions program. Del Valle *et al* (2000) point out that the fishing effort, can be interpreted as an aggregate input that can be consistently formed only under the condition of weak separability of the production technology. So fishing effort can be interpreted as an aggregate index of different production factors. Therefore, the conditions of the production technology must be determined in order to reduce the production function to the expression

$$Y=F(E(X1,\ldots Xn),Xz),$$

where Y is the output, (1,..Z) are the inputs and E (the fishing effort) is a consistent aggregator function.

This approach allows us to test an aggregated index of fishing intensity and vessel characteristics.

The flexibility of a selected functional production form makes the estimation of the elasticity possible of substitution between the inputs that make up effort. This transformation can be

very useful for policy makers, especially for a fishery with clear evidence of regulation failure via TAC/licensing and the foreseen reduction in the spawning biomass. In addition, although ignored in many studies, the difference in skill of fishing skippers explains a considerable portion of the variation in fishing potential/capacity among units. There are many instances where the physical inputs and even the fishing intensity are less important than those related to the skill of the fisherman in making managerial decisions such us how to fish, when to fish or when to stop fishing.
The result of these studies point out as the elasticity of substitution between inputs (tonnage and boat days, or horsepower and boat day for example) is in many cases positive and less than one (see del Valle *et al* 2000), therefore, despite tonnage or horsepower are a substitute for boat days, the substitution possibilities are low. Thus, if policy makers decided to adopt input restriction to enforce the non-operative TAC/licensing system, fishermen could answer a limitation of boat days with capacity or horsepower increments.

3.2.4 Fishing effort in practice

As mentioned above there is strong evidence of failure of the TAC/licensing system: too many vessels competing against a population with high a risk of suffering a collapse. Although policy makers have the difficult job to decide the way, limitation of fishing effort, directly (via licensing restriction and input restriction) or indirectly is considered to be strictly necessary in many cases. So the reduction of fleet capacity in the EU is an important objective of the EU's Common Fishery Policy and the success of such programmes depends both on the variation and the level of efficiency within the fishing fleets. So the concept of fishing effort became central to fisheries economics and management. But the term fishing effort has frequently been used in a seemingly simplistic way which implies a certain intensity or magnitude in relation to the activity of the fishermen (number of boat days, number of trips, etc) or the gear of equipment that the fishermen use to extract the catch (number of hooks set, number of shots made, etc). Most cross sectional production analysis also involves physical attributes of fishing vessels (tonnage, horsepower) or different intermediate inputs like fuel or ice.
Concerning the fishing effort reduction approach is important to note that mainly fishing effort reduction is obtained by sweeping less economical efficient firms away from the market and consequently the authority must face a so-called re-conversion problem (Del Gatto *et al*., 2001). In this way it is possible to improve the global efficiency of fisheries but this policy sacrifices operators in the name of only hypothetically correct resource management with relevant negative effects from a social point of view. Good economic action should obtain the greatest output from resources but not defend them at any cost. In other words the number of operators could be reduced only if their re-conversion can be assured, though difficult and expensive it may be.
This approach derives from the application of a catch-effort model that implies a policy of control-invested capital through some steps (Del Gatto *et al*., 2001):

(a) a close relationship exists between catch and fishing effort;
(b) a close relationship exists between fishing effort applied to resources and fishing capacity (seen as the highest attainable level with available equipment) and
(c) fishing capacity can be measured through invested capital. Therefore if there is a strong relationship between over-exploitation and over-capitalisation then a catch-effort model requires capital reduction or limitation.

The incoherent aspect of such logical procedure that acts mainly on invested capital for managing fishing capacity is evident. The reason for such inconsistency has to be found in the above-mentioned double goal: on one side the objective to manage resources (i.e. fleet reduction, according to catch-effort model) and on the other side the objective to protect operators' interests. The regulation obliges the establishment of a system (meant to use resources in the best way) which depends on structural policies. In this context such policies have been asked to fulfil both the aims to support fishing operators (financing re-conversion and equipment renewal) and to induce definitive withdrawals. At the same time tax policies have been used in several countries (according to the programme guidelines settled by EU) for helping fishing segments with a small fiscal capacity (small-scale fishing)[9].
In addition in classical fishery economics most attention is given to long-term investment decisions with the basic assumption that fishing effort will adjust by reallocating to the most profitable fisheries and withdrawing from those which are non-profitable instantaneously or after an adjustment period (Gordon, 1954; Eggert and Tveterås 2001). However, these models have dealt with single species of fish and focused on optimal solutions with implicit assumptions of complete effort control. In reality, fisheries are often multi-species, not perfectly enforced and fishers may not solely focus on maximizing expected profits, as they have to deal with a considerable level of risk[10].

3.3 Risk management

The previous approaches concern the decision problems in a deterministic framework, but the reality is characterised by risk. In fact, as long as total effort cannot be completely controlled, a more thorough understanding of fishers' supply response decisions will be beneficial for fishery managers. The results of some studies indicate that fishers have a strong tendency to choose the same gear used on the previous trip, while in general they react to changes in economic and biological conditions by responding positively to increases in expected landing values and negatively to increases in the variability of the expected landing values, indicating risk aversion (Eggert and Tveterås, 2001).
Therefore in fisheries management the risk analysis should assume a relevant role, the portfolio analysis should be used to evaluate the risk preference structures of fishermen and predict their choices. Finally, the adoption of insurance instruments, also under public control or with public insurance companies, could be very useful to mitigate the risks for fishermen, in a similar way to the insurance policies in the agricultural sector.

[9] Some studies (Del Gatto et al., 2001) remarked the bad aspects of a high fiscal charge and a more rational use of subsidies and taxes in the case of Italy.
[10] See the paragraph titled *Risk management*.

3.4 Some conclusive remarks

The exploitation of common pool fish stocks is traditionally characterised by externality problems among fishers. That is, a fisher's individual production function is interdependent, with his realised catch depending on the catches of other fishers. Because fishers do not have the incentives to conserve fish stocks, they tend to over-invest in capital to harvest fish. The theory of fisheries economics indicates that fisheries can be regulated efficiently if market forces are allowed to dictate the evolution of fishing fleets, discouraging the competitive build-up of excessive capacity. A management strategy that is based on output constraints and the internalisation of externality problems, through the use of landing taxation and individual property rights for example, would lead to a gradual optimisation of fleet capacity.
However, most global fisheries are in regulated open access conditions, where management strategies have been based on difficult input control measures. These measures fail to address the eternality problem and, hence, management has been forced to address the issues of fishing capacity and overcapacity in order to implement fleet adjustment programmes to optimise fleet capacity levels. As a result, to create effective adjustment programmes one has to be able to define and measure fishing capacity correctly and ensure that the concept can be correctly linked to the concepts of fishing effort and fishing mortality, concepts that management measures are often based upon. Although there are interesting alternatives to the classic input restrictions such as those based in co-management, the difficulty to get a consensus between different states could be an important barrier to major changes.
We can summarise the above remarks as follows: to implement correct fisheries management a fisheries authority should (a) consider the companies' conduct and their reaction to public policies, in particular in the case of constraints on input factors or activity as a whole; (b) increase the firms' revenues, and consequently the profit, through the market system avoiding or limiting the high and inefficient direct payments to fishermen.
Therefore an analysis of consumer demand and market organisation has become critical to implement sustainable fishing activity.

4. Trend of fish market and consumers' demand

4.1 International trade organisation and its impact on the European union market

In European Union the customs' regulations on fish products is characterised by the total or partial suspension of duties on products which are destined to the processing industry (raw material provisions) and, by the existence of border protection mechanisms (reference prices and safeguard measures) to protect against foreign products. This situation is, partially a consequence of GATT negotiation[11]. The general principles of the Uruguay round of negotiations, which affected fish products, can be summarised in two points[12]: reduction of

[11] The dismantling of customs tariffs in the EU prior to the Uruguay Negotiation Agreements was widespread and new tariff exemptions regarding raw materials were added to already existing ones in order to guarantee supply to the internal market, or the application of a tariff benefit linked to compliance with international trade agreements within the framework of autonomous and conventional EU trade policies.
[12] Basically, the intention was to make progress in trade liberalisation, making access to markets more flexible, reinforcing free competition (with the elimination of subsidies) and eliminating artificial obstacles imposed by means of different regulations.

tariff peaks (tariffs equal to or higher than 15%) by 50% and average tariff reductions of at least 33% for all the other products. Therefore, the decisions taken under the agreement of the World Trade Organisation and the new applicable regulations on the common organisation of markets in the fish products sector only consolidate the open commerce trend which, for some years now, has been seen in fish products and which has made the European Union the most important world market for these products.

4.2 Global trend of fish markets

In the last few decades, world fish production has experienced a growing trend in catches accompanied by a process where production has become even more concentrated to just a few countries. According to information given by the FAO, developing countries are playing an ever more important role in this process, increasing their participation both with regard to production and consumption. In spite of this, the developed countries still have a higher consumption per capita ratio and, within such countries, there are significant differences insofar as habits and diet are concerned. The increase in production in Developing Countries and in consumption in Developed Countries has favoured the development of the international fish trade and the opening of markets in the latter, where the majority of imports are concentrated (between Japan and the EU, imports represent more than 60% of the world total) (Cannata and Forleo, 1999). The EU depends on external supply (except Denmark, Ireland and the Netherlands), which has facilitated the establishment of a customs regime distinguished by its degree of true openness and the existence of minor protection measures (reference prices and safeguard measures)[13]. Both the regulations of the WTO as well as the new regulations on the common organisation of markets are moving towards a consolidation of this open trend. In European domestic markets we are witnessing great vitality and trends which must be followed carefully. Thus, within the general downward trend of the portion of income given over to food, differences between countries and types of products can be clearly seen.

Within this context, in the last few years interesting modifications have taken place, affecting food distribution in the European domestic market which should be taken into account when talking about fish products. The strategic management which companies within the food distribution sector have adopted has been characterised by the search for economies by means of mergers and acquisitions applied by leaders in the sector to small companies, cuts in trade channels or circuits and reductions in the costs of distribution companies based on greater negotiating power.

The distribution of fish products is related to these trends. The European consumer, with an average income increase, is spending a smaller proportion of his/her expenditure on food consumption.

The growing number of women in the employment market and new lifestyles (with less time for shopping and cooking), together with family characteristics (increasingly elderly population, fall in the average number of members per family, increase in the number of people who live alone, etc.), only favour trends whereby shopping takes place on a limited basis both in space and time, food consumption outside the home increases and the demand for ready-

[13] In the EU it is possible to identify three groups of countries according to their average consumption: high (Portugal, Spain and Finland), moderate (France, Denmark, Sweden, Greece, UK and Denmark) and low (Ireland, Germany, the Netherlands, Belgium and Luxembourg).

prepared meals grows (frozen foods, pre-cooked food, etc.) (Liniero, 1998, 1999). In many countries we can see that food expenditure is following a downward trend in favour of non-domestic consumption (mainly the restaurant trade) (Trevisan, 1998).
These new lifestyles and family characteristics favour the concentration of shopping, the demand for new products and non-domestic consumption. This combination of elements brings about an increase in the market quota of new forms of trading (supermarkets, hyper-markets and discount stores) to the detriment of traditional retailers (fishmongers and markets). In order to respond to this new reality, companies have adopted new dynamic commercial strategies (alliances, mergers and take-overs of distribution companies, high level of concentration of companies, expansion of new technologies, etc.) with a significant impact on traditional distribution circuits. Although fish distribution lags behind somewhat where other food products are concerned, these trends will have serious repercussions on the sector as a whole.
The functioning of companies in the food distribution sector brings substantial changes to commercial chains. Alliances, mergers and take-overs of distribution companies; the appearance of shopping and trade centres (for obtaining groups of goods and services in advantageous conditions both within the EU and outside it); the commercial concentration of retail distribution; the development of the small organised business (small and medium size distribution companies which join the ranks of cooperation networks and establish purchasing groups and affiliation chains with the aim of strengthening their position with respect to the suppliers); and the growth of the new technologies applied to trade (related to electronics and the possibilities it offers: commercial transactions, data exchange, access to sources of information, easy communication with the end consumer, control with regard to product rotation, etc.); all clear symptoms of the transformations which food distribution chains are experiencing increasingly and which will influence fish markets.

4.3 Market and fishery sector organisation

As is well known, in neo-classical theory, price formation for a normal goods is considered as a process where demand and supply meet, thereby reaching the equilibrium and market clearing price. In this process, production quantity and price is determined interactively. However, this process only applies for normal goods where production quantity which would not usually be affected by changing price. On ex-vessel fish markets, production quantity is not expected to be affected by changing prices to a considerable extent, partly as it is supposedly determined by exogenous factors as biological factors, weather, fisheries regulation, and partly since fish has to satisfy the basic human need for food. Therefore, another market clearing process is taking place on ex-vessel fish markets, where these factors determine production quantity in a first step and production quantity determines price in the second step.
Far away from this theory, several fish markets are increasingly organised through binding relationships. More contracts, vertical integration and long term trading relationships are taking place along the seafood value chain. The stabilisation and convergence of prices and margins would however tend to demonstrate that markets have never been so efficient in spite of the numerous intermediate traders and processors; information is shared on the markets at a broader level due to globalisation. This apparent paradox might be resolved as long as markets are seen as a social construction. Institutional arrangements at the downstream levels

are designed to cope with the volatility of prices at the upstream stages (Guillotreau and Le Grel, 2001). But this process doesn't concern all "geographical" markets, in fact in many cases, especially in the case of small local markets, suppliers and demanders would meet freely under the auction markets, thus setting up the price of fish. So depending on the species of fish and geographical markets it is possible to meet various situations that are closer to perfect competition models or to imperfect competition models (oligopoly or monopoly competition), with connected, different market power of the operators (Gallenti, 1998, 1999; Mauracher, 1999; Prestamburgo, 1998, 1999; Trevisan and Mason 1999).
Therefore one important economic problem consists in the definition of market for a product and their organisation, in particular the relationship with other markets. A market can be defined as "the area in which price is determined" (Stigler and Sherwin, 1985), giving price the principal role in defining market boundaries. So two products are considered part of the same market if they are close substitutes and their relative prices maintain a stable ratio. In addition, prices for these products must be part of a long-run equilibrium system, although significant short-run deviations from equilibrium conditions may still be observed. From methodological point of view one relevant problem concerns the structure of data series: in fact most macro-economic time series data are inherently non-stationary. That is, their means, variances or co-variances depend on time. Regressing such non-stationary time series to estimate the parameters of a demand function some spurious correlations will probably be obtained, where strong relationships between two or more variables is caused by statistical fluke or model specification issues rather than by meaningful causal relationships. In these cases it is possible to adopt a co-integration analysis that permits inference of causal long term relationships between non-stationary variables and has become one of the most commonly used methodology for delineating markets[14]. When co-integration is verified, variables exhibit stable long term relationships, which indicate that a price parity equilibrium condition exists and variables are part of the same market[15].
The knowledge of price determination and market boundaries allows for the orientation of the catch quantity of a group of fishermen and influences the price to varied extents. The income can increase depending on the price flexibility[16]: if this value is less than –1 the price is flexible[17] and the reduction of quantity sold determines an income increment with fishermen's profit improvement[18]. This type of supply control operated by producer associations can be at the same time a measure to correct fish stock management and a market policy able to sustain fishermen revenue. Other alternative/complementary strategies concern the quality policy such as product differentiation.

[14] On this aspect see Ardeni 1989; Asche and Hannesson, 1997; Asche and Sebulonsen, 1998; Asche *et al*. 1998; Baffels, 1991; Bjørndal e Asche, 1995; Bjørndal *et al*., 1996; Hannesson, 1994a; Hannesson, 1994b; Hartmann and Perez Agundez, 2000; Gordon *et al*. 1993; Ravallion, 1986; Zanias, 1993.
[15] More precisely the economic interpretation of cointegration is that "if two (ore more) series are linked to form an equilibrium relationship spanning the long-run, then though the series themselves may contain stochastic trends (i.e., be non-stationary) they will nevertheless move closely together over time and the difference between them will be stable (i.e. stationary)" (Hartmann and Perez Agundez, 2000).
[16] Price flexibility is defined as the percentage change in the price of a good, as the quantity purchased on the market of that good increase by one percet.
[17] The normal, uncompensated, price flexibility contains both the direct quantity induced price effect, and the indirect quantity induced price effect, caused through changes in total expenditure. Therefore it is necessary know the whole market relationship to predict the effect of a quantity change supplied.
[18] This effect is well know in agricultural sector where is called by agricultural economists "King effect".

4.4 Product differentiation strategies

There is a considerable interest in the adoption of strategies for market differentiation in the fishery sector, in particular the use of eco-labelling to improve management of natural resources by allowing consumers to make informed purchasing choices. More precisely, this approach concerns the range of measures that regulate fisheries with market driven instruments such a price differences on fish that are caught in a sustainable manner contrary to a non-sustainable manner. Basically, the approach relies on the consumers' willingness to pay a relatively higher price for fish that are caught in a "responsible" way. On this aspect see, in particular, Idrissi (1997) on Seafood, Peacey (2000) on certification methods, and Frost and Michelsen (2001) on fisheries in the Baltic Sea. There is evidence, for the most economically developed countries, of some relevant price differences between certified and non certified fish, but also there is a lack information among fishermen about this situation. In addition the problem is highlighted of whether the whole process towards sustainable fishing could be started by use of certification only. In particular, "if certification is used together with other types of regulation, the interdependency between the various restrictions and the fishing technology could lead to unexpected results, that may even be undesired" (Frost and Michelsen, 2001)[19].

In this context a growing role is played by the specialisation of some areas that have particular characteristics such as environmental characteristics (protected areas, natural areas), traditional fishing methods, traditional life style of the local community. All these elements related to sustainable fisheries, from an environmental, social and economic point of view, are even more appreciated by consumers. In these cases some fisheries districts can be developed where there are traditional small fishing activities. The consumers' demand is correlated to these characteristics and to tourist flows (Trevisan, 1998, 1999).

These considerations also lead to a consideration of a multi-sector approach in a methodological context in which the exchange between different sector activities can be analysed through the externalities of each activity.

5. Conclusions

This paper should have pointed out how fisheries management cannot be reduced to fish stock control in a direct way, but needs a more complex analysis including market and sector analysis studies, fishermen behaviour prediction, local specialised fisheries areas (fisheries districts) and overall a multidisciplinary and multi-sector approach. Therefore single policies that do not consider the complexity of the fisheries world have a great probably of failure as shown by CFP.

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[19] Another important market differentiation concerns organic aquaculture production, see Aarset *et al.* (2000) for the demand for organic salmon in EU.

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Fish marketing and trading in Albania

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Abstract

An overview on the current situation (2001-2002) of fish marketing and trading in Albania is presented. Details are given on the national policy and legislative framework, fishery production, aquaculture production, the fish processing industry and marketing, the fish catch distribution system and fish prices. Some recommendations to overcome the problems of the current development of the Albanian fish market are described.

1. Introduction

Albania is located along the eastern seaboard of the Adriatic and the Ionian Seas, bounded by Montenegro and Kosovo to the North and Northeast, Macedonia to the East and Greece to the South. There are significant water resources in the form of large lakes, flooded valleys, agricultural and drinking water reservoirs, irrigation canals, coastal lagoons and of course the Adriatic and Ionian Seas.

Albania has a coastline of about 450 km and territorial waters 12 miles wide; moreover, there are several coastal lagoons with a total surface area of 10,000 ha, three lakes with a total surface of 300 km^2 and around 700 reservoirs with a total surface of 12,000 ha. The fishery sector in Albania has regional importance though on national scale it is not as critical as agriculture. This sector is providing revenues to government from license fees and other taxes. At the same time, it is receiving no government subsidies and pays the same tax on fuel, the major expenditure like the other sectors of Albanian economy.

The potential sustainable catch from these waters has been assessed at between 14,000 and 17,000 t of fish and shellfish annually (about 8000-9000 t of marine fish; 3000 t harvested from lagoons, inland waters and aquaculture; and 3000 t of bivalve molluscs. The contribution from the marine, freshwater and mollusc sectors (the published statistics do not seem too precise during the nineties) has remained roughly constant with an average percentage contribution 57-60%, 20-23% and 17-23% for the years 1984 to 1993. In the forty-five years to 1991, Albania was governed as a largely closed command-led economy. Under this structure the fishery resources of the country were closely managed for productivity using systems of communal management and exploitation. Marine harvests exceeded 8,000 t per year, much of it in the form of small pelagics, whilst freshwater harvests were in excess of 2,000 t per year, with the bulk in the form of Chinese carps. In addition, mussel cultivation in Butrinti lagoon in the south of the country yielded production of several thousand tons a year.

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With the economic disruption that followed the fall of communism, and later with the financial collapse of 1997, fisheries constituted one of the few resources that could be readily exploited for food and for cash income, with limited practical barriers to participation in these fisheries. The decade from 1991 has accordingly seen heavy and often indiscriminate exploitation of the country's fishery resources, with the more traditional fishermen joined by the unemployed. Although increasing order has been brought to the control and management of these fisheries as the decade has progressed, most freshwater resources, and arguably also the marine resources (though marine resource management is subject to complex externalities) have been over-exploited. Accordingly they must be recognised as being in slow and fragile recovery. Official statistics suggest that both freshwater and marine fish landings are well down on levels achieved under communist rule, with freshwater landings under 1,000 t and marine landings a little over 2,000 t per year.
Though these figures should be treated with some circumspection, and accepted as only reflecting a partial picture of fish exploitation, these figures are a poor measure of the potential harvest that the country's natural resource base could support.

The Albanian fisheries economy can be roughly valued on the basis of estimated current landings of 2,000 t of mixed marine species and 1,000 t of mixed freshwater species. At average first-hand sale prices of about US $ 2.80 (lek 400) / kg for marine fish, US $ 1.90 (lek 270) / kg, this equates to a total first-hand sale value of US $ 7.50 M. In the order of two-thirds of marine landings, comprising the more valuable sizes, qualities and species of fish, is exported, primarily to Italy, contributing perhaps an additional 50 per cent of first-hand value to GVP (say 1,340t at US $ 3.50; equivalent to 2.35 M). The remainder of the marine catch, plus most of freshwater landings, are distributed and consumed within Albania, in whole and gutted form, contributing perhaps a further 30 per cent to GVP (US $ 0.70 M).

The total direct economic value of Albanian fish landings thus amounts to something like US $ 10.55 M. In addition to the above, Albania also imports a sizeable amount of fresh and frozen fish for domestic consumption. Import figures for 2001 suggest that 2,048 t of fresh, frozen and processed fish was brought into the country (assumed for domestic consumption), with a value of some US $ 1.68 M (average price US $ 0.82/kg). In 2001, average per capita fish consumption was about 1.5-1.7 kg (Carleton C., Flloko A., 2001), some general information is given in Table 1.

Table 1. Some general data.

Area	28 748 km2
Length of coastline	450 km
Population (1990)	3 255 891
PCE per head (2001)	1200 US$
GVP (2001)	10 550 000 US$
Value of imports (2001)	1 036 350 US$
Value of exports (2001)	588 350 US$

2. National policy and legislative framework

Albania has faced a difficult and turbulent decade. Ten years ago, it was the most isolated country in Europe. Early efforts to introduce democracy and to build a market economy were severely damaged by the lawlessness and economic collapse, which followed the failure of the pyramid schemes in 1997. In 1999, it bore a huge burden during the Kosovo crisis; at the height of the crisis, Albania was host to over 460,000 refugees. Albania has made considerable progress since 1999. Economic decline has been reversed and in 2000 GDP grew by 7.8%, in line with growth rates reported for 1999 (+8.0%) and 1998 (+7.3%). Privatisation of small and medium enterprises can now be considered as completed and, with some delay, privatisation of larger companies is also progressing. Important progress has been made in securing government revenue through reform of the customs and tax services, Albania's trade regime has been modernised and liberalised and Albania became a WTO member in September 2000.

The democratic developments in Albania made the liberalisation of the socio-economic activity of the country indispensable, and this started mainly through the liberalisation of both domestic and foreign trade. Albania has introduced a free open trade system. Albanian fish exports are normally free of restrictions (except for bivalve molluscs and live fish). Albania has still excise duties above the Community for certain products. On the other hand, tariff duties on imports are being progressively reduced. Albania has also abolished quantitative restrictions or measures having an equivalent effect. Albania has tended towards greater and greater liberalisation. From 1998 to the present the level of customs tariffs for imported goods in Albania has decreased. So, the maximum level of tariffs in 1998 was 30% and it has been gradually reduced year after year reaching the level of 15% in January 2001. Custom tariffs for agricultural products have been reduced in the last years. All custom tariffs were *ad variorum*; there were no products on which Albania applied specific or combined duties.

Albanian fish imports are submitted to a simple tariff system of 4 levels: 0%, 2%, 10% and 15%. Import tariff of 2% is applied to the fishery inputs. This benefit offered by trade liberalisation contributes in the entry of inputs that have a significant role in the productivity and quality improvements of Albanian products. Currently the regime of export-import of goods is completely free, except the goods that are considered as dangerous. The import – export is carried out in full compliance with international rules, according to the sectors. There are no export bans or restrictive measures; neither are there export taxes or any other tax of the same effect. The Value Added Tax (VAT) is the final tax applied to imports and industry production. It is a broad base tax, which is applied on all sources of goods and services. It is applied at a single rate, 20%, on all goods and services. It is important to recognise deductible value of VAT for all cases when the fish processing industry purchases raw material directly from the producers. According to Albania's membership of the World Trade Organisation, customs taxes for all fish species and other fish products became zero on January 1, 2002 (from the previous 2, 10 and 15 percent) (Ministry of Agriculture and Food, MAF, 2002).

The fishery policy in Albania should have these objectives: to ensure responsible fishing; to program and realize management in fisheries; to provide measures for storage (based on

biological criteria for marine ecosystems and inland waters); to develop aquaculture in sea and inland waters; to promote and regulate the scientific and technological research on the conditions and safeguarding of resources and harmonious development; to guarantee constant development of fishing and aquaculture activity and good social economic conditions for producers and to guarantee the interest of consumers by the introduction of high qualitative standards in market of fish products.
The other part of the fisheries policy in Albania concerns the use to which the fisheries activity and product is put. The activities can be aimed at satisfying producers, consumers, or both. A prime objective of fish marketing development should be to ensure that fish obtain the highest price possible. This will be achieved by ensuring that the quality is as high as possible, and providing the best market access. The best markets for Albanian fish require whole, fresh fish, thus the handling requirements are that the catch is sorted, adequately and properly iced and boxed at sea and stored at temperatures just above freezing point. After this, the less handling the better. The shorter the time between capture and sale the better.

Albania has frequent and direct links to one of the best fish markets in the world (Italy) and Greece, another important market for fish, is nearby. Other markets on which fish fetch high prices are France and Spain, both within marketing distance. To maximise fish sale prices, fish auctions need to have sufficient product, both in quantity and variety, to attract foreign buyers; and, the selling, packing and storage facilities must be absolutely first class. Sales should take place at a time which is most convenient for buyers. For example, this may mean varying the time of sales to enable product to be dispatched on the next ferry departing for Italy. Thus the major requirements are volume and variety of product, quality and convenience. I believe that there will not be sufficient production in Albania to justify more than one regional-class auction and thus a central site should be selected and infrastructure developed so that the product landed at the other three main centres can be moved to the main auction for sale. If the site is Dürres, national policies should be adopted that encouraged landings of fish from Montenegro to also be sold through the auction (MAF&Eastfish, 2000).
For these reasons a prime objective of fishery policy should be to optimise fish marketing. For exports this would be done by developing a world-class single national auction facility. While Albanians have not been major traditional consumers of fish products, experience elsewhere in the world has shown that this is usually because of lack of exposure rather than because of unchangeable market preferences. Market promotion should be undertaken to encourage fish consumption, particularly of small pelagic species, freshwater and marine, in the fresh fish form as this will remove the need for any canning or other preservation activity. Such a domestic marketing campaign should be part of the next initiatives.

Immediate goals in the fisheries sector in Albania are to harmonize the national fisheries legislation, to monitor and control the level of the fishing effort in both marine and fresh waters to ensure that it is sustainable, to monitor and control quality of fish products, to provide some physical infrastructure (ports, fish markets) and some education and training, and to undertake marine and freshwater stock assessment work as required to manage the fisheries concerned, to create an information and statistical fishery system, to create the organizations of producers etc. There is no specific legislation that regulates fish marketing and trading in Albania. International conventions are, however, applied with regards to the public health and based

on laws No.7908 (Fishery and Aquaculture) and No.7674 (Inspection and Veterinary service) the Ministry of Agriculture and Food issues the necessary authorisation.
Concerning Fishery Regulations there are some of the general rules regarding fishing activities, according to season and fishing areas. These are listed: the minimum harvestable size lists of a number of commercially important marine and freshwater fish species; a number of marine and freshwater fish and molluscs of which, under the current legislation, any kind of exploitation is strictly forbidden; the closed seasons for selected commercially important finfish species in Albania. The fishery sector is regulated by a series of closed fishing seasons that vary depending on the fishing ground.

3. Fishery production

The fisheries sector in Albania could be classified in these main activities: capture fisheries, aquaculture, fish processing industry, and marketing and trade. Fishery production by category could be classified in capture fisheries and aquaculture fisheries. The capture fishing sector in Albania has substantial potential for development. Such development may both create sector employment and contribute to GDP. Although the quantity of marine resources of Albania is relatively contained due to the size of the country, several species appear to be highly valued in the world market. One other advantage is that Albania is physically well placed for marketing its products into the EU market.

3.1 Capture Fisheries

The capture fisheries sector in Albania comprises the following important activities: marine fisheries, coastal fisheries (inshore and lagoons) and inland fisheries.

3.1.1 Marine Fisheries

Fishing activity takes place along the entire 450 km length of Albania's coastline, including its territorial waters 12 miles offshore, bordering the international boundary. It is however concentrated along the continental shelf zone, which on the Adriatic side in the north extends 25 miles, but only 2-4 miles on the side of the Ionian Sea.
The entire fishing fleet has been privatised. The fishing fleet in Albania exercises these fishing methods: trawling, purse seining and selective catch (artisanal). In 1990, the fishing fleet numbered 110 vessels. Since privatisation during 1992-1994, the marine fishing fleet has grown and changed in structure. Table 2 indicates these changes for the period 1990 to 2002 (MAF, 2002).

Table 2. Number of fishing vessels according to fishing method, 1990-2002.

Type of catch	**1990**	**1993**	**1996**	**1999**	**2002**
Trawling	72	74	105	108	131
Selective	0	0	55	48	66
Purse seining	38	46	8	18	8
Multipurpose	-	-	-	-	7
Total	**110**	**120**	**168**	**174**	**212**

Tables 3 and 4 below indicate the types of vessel, number of fishing vessels by fishing method in each port in 2002.

Table 3. Types of vessel in the Albanian fishing fleet.

Class	Engine size (HP)	Fishing method
Trawlers	200 - 600	trawlers
Coastal	80 - 140	lines, gill-nets, etc.
Purse seiners	150 - 300	purse seiners

Table 4. Number of fishing vessels by fishing method in each port in 2002.

No Port	Number of vessels				
	Trawlers	Selective	Purse seiners	Multi purpose	Total
1-Shengjin	19	10	1	-	**30**
2-Durres	62	12	2	-	**76**
3-Vlore	43	20	5	7	**75**
4-Sarande	7	24	-	-	**31**
Total	**131**	**66**	**8**	**7**	**212**

The marine fishing fleet is based in four harbours: Shengjin, Durres, Vlore and Sarande, amounting to 212 vessels in 2002. From the fishing fleet there are actually 33 vessels not involved in fishing activity (29 in Vlore, 3 in Sarande and 1 in Shengjin).

The increased fishing from the Albanian trawlers in near-shore areas and presence of a large numbers of foreign vessels has placed pressure on the demersal stocks of Albania. As a result, there are signs of over-exploitation of demersal coastal fish resources in trawlable areas; catches per unit effort have declined and average sizes of fish caught by Albanian trawlers have become smaller. Trawlers make up the majority of vessels registered. Their catch is estimated about 400-500 kg/day with an effort of 100-120 days/year with boats of more than 200 HP (a few 600 HP vessels also exist). They mainly exploit waters up to 50 metres deep due to biological conservation restrictions. The catch is mostly hake and mullets, cephalopods (cuttlefish, octopus and squid), crustaceans (shrimps) and other demersal fish (sole, turbot, sea bream, gilthead, anglerfish, etc.).

The fish fauna of commercial interest in sea waters comprises several species and groups of demersals, small and big pelagics fishes, crustaceans and mollusks. The most important species of small pelagics are sardine and anchovy, but also mackerels, etc.

Nevertheless, Albania has the potential to explore untapped marine resources with new fishing methods, which may include pelagic species caught by purse-seiners, lampara nets and gill-nets, demersal species in rocky and deep areas applying bottom long-lines or traps.

3.1.2 Coastal Fisheries

Shoreline fishing is undertaken by 66 vessels with outboard motors and about 150 small boats without outboard motors, owned by private groups are currently applying traditional fishing with

gill-nets, hooks, and other selective gears along the coast and in coastal lagoons. All these activities are privately run.

Along the Albanian coast there are eight coastal lagoons, with a total surface area of about 10 thousand ha. Coastal lagoons are licensed to private cooperatives and entrepreneurs. Lagoon fishing follows traditional methods such as gill-nets and fish barrier. This fixed fishing gear based on the principle of V shaped traps is made of plastic pipe in the channels connecting the lagoon to the sea. Some of these boats are situated in the coastal lagoons, above-mentioned harbors and other places along the coastline. About 100 boats are equipped with outboard motors. Annual lagoon production varies from 50 to 150 kg/ha of mainly sea migratory species as grey mullets (*Mugil* spp*., Liza* spp. *and Chelon* spp.), seabass, seabream, eel, and mussels in Butrinti lagoon.

3.1.3 Inland Fisheries

Inland waters include: natural lakes (of about 25,000 ha), hydropower dams (of about 7,000 ha), agriculture reservoirs (of about 3,000 ha) and rivers. Fishing activity in inland waters is mainly based in three major natural lakes Shkodra, Ohrid and Prespa Lakes. The main fish species are Chinese carps (*Hipophthalmichthys molitrix*- silver carp and *Ctenopharyngodon idella*- grass carp), common carp-Cyprinus carpio, salmonids (such as *Salmo letnica*-koran and *Salmothymus ohridanus*-belushka in Ohrid lake), eel etc.

Albania is a country rich in water, many artificial lakes were built for energy production and irrigation. In the reservoirs created by hydroelectric power stations and in the agriculture reservoirs, new fish and juvenile fish of the cyprinidae family have been introduced in addition to the endemic fish species belonging mainly to the cyprinidae family.

Table 5 lists the most important species landed, and Table 6 lists landings according to fishing grounds and methods in 1992, 1994, 1997, 1998, 1999, 2000 and 2001 in Mt.

Table 5. The most important marine and freshwater species.

Systematic group	English name	Albanian name	Scientific name
Bivalves	mussel	midhje	*Mytilus galloprovincialis*
"	clams	vongola	*Chamelea gallina*
"	clams	verace	*Ruditapes* spp.
Cephalopods	common cuttlefish	sepie	*Sepia officinalis*
"	squid	kallamar	*Loligo* spp.
"	octopus	oktapod	*Octopus* spp.
Crustaceans	shrimp	karkalec	*Penaeus kerathurus*
"	rose shrimp	" thellesie	*Parapenaeus longirostris*
"	lobster	aragoste	*Palinurus* spp*, Homarus* spp.
Fish	shark	peshkaqen	*Squalus* spp., *Scyliorhinus* spp.
"	smoothhound	pellumb	*Mustelus mustelus*
	angelshark	skadhina	*Squatina* spp.
"	ray	raja	*Raja* spp.
"	sardine	sardele	*Sardina pilchardus*
"	sardinella	renge	*Sardinella aurita*
"	anchovy	acuge	*Engraulis encrasicholus*
"	rainbow-trout	trofte ylberi	*Oncorhynchus mykis*
"	endemic trout	koran	*Salmo letnica*

"	common carp	krap	*Cyprinus carpio*
"	silver carp	ballgjer	*Hypophthalmichthys molitrix*
"	prussian carp	karas	*Carassius auratus*
Fish	bleak	gjuhce;cironke	*Alburnus spp.*
"	european eel	ngjale	*Anguilla anguilla*
"	european hake	merluc	*Merluccius merluccius*
"	john dory	kovac	*Zeus faber*
"	grouper	kerr	*Epinephelus* spp.
"	seabass	levrek	*Dicentrarchus labrax*
"	horse mackerel	stavrid	*Trachurus* spp.
"	red mullet	barbun	*Mullus* spp.
"	axillary seabream	spalce	*Pagellus* spp.
"	bogue	vope	*Boops boops*
"	dentex	dental	*Dentex* spp.
"	seabream	koce	*Sparus aurata*
"	atlantic mackerel	skumer	*Scomber scombrus*
"	bonito	pallamid	*Sarda sarda*
"	grey mullet	qefull	*Mugil* spp., *Liza* spp.
"	gurnard	gjel	*Trigla* spp.
"	flounder	shojze	*Platichthys flesus*
"	brill	romb	*Scophthalmus rhombus*
"	sole	gjuhez	*Solea* spp.
"	angler	peskatrice	*Lophius piscatorius*

On the basis of the above there are at least some opportunities to return the volume of marine resource catches to levels achieved in the 1980s. In addition there is identified need to stabilise fish stock health in the main freshwater lakes in terms of both stock and fisheries management.

Table 6. Fish landings in Mt., 1990, 1991, 1996 and 2001.

Fish.grounds/ methods	**1992**	**1994**	**1997**	**1998**	**1999**	**2000**	**2001**
1. Marine Fisheries	1920	757	716	1847	1485	1613	2100
- *trawling*	1657	529	652	1602	1313	1410	1700
- *pelagic*	263	190	49	216	140	60	250
- *purse seining*	-	38	15	29	32	143	150
2. Coastal & lagoon	241	108	215	466	640	264	310
3. Freshwater	108	93	58	351	627	1198	850
4. Fish Farming	-	-	16	20	40	15	60
5. Mussels	300	300	104	-	200	200	350
6. Other bivalves	300	400	-	-	-	-	-
Total	**2869**	**1658**	**1109**	**2684**	**2992**	**3290**	**3630**

The main opportunities associated with these capture fisheries probably, however, lie in increasing the overall value of these fisheries - through improved targeting of fishing operations, cost control, improved handling and preservation of fish, and improved marketing - rather than simply increasing catches. Currently valued at some USD 10 m per year, it is not unreasonable to expect to be able to achieve economic growth in sector output of 10 to 20 per cent per year as a result of volume and value improvements. Thus, if a feasible growth rate of

some 15 per cent per year could be achieved in five out of ten years, this would double the overall value of capture fisheries output by 2010 (MAF, 2002).

3.2 Aquaculture

Commercial freshwater aquaculture in Albania started at the end of sixties. Warm water freshwater species (originally based on common carp, to which Chinese carps were introduced at the beginning of seventies) represent the major aquaculture production in our country. Cold water salmonides, principally *Oncorhynchus mykiss* and *Salmo letnica* are another important group for aquaculture production in Albania. Due to the economical and political transition period, production declined sharply but the last two years showed a positive trend.

Bivalves culture (especially *Mytilus galloprovincialis*) began more recently and the average production was about 2000 tons/ year and with a maximum about 5000 tons in the year 1990. Shrimp culture is still a new activity. There is only one shrimp culture farming in Albania. As regards marine aquaculture there are three small cage culture fish farms in the Saranda region for sea bream and sea bass. There are lots of possibilities to develop the marine aquaculture in Albania.

Carp aquaculture, which is based on the rearing of Chinese and common carp, is traditionally developed in Albania and it is the most widespread aquaculture practice. Maybe Albania is the first Eastern European country to introduce Chinese carp, first in 1959 and after that in 1969. For the first time we achieved artificial reproduction and mass production of fingerlings at 1972. From this time until 1990 constructing new fish farming centers all over the country with a total surface area of 215 ha, the production of fingerlings for restocking purpose arrived at more than 32 millions fingerlings of about 8 - 10 g, each. On the other hand, part of these fingerlings was used as stocking material in the fattening ponds of the semi-intensive fish farming. There were about 200 ha in, all fattening ponds and the average yield was 2 - 2.5 ton/ ha with a maximum of 5 ton/ha. In 2001, the carp production was 15 t fish and 5 million fingerlings.

Trout farming. There was also one trout farm (*Oncorhynchus mykiss*) covering 4.2 ha raceways near Saranda with a yearly production of about 250 t. The fingerlings were produced locally in a 1 ha hatchery and the pellets were imported from France and Italy. There is an excellent abundant freshwater source but the trout farm suffered from a poor feed conversion rate, low international market prices and high cost of imported feed. Currently this trout farm is out of action but there are three small private initiatives for trout cultivation with a total production about 15 t in 2001.
With the beginning of the privatization process all the hatcheries and fish farming centers both for carps and trout cultivation are privatized, but few of them are in operation. So there are working now 8 hatcheries with a total surface of about 40 ha and a yearly production of about 3 million fingerlings. This sharply declines in the fingerlings production occurs due to the political and economical transition period (absence of legal framework and financial support, land ownership problem, water price liberalization etc.). On the other hand this lack of fingerling production influences the poor stocking rate of the reservoirs, natural and

artificial lakes, and, directly, the fish catch. Besides licensed professional fishermen, there are some illegal and abusive fishermen in these ecosystems, so the problem is more complicated and the fish production has fallen.

Shrimp farming: The farming of marine species is in the initial stages of development in Albania. There is only one extensive shrimp culture farming at Kavaja with a total surface of 215 ha. It was built 30 years ago and the main production until 1992 were the fingerlings and finfish of Chinese carps. In the year 1994 a Joint Venture was founded with Italian partners named 'KAP' (Kavaja Aquaculture Production). They carried out a reconstruction of the farm and are working now on a surface of 120 ha for extensive cultivation of shrimp *Peneaus japonicus*. Annual production during the last years was from 7t to 15 t (10 t in 2000). In the near future they have foreseen that half of the farm will continue with shrimp culture and the other half of the farm is prepared to begin with species like sea bass and sea bream. There are some attempts by owners of fish farm of Narta (200 ha) to put it in operation by founding a Joint Venture with an Italian partner. Being near to the sea this fish farm shown some advantages for foreign investors

Bivalve farming: Bivalve culture has been developed since the beginning of the '60 in the coastal lagoon of Butrinti. Fixed structures are used for the production of the mussels (*Mytilus galloprovincialis*). Due to the very good environmental conditions in this lagoon, about 80 fixed concrete units were constructed there at the end of the seventies. Since this time the production of the mussels has growing year by year, arriving a maximum of 5000 tons/year in the last years of the '80s. During the last years mussel breeding was practically stopped, for internal organisational reasons, but above all because of the block on exports imposed by the EC in October 1994 for sanitary reasons, applicable to all living products of the fishery sector. There have been some attempts by private groups to put about the half of the fixed structures in operation, mainly for local market, hoping in the opening of the exportation to the EC countries in the near future. The annual mussel production in 2001 was 350t.

The cage farming of marine finfish is in its first year of production in Albania. The last year five private entrepreneurs are licensed to begin the cage farming of marine finfish (seabream - *Spaurus aurata* and seabass - *Dicentrarchus labrax*) in the few units (about 16 units and 8000m^2 marine waters), and the first production (in 2001) was about 20 t. a lot of good places for this aim have been identified along the littoral zone of the Ionian sea and there are not constraints owing to the other users. The lack of funds seems to be for the moment the most important constraint to overcome in close collaboration with foreigner investors and other international donors.

4. Fish Processing Industry and Marketing

Real knowledge of the marketing possibilities, national and international, will greatly help the fishery sector to develop better. Until the beginning of the 1990s the fish processing industry in Albania consisted of five factories producing preserved fish. However, since the beginning of the 1990s, and as a result of private enterprise and free competition, many

fishing, marketing and processing enterprises have been established. Fish processing has a good future export and offers employment possibilities in Albania. EU processing industries already invested in the processing plan in Albania and import raw material. The local market is hungry for cheap protein such as fish. There is a large space to market locally produced carps and marine fish in all cities and villages. The HACCP (Hazard Analysis Critical Control Point) system has already become a standard for all the EU exporters and Albanian processing industries must also comply with the EU standards.

Today there are 36 approved establishments (for export to the EU) that carry out processing and marketing activities for fish and fish products. All these establishments are private companies. However, the figures cannot be taken at face value, and should only be used to give an indication of the processing activities. In most cases, the figures came from informal surveys rather than systematic data collection. However, with the vast majority of these companies being formed since 1992, it shows the rapid recognition by Albanian entrepreneurs of the potential value of the fledgling processing industry as viable business ventures. In many cases, companies were already looking for investment into larger and better-designed factories or were in the process of upgrading and expanding their plants. However, it must be remembered that the 1997 pyramid scandal had a significant effect on investment, with several companies having premises destroyed during the aftermath of the collapse of the pyramid schemes and considerable losses of savings.

The fish processing industry in Albania is mainly concentrated in areas near the main harbours. These are (from north to south) Shengjin, Durres, Vlore and Sarande. Table 7 lists the 34 companies with some key statistics about each company. The companies receive, process and export fresh fish products, mainly to Italy and Greece. There are also three companies producing salted anchovies (canned or bottled) for export. Raw material is imported, mainly from Italy, Spain, Morocco and Argentina, and either arrives as frozen block or already salted in barrels. The domestic market also consumes some imported fish and fish products. These imports were initially destined for consumption, and later, as mentioned above, as raw material for processing (MAF&Eastfish, 2000).

Table 7. Fish establishments and processing factories, in 2002.

Name	**Town**	**Production(t/yr)**	**Products**
Konservimi Adriatik	Durres	not functional	canned, jars
Vival Novosel	Vlore		fresh/frozen fish
KAP Kavaje	Kavaje	10-30	fresh fish
Albamar	Durres	50-60	“
Aulona-Peshk	Vlore	60	“
Pesca Adriatik	Vlore	130	“
Sangiovani	Lezhe		“
Italpeshk	Durres		“
Peshk Karavasta	Lushnje		“
Toma	Lezhe	156	fresh/frozen fish
Ihtisara	Sarande	50	fresh fish
Limjon Peska	Sarande	75	“
Acquario-Sali Peshk	Vlore	100	“
N. Peshkimi			“

Adriapeshk		50-60	“
Goga-Shengjn		215	“
Rayk			“
Llajo			“
Fridi		50-60	“
Albit Company	Lezhe		“
Zhaku Butrinti	Sarande	50	“also live mussels
Dental Shengjin	Lezhe	220	fresh fish
Tekos Dvoran	Korce		“
Aleksandros	Sarande		“
Inca Lezhe	Lezhe		canned, jars
Inktioadria	Durres		“
Rozafa	Lezhe		fresh/frozen fish
Poseidon	Lezhe		canned, jars
Adria Mare	Durres		fresh fish
Mare Adriatik	Lezhe		“
Adriatik	Lezhe		“
Eurofish	Lezhe		canned, jars
Alxiar	Vlore		fresh fish
Jon Impex	Vlore		“

The main strength of the industry relates to its harmonised status as a fully approved “third country” for the “placing on the (EU) market of fishery products”. Albania has enjoyed this status for several years, and was one of the first Central and Eastern European countries to gain this status. Even today, only Russia, Estonia and Poland are also fully approved third countries. This allows the fishing industry to export to its near neighbours, Greece and Italy, which they do on a daily basis. This puts Albania in a strong position compared to its neighbours. One positive aspect is the widespread use of ice for fresh fish, at least in the processing plants, and all factories have (operating at between 1-4°C), and several had cold stores (-20 to -30°C). Secondly, most plants also had appropriate flooring (mostly coated concrete) and walls (mostly tiles) for processing fish, which did indicate some level of understanding of the fundamental requirements for factory design and operation under good manufacturing practice (MAF&Eastfish, 2000).

5. Fish catch distribution system

Albania has enjoyed the status of being allowed to place fishery products on the EU market except shellfish, the export of which to EU countries is banned, and this allows the fishing industry to export to near neighbors, in Italy and Greece. Before the economy was liberalized, exports were minimal. At the beginning of the 1990s, after the political and economic changes within the country began, the export of fish and other aquatic organisms grew, particularly in the private sector. It constituted about 50 % of total production during the period from 1992 to 1998 year, all exported by the private sector. In recent years the export has constituted about 10-15% of total production. There are no limits on the fish products export from Albania. The Albanian traders export the fish on a daily basis.

With the full implementation of the shellfish monitoring system and subsequent lifting of the EU ban, live mussels and other bivalves will also be able to be exported to the EU. The main requirement for the export of live mussels to the EU is the setting up of a shellfish monitoring system to guarantee the safety of bivalves harvested from water bodies. Currently Albania faces a ban due to a previous outbreak of cholera in live molluscs.

This issue is now being addressed through the development (with Italian Government support) of a monitoring system to certify the areas on the Albanian coastline and the inland water bodies that can harvest and export mussels. This is covered by EC/91/492 on placing live bivalves on the EU market. In brief, the situation is that live bivalves from waters classified as A areas (against a set of microbiological, chemical and physical criteria laid down in EU directives) can be exported from approved third countries to the EU. B areas require depuration before consumption. However, bivalves from B areas cannot be exported to the EU even after depuration, but can be used for local consumption. The export of fishery products to non-EU countries is not important for the Albanian fishery sector.

Value and quantity of Albanian fish exports in 2000, 2001 and Jan.& Feb. 2002:

2000:	407 ton	100,328,000 lek *	716,629 US $
2001:	303 ton	82,369,000 lek	588,350 US $.
Jan&Febr.2002:	52 ton	13,093,000 lek	92,204 US $.

The domestic market consumes most of the marine fish, all the freshwater fish and the fish imported. Because the Albanian consumer is poor, fish species sold on the domestic market tend to be of low quality, and therefore low price.
Until the beginning of 1990s no fish imports were recorded. With the liberalization of the economy in the early 1990s, the right conditions for importing fish were created. These imports are destined for consumption, but also as the raw product for processing. Fish is imported mostly from Italy, Greece and Spain. The most popular species imported are fresh sardine and mullet from Greece, salted anchovies from Italy and Spain, and recently frozen hake from Greece.

Value and quantity of Albanian fish imports in 2000, 2001 and Jan.& Feb. 2002:

2000:	1459 ton	93,134,000 lek	665,243 US $.
2001:	2048 ton	145,089,000 lek	1,036,350 US $.
Jan&Febr.2002:	633 t ton	24,494,000 lek	172,493 US $.

* In 2000 and 2001: 1 US$ = 140 lek; In 2002: 1 US$ = 142 lek

Currently there are five Albanian companies importing fish: 2 in Vlore, 2 in Tirane and 1 in Durres. Table 8 lists the fish imported by one of the most important companies (Rozafa, in Tirana), in 2001.

Table 8. Fish imports of Rozafa Company, in 2001.

Species	**Products**	**Imported (ton)**
seabass	fresh	30
seabream	"	22
hake	frozen/fresh	10
red mullet	fresh	2
dentex	fresh	1.5
trout	fresh/frozen	1.5
sardinella	fresh/frozen	100
sardine	fresh/frozen	2
horse mackerel	fresh/frozen	15
axillary seabream	fresh	5
bogue	fresh/frozen	5
atlantic mackerel	fresh/frozen	5
grey mullet	fresh	130
cuttlefish	fresh	10
squid	fresh	20
octopus	fresh	8
shrimp	fresh	7
Total		**374**

The value of this fish imported is 99 350 000 lek or 709,643 US$. From this company, during 2001, John dory, brill, lobster, sole, salmon etc were also imported in small quantities. (Flloko, 2002). Fish distribution channels in Albania do not have generally intermediaries between producers (fishermen or fish farmers) and consumers.
The distribution channel for fresh fish has these stages: ***Fishermen*** - ***Processors*** *(and Wholesalers)* - ***Retailers****, Hotel and* ***Restaurants*** - ***Consumers****.*

In Albanian marine fishery this is the normal fish catch distribution system, but sometimes the business outside these channels can also be used. Some producers are able to sell their production locally direct to retailers or restaurants, but in many cases it is more profitable not to sell directly to retailers. As we mentioned before, today there are approved establishments (for export to the EU) that carry out marketing activities for fish and fish products. All these establishments are private companies. These companies receive, process and sell fish products to retailers and restaurants.
In Albania, currently there are no wholesale markets, therefore we can consider these category of traders as processors. Sometimes the establishment owners are also fishing vessels owners (or co-owners).

Table 9 lists the fishing vessels of four Albanian fishing ports and the number of establishments that receive fish from fishermen (AdriaMed, 2002).

Table 9. Marine Fishery - Fish catch distribution system.

Fishing Ports	**No. of establish.**	**No.Vessels in establish.**	**No.Vessels out establish.**	**No.vessels out activity**	**Total Vessels**
Durres	8	42*(42tw)*	34	-	76*(20tw,2p,12s)*
Vlore	6	33*(26tw,7s)*	13*(4tw,3p,6s)*	29	75
Shengjin	5	29*(19tw,1p,9s)*	-	1	30
Sarande	3	7 *(6tw,1s)*	21*(21s)*	3	31
TOTAL	**22**	**111**	**68**	**33**	**212**

*The number in brackets indicates the fishing methods: tw-trawler; p-pelagic; s-small scale.

Some of the establishments export fresh fish products, mainly to Italy and Greece. There are about seven establishments exporting fish: 2 in Durres, 2 in Vlore, 1 in Tirane, 2 in Sarande and 1 in Shengjin.

6. Fish prices

Fish prices at landing, wholesale and retail as of 2001 are given in Table 10.

Table 10. Prices of fish produced in Albania, in 2001.

Species	**Prices** (lek/kg) (1 US $=140 lek)		
	from fishermen to harvest or processors	*from processors to retailers*	*from retailers to domestic market*
sea bass	1000-1200	1250	1500
sea bream	1000-1200	1250	1500
hake	500	530	600
red mullet	600	650	800
dentex	1200	1300	1500
trout	400	450	500
sardinella	100	120	200
sardine	100	120	200
horse mackerel	150	170	240
axillary seabream	800	850	1000
bogue	120	150	220
atlantic mackerel	150	180	250
grey mullet	220	250	320
common cuttlefish	350	450	600
squid	500	550	650
octopus	250	300	420
shrimp	1500	1700	2000

Unit value of imported and exported fish are given in tables 11 and 12.

Table 11. Prices of fish imported, 2001.

Species	**Prices** (lek / kg) (1US $=142lek)	
	from import	*retail*
sea bass	600	800
sea bream	600	800
hake	300	400
red mullet	500	700
dentex	800	1000
trout	300	450-500
sardinella	100	180-200
sardine	100	180-200
horse mackerel	150	230-250
axillary seabream	120	200
bogue	140	220
atlantic mackerel	170	250
grey mullet	180	250-280
cuttlefish(*clean*)	400	600
squid	400	600
octopus	250	400-450
shrimp	1500	1800-2000

Table 12. Prices of fish exported from Albania, in 2001.

Species	**Prices***(lek / kg)*(1 US $=142lek)	
	from fishermen to traders	*from traders to export*
sea bass	1000-1200	
sea bream	1000-1200	
sole	800-900	1100
hake	500	650
red mullet	600	850
dentex	1200	1800
brill	500	800
grouper	600	900
gurnard	550	900
john dory	600	1100
trout	400	
sardinella	100	
sardine	100	
horse mackerel	150	
axillary seabream	800	
bogue	120	
atlantic mackerel	150	
grey mullet	220	
angler	250	400

ray	150	280
cuttlefish	350	
squid	500	
octopus	250	400
shrimp	1500	2100

7. Conclusions

There is limited and inadequate information on the market system, but this fact makes some minimal reflections possible. The current situation of the Albanian fish market development demonstrates evident changes that characterise the market structure and organisation, although these changes are limited.

During the recent years, especially after the "financial pyramid schemes" phenomenon, the following could be remarked:

- The producing sector has changed in the last years;
- The increase of domestic fish consumption results from an increase of the market capacity, as well as an increase in production;
- Production export towards countries such as Italy and Greece, represents a good income in foreign currencies that is connected mainly with high-value species (finfish);
- The fish products importation has affected the domestic consumption; this is mainly with reference to the low-value species (small pelagics, grey mullets etc.)
- Considerable production comes from the inland freshwater species with a low economic value. These species are destined for the domestic market and are a low-cost protein source;
- The distribution network is characterised by a simple system: producers-processors-retailers-consumers. This net has weak chains and in the current situation is difficult to qualify the system in the most proper way.

Based on the raw considerations, it is possible to make some recommendations that could serve to overcome the problems of the current development of the Albanian fish market:

- Improvement of the legal framework in order to give to the sector operators, as well as public institutions, more effective ways to import and export fish products;
- Improvement of the production quality, both from the point of view of hygiene and advertising. This should be achieved through all commercial chains, up to the sellers, giving a higher compatibility of the Albanian production for exporting high-value products towards markets such as Italy and Greece;
- Higher knowledge of the national distribution system, in order to achieve the optimisation of the national production as well as the identification of the potential areas for market expansion;
- Identification of markets in neighbouring countries such as Serbia and Montenegro, Kosovo, etc.;

- Giving a higher value of the national production in the domestic and international markets;
- Carrying out a study on the Albanian fish marketing and trade system.

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Fish marketing and trading in Croatia

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Abstract

An overview of the current situation (2002) of the Croatian fishery sector is presented. Data are given on employment, investments, legislation, the fish processing industry, import/export and fish market aspects (prices, facilities, agents). In particular aspects on the regulation and organization of fish markets and trading are discussed and the Croatian strategy for marine fishery development is highlighted.

1. Introduction

The Republic of Croatia covers 56,000 sq. km and has a population of 4.5 million. Its coastal length is approximately 6,000 km since it comprises more than 1,000 islands which account for nearly 9% of the total Mediterranean coastline.

Fishing has always been an important economic activity in the coastal area. However, the position of fishery in the national economy as a whole has not been as important as one might expect. In addition, due to the transition from the socialist to the market-oriented economy and consequent reform processes (privatisation, restructuring) as well as attempts to join the international market (especially EU), the fishery sector has experienced profound changes. These include changes of legislation, institutional framework, as well as changes in ownership structure, organization of administration and management, and also those regarding the development of new economic activities within the fishing sector.

2. The position of fishery industry within the Croatian economy

2.1 Fishery sector and GDP

The average annual contribution of the marine and freshwater fishery sector to the national economy amounted to US$ 180 million over the last decade.
In terms of the GDP structure, the share of fisheries is shown in Table 1, while the growth trend is shown in Table 2.

Table 1. GDP Structure (%).

(current prices)

Year	1996	1997	1998	1999

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Table 2. GDP of fishery sector (constant prices).

Year	1996	1997	1998	1999
Indices (previous year =100)	79.6	96.6	96.8	91.4
Growth rates (%)	-20.4	-3.4	-3.2	-8.6

Source: Croatian Bureau of Statistics

In fact, the Croatian fishery sector suffered a serious downfall during the years of war. The consequences of the war conditions can be seen even in the 1996 results, when the growth rate was still enormously low. However, the fishery sector started to recover its position in the Croatian economy by the end of 1990s, which can be seen through its stable share in the GDP. The 1999 drop follows the decreasing significance of the agriculture sector in the Croatian economy in general.

2.2 Legal entities in the fishery sector

Analyse of the number and structure of the legal entities (enterprises) involved in the fishery sector of Croatia points out some significant indicators (Table 3).

Table 3. Registered legal entities in the Croatian fishery sector.

Entities	Registered legal entities		Active legal entities		Crafts & trades	
Year	**Number**	**Structure (% CRO)**	**Number**	**Structure (% CRO)**	**Number**	**Structure (% CRO)**
1997	468	0,27	-	-	-	-
1998	485	0,27	-	-	-	-
1999	500	0,27			-	-
2000	511	0,269	-	-	2.449	1,20
2001 (March)	520	0,30	231	0,30	1.535	1,75
2002 (March)	536	0,30	221	0,30	1.609	1,79

Source: Croatian Bureau of Statistics

As far as the number of registered legal entities is concerned, this number has been increasing, while the share of the fishery companies in the overall structure of the Croatian firms is quite steady. However, it has to be noted that the number of actually active registered legal entities is decreasing (still maintaining the same percentage of the total number of active legal entities). The significant indicator is by all means the number of craftsmen engaged in the fishery sector, which is rising, both in absolute values and in relative terms.

Table 4. Active legal entities according to ownership in March 2002.

	Forms of ownership								Total
	state		private		collectives		mixed		
	No.	%	No.	%	No.	%	No.	%	
Entities	5	2,3	198	89,6	11	5,0	7	3,2	221

Source: Croatian Bureau of Statistics

It is worth taking a look into the ownership structure of the active legal entities in Croatian fishery sector (Table 4). The important thing here is that the great majority of them are privately owned (89,6%). This is a profound change compared to the situation a decade ago.

Another rather interesting point is the territorial distribution of these entities (data in Table 5 are from 2001, but the structure has not significantly changed).

Table 5. Legal entities in March 2001 – territorial distribution.

	Registered entities		**Active entities**	
County	**Number**	**%**	**Number**	**%**
Zagreb	7	1,35	5	2,16
Krapina & Zagorje	1	0,19	1	0,43
Sisak & Moslavina	2	0,38	1	0,43
Karlovac	1	0,19	-	0,00
Varaždin	3	0,57	2	0,86
Koprivnica & Križevci	1	0,19	1	0,43
Bjelovar & Bilogora	9	1,73	7	3,03
Virovitica & Podravlje	-	0,00	-	0,00
Požega & Slavonija	2	0,38	1	0,43
Brod & Posavina	2	0,38	2	0,86
Osijek & Baranja	10	1,92	7	3,03
Vukovar & Srijem	1	0,19	-	0,00
Međimurje	2	0,38	2	0,86
City of Zagreb	19	3,65	7	3,03
Continental counties	*60*	*11,54*	*36*	*15,58*
Primorsko-goranska	63	12,11	25	10,82
Ličko-senjska	5	0,96	2	0,86
Zadar	68	13,08	44	19,05
Šibenik & Knin	40	7,69	18	7,79
Split & Dalmatia	165	31,73	57	24,68
Istria	86	16,54	31	13,42
Dubrovnik & Neretva	33	6,35	18	7,79
Coastal counties	*460*	*88,46*	*195*	*84,42*
Croatia	***520***	***100,00***	***231***	***100,00***

Source: Croatian Bureau of Statistics

Assuming that the legal enterprises in the continental part of Croatia are involved in freshwater fishing and those in coastal counties in marine fisheries, it becomes quite clear that the marine fishery dominates in the Croatian fishery sector. However, it should be noticed that more than half (60%) of the continental entities are active, while only 42,39% of the entities registered in fishery in the coastal areas actually operate. They still make 84,42% of total active entities.

2.3 Employment

The data on employment in the fishery sector in Croatia are shown in Table 6.

Table 6. Employment in legal entities in fishery sector in Croatia 1999-2002.

	1999		2000		2001		2002 (March)	
	Total	Women	Total	Women	Total	Women	Total	Women
Fishery	1.140	212	1.137	201	1.214	231	1.239	221
% CRO	0,11	0,04	0,11	0,04	0,11	0,05	0,12	0,05

Source: Croatian Bureau of Statistics

Thus, it can be concluded, that employment in the Croatian fishery sector is low but its share in total employment is stable. Moreover, the distribution of employment over the legal entities in the counties is rather interesting to analyse (Table 7).

Table 7. Employment in the legal entities in fishery sector in Croatia (March) 2000 – territorial distribution.

	Employment		Women	
County	**Number**	**%**	**Number**	**%**
Continental counties	*442*	*38,80*	*60*	*29,56*
Primorsko-goranska	115	10,10	43	21,18
Ličko-senjska	31	2,72	3	0,49
Zadar	290	25,46	40	19,70
Šibenik & Knin	24	2,11	5	2,46
Split & Dalmatia	91	7,99	13	6,40
Istria	97	8,52	35	17,24
Dubrovnik & Neretva	49	4,30	4	1,97
Coastal counties	*697*	*61,20*	*143*	*70,44*
Croatia	***1.139***	***100,00***	***203***	***100,00***

Source*:* Croatian Bureau of Statistics

It should be noted that ca 85% of total number of total legal entities, those registered in the coastal areas, refers to only 61,20% of total employment in the fishery sector. The largest percentage of the employment is found in the Zadar County. Other data show that more than half of the people employed were engaged in the private sector at the time.

Moreover, the analysis of employment in crafts and trades related to the fishery sector in the year 2000 shows that this part employed 2.449 people, which is more than double compared to the legal entities. 62,23% of all those employed were the owners themselves, and the remaining 37,77% were employees. Therefore, the Croatian fishery sector employed 3.588 persons in 2000, out of which only 31,74% in the registered legal entities.

Two thirds of total employment in fishery refers to the crafts and trade sector. Data on employment, however, are not very dependable, since they include a rather high level of estimation.

Nonetheless, the percentage of those employed in the fishery sector in total employment figures in Croatia in 2000 was 0,4% on average, while it tended to grow to 0,7% in the private sector. As far as employment is concerned, it would be interesting to take a brief look

at the data on the structure of legal entities according to the number of people employed (Table 8).

Table 8. Active registered legal entities according to the number of employed persons (March 2002).

Number of employed													
0		1 - 9		10 - 49		50 - 249		250 - 499		500 >		Total	
No	%	No	%	No	%	No	%	No	%	No	%	No	%
84	38,01	106	47,96	27	12,22	3	1,36	1	0,45	-	-	221	100,00

Source: Croatian Bureau of Statistics

As seen, the largest part (85,97%) of the active entities refers to the small firms with up to 9 people employed. The remaining 4 legal entities are presented in Table 9.

Table 9. Legal entities with more than 50 employed persons (March 2002).

Name of the entity	Place	County	No. of employed
"Neptun"	Komiza (Vis)	Split-Dalmatia	79
"Mardešić"	Zadar	Zadar	185
"Sardina"	Postira (Brač)	Split-Dalmatia	218
"Adria"	Zadar	Zadar	254

Source: Croatian Chamber of Commerce

It seems quite intriguing that the largest legal entities of the fishery sector involve both marine fishing and fish processing. Two of them are located on the islands of the Split-Dalmatia County, and two of them are in Zadar, on the coast. Data on the salaries in the fishery sector are shown in Table 10.

Table 10. Monthly paid (net) salaries in the fishery sector.

	Average net salary (Kn)		Real index (previous year)	
Month / Year	Croatia	Fishery	Croatia	Fishery
November 2000	3.503	2.321	100,9	103,6
May 2001	3.625	2.393	100,7	92,2
October 2001	3.538	2.677	102,5	134,6
March 2002	3.622	2.603	99,6	100,2

Source: Croatian Bureau of Statistics

So, the average net salary in the fishery sector varies a bit, but it has always been, at average, ca 71-72% of the average salary in Croatia, which is rather low salary compared to the costs of living and certainly is not an encouragement to get involved in the fishery sector.
Data on the reported vacancies in the fishery sector speak in favour of this statement (Table 11).

Table 11. Reported vacancies in the fishery sector in Croatia.

	1998		1999		2000	
	Croatia	Fishery	Croatia	Fishery	Croatia	Fishery
Vacancies	131.498	226	134.655	182	148.186	290

Source: Croatian Bureau of Statistics

2.4 Grey economy

The above-listed data are based on official statistics. It relies on the business records and statistical reports by the legal entities and craftsmen. However, the administration is very well aware that official reports do not represent a complete and/or accurate reflection of what is actually going on in the fishery sector. Therefore, a study was done so as to estimate the extent of grey economy (unregistered employment, unreported income etc.) in the Croatian economy. As far as the fishery sector is concerned, it was estimated that the unregistered added value was about 13,77% of the registered added value in 1998 and about 11,63% in 1999.

2.5 Investments

There have been some substantial investments in the Croatian fishery sector recently. In fact, according to the statistics, there were investments not only in fixed but also in new fixed assets in the fishery sector. Following is the data for the year of 1999.

Table 12. Gross fixed capital formation in fixed assets by technical composition.

(000 Kn)

	Technical composition				**Total**
	Construction	Equipment			
Sector	woks	domestic	imported	Other	
Croatia	17,741.029	4,358.002	7,464.453	1,765.829	31,329.313
Fishery	888	2.209	1.897	365	5.359

Source: Croatian Bureau of Statistics

Obviously, investments in the fishery sector (0,02% of total) were dedicated mainly to the acquisition of equipment (76,62%), while only a modest part of them was directed to construction works (16,57%), Table 12.

Table 13. Payments for gross fixed capital formation by main forms of investment.

Payments for gross fixed capital formation in fixed assets				
own assets	joint assets	financial credits	funds & budgets	total
70,51	-	29,49	-	100,00

Source*:* Croatian Bureau of Statistics

It can thus be concluded that the Croatian fishery sector is self-dependent. All the investments were financed by privately owned assets or through financial credits (Table 13).

It is interesting to notice that the investments in this sector were not encouraged or co-financed by any fund or budget whatsoever. However, there were also some investments in new fixed assets in 1999 (Table 14).

Table 14. Gross fixed capital formation in new fixed assets.

(000 Kn)

Sector	Technical composition				Total
	Construction works	Equipment		Other	
		domestic	imported		
Croatia	16,656.592	4,213.698	7,213.980	1,171.522	29,255.792
Fishery	900	2.053	1.830	1.129	5.912

Source: Croatian Bureau of Statistics

Although the share of fishery sector in the investments in new fixed assets is the same as above, the data on the kind of construction works are rather optimistic: 27,22% of the new investments refers to the construction of new capacities, 45,74% to the expansion, reconstruction and renovation, while the rest went to the replacement. To get a more detailed insight into the investments in new fixed assets in 1999, let us mention that most (81,38%) of the total investment came from the fishery sector itself, while the remaining part was invested by the companies registered in the sectors of agriculture (3,08%), food processing industry (13,08%) and production of transportation equipment (2,47%). At the same time, companies registered within the fishery sector invested in that very sector (97,09%) and also in the sector of wholesale and retail trade (2,91%). It can thus be concluded that the fishery sector becomes attractive to the trade and food processing sectors on one hand, and that companies involved in fishing expand their activities to the trade industry on the other hand. Another interesting aspect of investment analysis regards the territorial distribution of the investments in new fixed assets in the same year.

Table 15. Gross fixed capital formation in new fixed assets by location.

County	%
Zagreb	13,31
Bjelovar & Bilogora	1,42
Virovitica & Podravina	3,08
Osijek & Baranja	4,70
Continental counties	*22,51*
Primorje & Gorski Kotar	2,33
Ličko-Senjska	-
Šibenik & Knin	-
Zadar	32,70
Split & Dalmatia	16,28
Istria	4,82
Dubrovnik & Neretva	21,32
Coastal counties	*77,49*
Croatia	*100,00*

Source: Croatian Bureau of Statistics

Obviously, structure of the investments in new fixed assets by the territory largely corresponds to the structure of the legal entities involved in fishery sector (Table 15).

3. Legislation

Marine fishery in Croatia is regulated by two major laws: Law on Marine Fishery (1997) and the Code on Professional fishing on the sea (2000).

Nevertheless, the Croatian Parliament is about to enact the Strategy of the Development of the marine fishery in Croatia, which imposes some specific tasks and objectives to the fishery sector. As far as marine fishing is concerned, it would imply balanced long-term catch of fish and other marine organisms. In the area of mariculture, it implies an increase in production of fish and shellfish, with high quality standards and obeying ecological principles. In the terms of fish processing industry, it would mean better utilisation of the small pelagic fish as the most important resource. Finally, in the framework of fish markets, it would imply the set up of the system of fish trade and distribution, probably in the form of organized fish markets and auctions.
There are also several by-laws and directives regulating various aspects of fishery (incentives and subventions; compensation for damages; fishing quotas etc).

As far as the fish marketing, distribution and control are concerned, there are some basic laws and directives regulating not particular this area, but food in general. They address standards of quality (controlled by authorised institutions), standards referring to the quantities of metals and non-metal compounds in the fresh fish and fish products, standards of transportation as well as the standards of sale of fish, other marine organisms and their products.

At last, there are a few directives defining foreign trade in terms of fish, marine organisms and their products (import – export quotas, duties regime etc.).

4. Marine fishery

Marine fishery has always played an important role in the Croatian coastal zone. Although a traditional economic activity, marine fishing was modernised after the World War II, and the catches kept on rising (Table 16).

Table 16. Catches of sea fish.

(tonnes)

Year	1947	1952	1957	1962	1967	1972	1977	1982	1987	1989
Catch	11.766	14.776	17.320	16.401	26.574	25.981	31.006	35.368	46.324	41.210

Source*:* Buturić, Š.: "Tisuću godina prvog spomena ribarstva u Hrvata", HAZU

In the nineties, fishing efforts were redirected resulting in a doubling of the number of trawlers and boosting the catch of demersal species. The increased catch of demersal fish

over the period coincided with decreased catch of pelagic fish. In reaction to the significant increase of demersal catch fish, Croatia prohibited the introduction of new trawlers.
At the same time, emphasis was laid on the small pelagic fish and their processing in view of the fact that this species is insufficiently exploited and that its catch may provide new jobs in the fish processing industry (Table 17).

Table 17. Catches of sea fish and shellfish.

(tonnes)

Year	Catch			
	Pelagic	**Demersal**	**Other**	**Total**
1990	26.440	6.049	2.412	34.901
1991	13.678	3.624	1.474	18.776
1992	18.620	5.892	1.951	26.463
1993	16.583	6.694	2.490	25.767
1994	9.395	5.090	2.075	16.560
1995	8.524	4.974	1.866	15.364
1996	11.322	4.189	1.836	17.347
1997	10.071	3.901	2.054	16.034
1998	15.659	4.101	2.155	21.915
1999	17.518	2.498	1.348	18.866
2000	19.447	2.365	1.524	20.971

Source: Croatian Chamber of Economy, Croatian Bureau of Statistics

5. Mariculture

Sea bass and sea bream are the dominant farmed species in Croatia. Owing to Croatia's marine ecological setting, sea bass is deemed the more suitable of the two. Additionally, tuna are ranched in the Central Adriatic, and there is a very small production of several other commercial species. The two main shellfish species cultivated in Croatia are the European flat oyster and Mytilus (Table 18).

Table 18. Production of sea fish, oysters and mussels.

(tonnes)

Year	Production					
	seabass	sea bream	other fish	oysters	mussels	total
1989	1.152	595	53	53	900	2.753
1999	1.300	450	19	52	1.100	2.921
2000	1.300	800	35	37	1.111	3.283

Source: Croatian Bureau of Statistics

Thirty-one companies farm sea bass and/or sea bream along the Croatian Adriatic and seven ranch tuna. Tuna production, according to export data, has increased dramatically from 39 t in 1996 to 1.100 t in 2000.

Nevertheless, it is the goal of the Croatian Government to increase annual mariculture production of fish to 10.000 t and that of shellfish to 20.000 t within next decade.

Currently, there is insufficient hatchery capacity in Croatia to support the demand of the grow-out sector. The shortfall of ca 8 million fingerlings for the 2000 stocking season was supplied through imports (mainly Sicily). Moreover, the labour force engaged is also rather low. Thus, it is necessary to set up 3-4 modern hatcheries, each of 12-15 million fingerlings annual capacity to meet the requirements of the mariculture sector. In addition, appropriate shellfish hatchery facilities should also be established. In the terms of feed, it would mean 22.000 to 28.000 T per year. The rapidly growing sector of mariculture demands extra labour force as well. The demand is estimated at 500 – 800 trained persons within the next ten years.

However, there are some problems regarding the range of the farming areas and the concessions needed to this end. Next issue will be the phasing out of the government incentives currently available for mariculture as well as the lowering of the import duties.

6. Fish processing industry

Of the 59 fish processing plants operating after the World War II only 7 are still in business. These have enlarged their production capacities in the meantime, but the overall national output has fallen to the present 30.000 T a year. There is also 14.800 T of available refrigeration capacity, which provides about 2.500 jobs.
The Croatian processing industry has traditionally been canning small pelagics, mainly sardines, anchovies, etc., and the bluefin tuna. A typical product is canned sardine in vegetable oil, both in steel and aluminium cans. Other products include mackerel, sardines and sprat in vegetable sauce, smoked fillets in oil, etc.
Some of the companies are trying to diversify production to value-added products, such as marinated fish, frozen fish fillets, salted and smoked delicacies etc., yet with limited success compared with the less expensive imports.
Other companies have specialised in frozen fish products from both domestic and imported fish, developing a range of ready-to-serve products for supermarkets as well as restaurants. This pattern is particularly followed by the small entrepreneurs emerging over the past few years in the tourism sector.
Sterilized canned fish accounts for more than 90% of the total output of the fish processing industry. This narrow structured production needs to adapt to the markets that show an increasing preference for fresh fish rather than canned fish. Some traditional fish products, such as salted and smoked fish are much in demand on the limited but prosperous end of the consumer market. Only recently some small business are emerging, specialized in this type of production.
While sterilized canned fish accounts for more than 90% of the total output of fish processing industry, pilchard has by far the biggest share in it, while others (anchovy, bluefin tuna, mackerel) lag behind. The production assortment therefore has to be enriched and diversified as to meet different market requirements.

7. Export and import

Foreign trade has always been an exceptionally interesting feature of the Croatian fishery. In fact, fishery is the only sector within the Croatian food production industry that has maintained a positive balance of trade. The following tables contain data for the last three years (Tables 19 and 20).

Table 19. Export of fish and fish products by volume and value.

1998		**1999**		**2000**	
T	USD	T	USD	T	USD
19,11	43,374.795	17,70	35,059.348	18,25	43,977.357

Source: EUROFISH 1/2002, pp. 60

Table 20. Import of fish and fish products by volume and value.

1998		**1999**		**2000**	
T	USD	T	USD	T	USD
12,88	29,930.756	14,56	28,567.309	25,53	33,098.275

Source: EUROFISH 1/2002, pp. 60

There were, of course, certain oscillations in the foreign trade figures over the years. These can be explained by the amounts of stocks of particular species as well as the crisis in the fish processing industry (as one of the most important segments of the Croatian fishery). However, one should consider the fact that the imports have been on constant increase regardless of the fact that the purchasing power of the average Croatian family has not increased at all during the last decade.

The comparison between the quantity and value of the imports and exports points out that the differences between the imported/exported quantities are lower than those in values. It can therefore be concluded that the fish of lower prices and (presumably) quality is imported to the Croatia while the export consists of fish of higher price.
That would be in absolute concordance with the purchasing power of the average clients in Croatia and in the countries importing Croatian fish and fish products. Such a trend will continue until the purchasing powers become equal or until importing countries raise their import barriers.

7.1 Imports of fish and fish products

Although the imports of the fish and fish products do not make a significant part of the total imports of food, it seems worthwhile to analyse the structure of the imports in terms of possible substitution of at least some items by domestic products (Table 21).

The analysis shows that the structure of imports is stable. The following is the imports structure for the period between 1994 and 1998.

Table 21. Imports structure 1994-1998.

Year	1994		1995		1996		1997		1998	
Import	ton	000 USD	ton	000 USD	ton	000 USD	ton	000 USD	ton	000 USD
Fish	7.268	17.616	8.755	18.137	10.326	21.287	12.083	26.162	10.653	23.999
Fish products	1.707	3.418	1.881	5.138	2.789	6.814	1.371	4.109	2.201	5.931
Total	8.975	21.034	10.636	23.275	13.115	28.101	13.454	30.271	12.854	29.930

Source*:* Ministry of Finance; Ministry of Agriculture and Forestry

The quantities and types of imported fish change from year to year. However, most imports involve the following fish products: fish fillets (frozen), frozen molluscs as well as dried and salted fish. Moreover, it has to be noticed that Croatia imports products of low-priced fish, as well as that there is rather low consumption of fresh fish (of highest quality and price). It is quite obvious that Croatians import and consume fish and fish products of a lower price and lower quality, which corresponds to their purchasing power. However, it should also be stressed that a considerable part of the imported frozen fish goes to the fish processing industry. Moreover, another important issue is the import of "raw materials". For example, almost 2 million USD of imports in 1998 related to the live sea fish dedicated to fish production. Another interesting issue is that the foreign trade balance is negative in the cases of crustaceans, fish fillets and dried fish. As far as the countries exporting to Croatia are concerned, their structure is shown in Table 22.

Table 22. Countries exporting fish and fish products to Croatia (1998-2000).

Year	1998		1999		2000	
Country	000 USD	%	000 USD	%	000 USD	%
Argentina	3.698	12,35	2.813	9,85	1.688	5,10
Austria	1.688	5,64	548	1,92	1.034	3,12
China	468	1,56	843	2,95	1.837	5,55
Denmark	993	3,32	910	3,19	1.464	4,42
Germany	1.891	6,32	1.212	4,24	1.127	3,40
Iceland	573	1,91	1.061	3,71	992	3,00
Italy	6.018	20,10	4.163	14,57	4.527	13,67
The Netherlands	1.586	5,30	1.341	4,69	681	2,06
Norway	1.497	5,00	2.279	7,98	1.843	5,57
Poland	242	0,81	250	0,88	1.642	4,96
Slovenia	949	3,17	1.103	3,86	1.122	3,39
Spain	5.980	19,97	7.288	25,51	7.540	22,77
Sweden	46	0,15	847	2,96	1.420	4,29
USA	183	0,61	603	2,11	1.135	3,43
Other	4.119	13,76	3.306	11,57	5,046	15,24
Total	29.931	100,00	28.567	100,00	33.098	100,00

Source*:* Ministry of Agriculture and Forestry, Fishery Directorate

As it may be seen from the Table 22, the main exporters to Croatia are Spain and Italy, followed by Argentina. However, some new countries are entering Croatian market, such as China, Denmark, Poland, Sweden or USA. The main imported product from these countries is frozen fish (different species).

7.2 Exports of fish and fish products

In spite of a kind of trade isolation Croatian fishery faces, with exports of fish and fish products is stable and significant. At the moment, there is ca USD 25 million of surplus in the trade balance each year. Nevertheless, this situation can be further improved, based on the natural advantages and biological potentials.
To this end, it seems necessary to join international trade integrations and organizations. In that case, the Croatian fish export would certainly exceed the imports even more, especially regarding some traditional fish products (such as canned sardine, cultivated sea fish, some freshwater species etc).

According to the data provided by the Croatian Bureau of Statistics, export of fish and fish products represents 1,0-1,5% of total Croatian exports. The following Table, Table 23, contains data on exports for the period between 1994 and 1998.

Table 23. Exports of fish and fish products between 1994 and 1998.

Year	**1994**		**1995**		**1996**		**1997**		**1998**	
Export	ton	000 USD	ton	000 USD	ton	000 USD	ton	000 USD	ton	000 USD
Fish	10.705	31.837	8.230	25.917	7.336	27.078	11.806	33.807	7.989	21.205
Fish products	10.091	18.943	8.214	19.766	9.795	22.518	12.954	26.797	11.124	22.168
Total	20.796	50.780	16.444	45.683	17.131	49.596	24.760	60.604	19.113	43.373

Source: Ministry of Finance; Ministry of Agriculture and Forestry

It is quite obvious, though, that the prices of fish are much higher than for the fish products. Consequently, the fresh demersal species are most frequently exported.
On the other hand, most of the fish processed in the food industry in Croatia refers to the cheap small pelagic. Moreover, according to the same source, the highest revenue (ca USD 6 million) was gained through the tuna export (ca 600 tonnes). As far as fish products are concerned, the highest revenue (ca USD 20 million) is associated with the exports of ca 10.000 tonnes of canned sardine.

The differences in prices and their trends point out, beyond a shadow of doubt, that both biological and economic regularities have to be taken into account when creating development policy for the fishery sector. Naturally, they have to be expressed through the laws and regulations.

As stated before, there are two main parts of exports. The first refers to fresh fish and the other to canned sardines. Principal importers of the first group are Italy and Slovenia (almost

90% of total export), while the canned products go to the CEFTA countries, Austria, Czech Republic, Bosnia and Herzegovina, Macedonia and Slovakia. It seems reasonable to expect that such a structure of countries importing Croatian fish and fish products (as shown in Table 24) would remain the same during the next few years.

Table 24. Countries importing Croatian fish and fish products (1998-2000).

Year	**1998**		**1999**		**2000**	
Country	000 USD	%	000 USD	%	000 USD	%
Austria	4.117	9,47	2.225	6,34	1.835	4,17
Bosnia&Herzeg.	6.897	15,86	4.778	13,62	4.320	9,81
Czech Republic	4.324	9,95	2.529	7,21	761	1,73
Italy	11.940	27,46	11.259	32,09	10.017	22,74
Japan	6.012	13,83	5.075	14,46	13.349	30,30
Macedonia	2.343	5,39	3.008	8,57	1.905	4,32
The Netherlands	300	0,69	146	0,42	1.070	2,43
Slovakia	1.789	4,11	1.198	3,41	603	1,37
Slovenia	3.150	7,25	3.418	9,74	2.624	5,96
Spain	102	0,24	9	0,03	3.785	8,59
Serbia and Montenegro	-	-	664	1,89	2.119	4,81
Other	2.401	5,52	750	2,14	1,609	3,65
Total	43.375	100,00	35.059	100,00	43.977	100,00

Source: Ministry of Agriculture and Forestry, Fishery Directorate

Some changes, however, could happen due to the integration processes. In fact, the EU market used to be a main export market of the Croatian fishery sector up to the end of the eighties. Introduction of high import barriers (15-25% duty tax) in these countries resulted in a shift to the export destination countries' structure. However, they are still main importers of the fresh fish. At the same time, there were no such problems with the countries of the Central and Eastern Europe, which import fish products from Croatia.

Presently, there are some quotas and import duties imposed on the imported fish and fish products. However, having joined the WTO, Croatia has initiated the process of phasing out the import duties and quotas, especially those relating trade with the EU and CEFTA, as well as implementation of bilateral agreements (e.g. Slovenian case). Still, some products are and will not be allowed in Croatia, for example the meat and product of whales.

8. Croatian sea fish market

8.1 Fish prices

Croatian Ministry of Agriculture and Forestry set up the Agriculture Market Information System (TISUP) in 1998. It collects the prices (at county level as well as national level) of

various agricultural products, including sea fish (catch and mariculture) on monthly basis (since January 1998).

8.1.1 Prices of sea fish from fish production

The prices indicated below (Table 25) are collected from the producers (fish farms).

Table 25. Average prices for sea fish from fish farms (Croatia).

(Kn; 1Euro= 7.60 Croatian Kuna)

Fish/Year	1998	1999	2000	2001
Mussels	6,43	13,37	-	-
Oysters	9,60	9,76	-	-
Sea bream (120-200 gr)	45,30	49,13	35,37	32,50
Sea bream (200 - 250 gr)	49,48	50,28	35,37	37,42
Sea bream (250 – 350 gr)	54,17	53,50	45,86	45,60
Sea bream (350 – 450 gr)	60,61	58,93	50,12	45,60
Sea bream (450 gr >)	67,97	65,34	58,87	51,40
Sea bass (150 – 200 gr)	43,77	44,45	34,04	36,25
Sea bass (200 – 250 gr)	48,28	48,02	39,06	41,30
Sea bass (250 – 350 gr)	54,25	52,14	45,35	57,40
Sea bass (350 – 450 gr)	60,03	56,69	49,79	57,40
Sea bass (450 gr >)	67,93	63,91	57,68	70,00

Source*:* TISUP

There is obviously a constant demand for sea fish from fish farms on the Croatian fish market. Comparing the two main fish sorts, sea bass and sea bream, and keeping in mind the natural conditions for their production (resulting in the quality of fish), it seems quite reasonable to expect somewhat higher prices of sea bass, regardless of its increasing supply. The sea bass price has been stable at 70,00 Kn/kg for a year and half.

8.1.2 Prices for sea fish catch

The prices indicated below are collected at the purchase stations (Table 26).

Table 26. Average prices for sea fish catch (Croatia).

(Kn)

Fish/Year	1998	1999	2000	2001
Seabream I	59,76	29,00	44,00	40,50
Seabream II	18,00	14,33	26,15	28,00
Bogue	6,57	3,13	5,71	5,17
Monk fish	45,13	-	30,05	55,00
Silverisdes	16,53	7,97	5,50	6,92
Picarels	7,26	4,88	3,00	6,00
Amber-jack	23,00	12,95	15,00	14,00
Sting-ray	13,14	4,61	4,99	4,67
Angler-fish	21,23	24,72	30,45	25,67
Lobster	125,00	-	-	150,00

Octopus	23,38	21,85	21,00	21,15
Mussels	8,88	8,00	6,00	-
Soles II	19,80	25,33	14,78	33,67
Mackerel	6,80	5,67	5,00	6,19
Sea bass I	59,29	73,75	56,00	24,00
Sharks	17,12	16,73	20,42	19,30
Musky octopus	10,89	10,58	9,61	9,49
Cuttle fish	25,22	18,83	20,40	21,00
Pilchard	2,46	2,48	3,17	3,63
Horse mackerel	5,41	4,33	5,83	6,02
Norway lobster category I	80,45	79,96	85,91	102,44
Norway lobster category II	60,79	71,35	73,56	78,70
Norway lobster category III	20,04	27,77	28,18	34,07

Source*:* TISUP

These prices really do reflect the changes in the supply; there is virtually no rule, but the price depends upon the season and the catch volume. These are average prices for Croatia as a whole, but the prices across the counties also vary. However, these are the prices at the purchasing stations. These are also very specific and act as a wholesale stations. It should be pointed out that not all the catch is brought to these stations, and thus the data are not complete (e.g. previously contracted catches, direct sale, sale abroad etc.).

8.2 Available facilities

It can be claimed that the very basic precondition for fish and fish product trading are available refrigeration capacity. According to the data provided by the Ministry of Agriculture and Forestry of the Republic of Croatia, there are 66 production and crafts constructions registered for the storage of fish and fish products. In addition, there are 21 facilities registered for some other kind of food processing industry or trading that is, at the same time, licensed for the storage of fish and fish products.

Taking into consideration the number of these facilities, it can be argued that there are enough refrigeration capacities in each important fishing port or settlement to meet the needs of fish processing and trading. It should be stressed again that these capacities meet the EU standards.

However, since some of the facilities are multipurpose, it is rather hard to estimate precisely total capacity of refrigeration facilities dedicated to fish and other sea organisms. Nevertheless, it undoubtedly meets the needs of processing industry. In some cases there is even a surplus of the refrigeration capacities for a large number of enterprises operates below their real production capacity.

8.3 Agents at the Croatian fish market

At the very beginning, it should be clearly stated that the fishery sector marketing as well as fish markets are rather undefined, unorganised and therefore changeable depending upon the occurrences in the environment. Fish and other sea and freshwater organisms are sold mainly at wholesale level (purchasing stations in the case of marine catches; sometimes illegal/non-registered), while only a minimum part of them are sold at local fish markets. A substantial part of the total fish quantity is exported.

8.3.1 Fishers

The very first agents in the "fish market chain" are fishers, i.e. those who posses the fishing licences (licences for professional fishing). Their number is recorded by the Ministry of Agriculture and Forestry, Directorate of Fishery (Table 27).

Table 27. Number of licences issued by the offices of the Directorate of Fishery (2001).

Office	**No. of licences**
Pula	707
Rijeka	520
Senj	55
Zadar	270
Šibenik	275
Split	650
Ploče	15
Dubrovnik	195
Croatia total	***2.687***

Source*:* Ministry of Agriculture and Forestry of the Republic of Croatia

The volume and structure of the Croatian fishing fleet is not the issue here, let us just point out that it is rather old and obsolete and therefore quite inefficient.

8.3.2 Wholesale level

There are no fish markets in the Republic of Croatia. Thus, the fish distribution and trading system is not similar to those in the West European countries at all. In fact, fish and other sea organisms are usually sold directly from vessels or hatcheries to the wholesalers. They distribute the products to the market. Producer's distribution/sales network is rather rare.

The wholesale level comprises two kinds of enterprise. The first refers to the private wholesalers who purchase fish and other sea organisms directly from the fishermen/producers and then distribute them through the retail network. They operate through the so called "purchasing stations". In fact, they are either independent firms or part of a larger company. In any case they are registered for export and must posses certificates issued by sanitary and veterinary authorities. There are 54 such stations in Croatia. Their territorial distribution along the coastal counties is shown in Table 28.

Table 28. “Purchasing stations” – territorial distribution.

Coastal County	No. of stations
Istria	18
Primorje & Gorski Kotar	7
Zadar	8
Šibenik – Knin	4
Split – Dalmatia	5
Dubrovnik - Neretva	2
Total	**39**

Source: D. Skoko; Croatian Chamber of Trades and Crafts

It seems necessary to stress here that none of these stations meet completely basic preconditions as wholesale marketplaces. In fact, in most cases the infrastructure (if any, especially on the islands), i.e. piers, warehouses, fridges etc., was constructed according to the needs of the fish processing industry. The collapse of the industry was not accompanied by the adequate state policy so that the facilities and the initiative were left to those with entrepreneurial spirit but with little or no capital, experience or knowledge of the matter.

The second kind of enterprise concerns those specialized in trade and/or processing of fish and other sea organisms. They also buy directly from the fishermen/producers and then channel the fish either to their own production or selling facilities. All those enterprise do not succeed in substituting fish markets, influencing a great deal trade, fish supply and price as well as fish consumption.

8.3.3 Retail network

Retail trade is mainly based on small private shops. According to the Croatian Chamber of Trades and Crafts there are 108 traders registered to sell fish within the retail network. They i.e. their small shops make the basis of the retail network for fish and fish products.

At the same time, large companies involved in the fish and fish products retail sale are almost non-existent. In fact, large enterprises are focused on wholesale or exports.

It should also be noted that there are two additional ways of fish trading (retail sale). One of them is typical for the settlements along the coast and is based on local, public fish markets. Fishermen rent a post within the fish market for a day or longer and sell their fish and other sea organisms there. The second refers to the continental part of the country where fishermen supply their own or rented shops and fish markets. The supplies consist of the catches of their own and/or other acquired species and goods.

8.3.4 Supply of fish and fish products at the Croatian fish market

Supply of fish and fish products reflects the conditions in the overall fish trading system. In short, it is rather small in comparison with the production and consumers potentials.

Brief analysis of the market shows that the levels of supply differ in terms of various fish products:

- The best is the supply of the products of the fish processing industry (cans). These products are mainly domestic but also imported and sold throughout the retail network (a large number of food stores and markets). Their advantages are duration and affordability.
- The supply of the "fast food" products is somewhat worse, although it implies various sources and distribution channels. These products encompass dried, smoked or salted fish. Actually, the demand for these articles is always higher than the offer, especially considering diversified assortment.
- The worst is the situation regarding the supply of fresh fish. The reasons are not to be found in small catches or production, but poor organization of fish trading and sales as well as consumers' preferences to meat over fish. Therefore, concerning new trends towards natural and healthy food, it could be expected that demand for fresh fish would increase. The supply side would have to accommodate changing demand.

On the other hand, analysing the supply from the standpoint of domestic/imported products, the following can be concluded:

- Most cans are produced in Croatia;
- The largest portion of the frozen and "fast food" fish products comes from imports, especially referring to the species not caught in the Adriatic Sea;
- Domestic catch/production meet the demand for fresh fish almost entirely. Imports are not significant in the terms of either quantity or value.

Consumption of fish and fish products is significantly influenced by the traditional attitudes and habits in different regions of Croatia. In general, it can be stated that the population in coastal zone consumes far more fish and fish products than the population in the hinterland.

There are numerous estimations of fish consumption in Croatia. They point out that the average Croatian consumes 5-9 kg of fish per year. However, it must be observed that almost all of them were based on total catches, enlarged by imports and diminished by exports. Taking into account rather unrealistic data on total catch, these estimations are not concerned reliable. Moreover, analyses show that real total catch is ca 20-30% higher than official figures, so that the average fish consumption should be corrected by the same percentage.

8.3.5 New initiatives

The Croatian fish market is not organized and is weakly regulated. Distribution and trade channels need to be improved and made more efficient so as to make fish trading simpler and cheaper. Within such a framework, the discussion on fish market has been going on for some time now, but the agreement on what should be done has not been achieved.

According to the recent national strategy of the marine fishery development, several new fish markets should be established. “Fish market” implies a wholesale fish market with auctions.

It is the firm belief of the Ministry of Agriculture and Forestry that such a type of fish market would efficiently regulate the supply and demand. First, fishers would benefit from it since they would no longer depend on traders and would be able to sell their catch directly at the market. At the same time, such a market guarantees the quality of fish. Secondly, this fact is

beneficial for the customers. Thirdly, state administration can pursue an accurate and efficient monitoring system over the sea resources as well as over the market prices, supply and demand. This would be of ultimate importance when deciding upon the policies towards the fishery sector. Fourthly, the number of "mediators" at the fish market would be significantly reduced, ultimately resulting in real prices of fish.

The state is willing to take some steps in this direction. Besides the strategy of fishery development and some consequent directives, it approved the two fish market projects, one in Pula (Istria) and the second in Komiža (island of Vis). The designs are completed, financial sources found and the realisation should begin soon.

9. Notes on data collection methodology

9.1 Data and methods of data collection

For the purpose of fishing surveys and basic indicators in the area of freshwater and marine fishing, data are collected on personnel, basic fishing means, vessels, fishing equipment, catches and production of sea and freshwater fish, crustaceans, oysters and shell-fish, production of milt, consumption of food and fertilisers in fishponds.

Data are collected separately for legal entities and their parts, as well as for private independent fishermen engaged in professional fishing (the Law on Marine Fishing, Narodne novine, official gazette of the Republic of Croatia, No. 74/94) or in production of sea fish and other sea creatures. Data for legal entities and their parts in fishing are collected through regular annual reports.

Data on fishermen, vessels and their equipment were obtained from the Office of Economy until 1997, and since 1998 the Ministry of Agriculture and Forestry - Administration Office for Marine Fishing Industry has taken responsibility for the records on the number of fishermen, fishing vessels and their equipment, which are based on the licences issued for engagement in professional fishing. Data are collected once a year.

Data on catch and production of sea fish are given by major groups through presentation of the total unloaded catch weight including all fishing means used in the respective quarter, irrespective of the catching area. It comprises the quantity of fresh fish unloaded, i.e. actual catch lessened by the quantity of fish that was, for no matter what reason, discarded from the total quantity in the period from the moment of catch until unloading. Data on crustaceans and shellfish refer both to edible and non-edible catch weight.

Data on fishermen, vessels and fishing crafts, fishing equipment, quantity of food, fertilisers, energy and fuel consumed, value of material used and services done are collected once a year.

9.2 Coverage and comparability

Reports comprise legal entities and their parts as well as independent fishermen engaged in the activity defined in the NCEA under section B Fishing and other legal entities and independent fishermen engaged in the above said activity but classified somewhere else. The coverage of legal entities and their parts is full, while that of independent fishermen engaged in marine fishing is selective, that is, it is defined by the turnover realised in professional catches.

10. Definitions

Fishery sector comprises marine and freshwater professional fishing and aquaculture as well as the fish processing industry.
Professional fishing is an activity of catching fish and other sea creatures for profit (the Law on Marine Fishing - purified text, Narodne novine, official gazette of the Republic of Croatia, No. 47/97).

Besides professional fishing, there is also *small-scale fishery* as well as *sports and recreational fishery*. The data on these activities are not outlined in the analysis.

Crustaceans are lobster, shrimps and other crustaceans. *Other molluscs* and *shellfish* are: mussels and other shellfish, squid, cuttlefish, octopus and musky octopus.

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Aspects of the Italian and Adriatic fish market

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Abstract

The objective of this study is to describe the main features of the Italian fish market: production, consumption trends, dynamics of sale prices, import and export structure, fish product trade in the Adriatic basin, in order to show the major trends of the sector.

1. Introduction

The Italian fishery sector[1]'s contribution to the national economy is definitely modest, both in terms of income and employment opportunities. The fishery sector also gives a similarly modest contribution to the macro-sector it belongs to, i.e. agriculture, sylviculture and fisheries[2], whose progressive decline owing to the industrialisation process of the economic system is well known. Yet if fisheries is observed and studied with reference to specific and well-defined local realities, it clearly emerges that it plays a major role, both in terms of wealth creation and employment.

National data show that in the year 2000 fisheries made up only 0.09% of the entire national economic system's added value, and the figure is not any better when analysing the Marche Region, where the added value brought about by the fish sector reaches just 0.22% of the total.

Similar observations can be made for employment in the sector. Although the productive processes used in fishing activities continue to adopt highly labour-intensive techniques, the total number of persons employed in the fisheries sector in 1991, i.e. in the last year in which the Italian National Institute for Statistics ISTAT registered data on employment in the fisheries sector, was just 0.2% of the total number employed in Italy.

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#The present study has been carried out thanks to the equal participation of the authors, who fully take on their responsibilities and merits for it. In particular, sections 2 and 6 are edited by Adele Finco, sections 5, 7, 8 and 9 are edited by Nikolina Jukic, and sections 1, 3, 4 and 10 are edited by Roberto Petrocchi.
[1] The fisheries sector is represented by fishing vessels, which carry out a professional fishing activity aimed at the achievement of a profit. From this respect, the fishing sector is to be distinguished from the heterogeneous system of operators – producers of fishing equipment, shipyards, retailers and wholesalers, operators of the processing and conservation industry, etc. -, who link their activity to the fisheries sector.
[2] From an institutional, political and administrative point of view, fisheries and aquaculture in several countries of the world are among the responsibilities of the Ministries of Agriculture or Agricultural Policies. Research, too, is to a large extent carried out by academic and non-academic technical and scientific institutions, which operate in the field of agriculture and animal husbandry. Moreover, from a conceptual, theoretical and applied point of view the management of renewable natural resources has been compared to that of woods and forest ecosystems from many perspectives; the same applies with much more evidence to aquaculture and water culture, which have been generally compared to agriculture.

As for data referring to added value, regional figures on employment are also higher than the national ones. In spite of the employment increase in the fisheries sector out of the total corresponding employment figure for the region, the number of persons employed in the sector is still only 0.5% of the total.

Fisheries' marginal role risks getting further worse because of the difficulties currently faced by the sector.
Besides the natural constraints that the economic activity of fisheries has to face renewable natural resources and the need for their rational management – that inevitably limit the range of production technical possibilities and the series of decision-making possibilities in order to maximise the company's income, other factors also need to be considered: the ill-functioning of the trade and distribution system, the great imbalance of trade and the trend in sales prices are all factors that even worsen the already difficult conditions faced by the sector in the last few years.

Hence the importance of the study of market issues in the analysis of the fish sector. Such a study should contribute on the one hand to highlight the causes of the above-mentioned difficulties better and, on the other hand, to identify some possible solutions to the sector's problems.
Unfortunately, the analysis is made increasingly difficult by the scarce data available, as well as by the sometimes rather remarkable differences between data themselves, depending on the statistical sources used.
After some brief theoretical considerations on the main features of fish markets in section two, section three will outline the dynamics of fish production. The value of production assumes the qualitative and quantitative knowledge of the different fish species making up the productive mix, i.e. the topic of section three, but also of the prices of the commercialised products. These topics in particular are discussed in section four. Section five will deal with consumption. Deviations between supply and demand, which should indicate the intensity of foreign trade, shall be dealt with in section six. The Italian market represents the main and sometimes the only existing outlet for the fish production of Adriatic coastal countries; the trade of fish products coming from the Adriatic basin is particularly important and shall be thus dealt with in section seven.

2. Competition on fish markets

The fish market, exactly like the agricultural one, is extremely complex. The market is not only defined as the place where supply and demand meet, but, as has often been the case recently, as a market or marketing system, i.e. as a whole series of relations between producers/suppliers and consumers/users that include all services, flows and exchanges in-between. The capacity of the price system to direct market operators – or, in other words, the capacity of producers to adequately respond to the signals coming from the market – largely depends on the effectiveness of the system itself.
In a mercantile economy individuals do not operate in isolation, but rather they tend to develop forms of interdependence, i.e. they must take other individuals' behaviour into adequate account. When individuals are given the possibility to leave the choices by other

subjects out of consideration in their decision-making, a particular market form known as perfect competition is realized[3]. On markets with perfect competition the price system determines, at least theoretically, the best conditions for the positioning of resources and provide for the best mechanisms for income formation. In the fishery sector such market forms are typical of the phase of fresh fish production, characterized by a large number of operators applying to fish markets, as well as by single suppliers looking for demand outside the official mercantile structures.

One of the most typical features of fresh fish markets is the possibility for market prices to fluctuate, sometimes sharply, thereby reaching values that are distant from the long-term tendency price. This is to be attributed to constraints of biological, seasonal, etc., nature, which characterize fisheries as a productive activity. Such constraints occur as contingent and occasional facts, which influence market prices in the short term and introduce uncertainties as for the entity of supply, and thus create a big gap between market prices and tendency prices in the long run.

It should be noted here that the uncertainties typical of the fish market are in fact typical of all markets where commodities are exchanged, because of environmental, economic and biological uncertainty factors (Lem, 1999; Hannesson, 1998).

In its various segments the fishery sector shows forms of imperfect markets, which are largely different from the system of perfect competition. In such market forms each individual's behaviour has an immediate impact on the range of actions of other individuals and, as a consequence, each individual's actions depend in the end on the actions of the others[4]. This situation of strategic interdependence is to be found in that particular market category known as oligopoly and monopoly competition. In an oligopoly, markets are characterized by the presence of few big enterprises establishing such relations one with the other, so that none of the enterprises can make their decisions without taking the others into account. Imperfect markets where suppliers are price-makers, i.e. able to determine the sale price through qualitative and quantitative modifications of the volumes supplied, require a differentiated analysis of the price system.

Imperfect markets are especially typical of the processing and distribution phases. This market form comprises import/export companies dealing with both the trading of fresh fish and, more specifically, its first processing. Within such market forms, companies are characterized by the production of similar and yet slightly diversified fish products, so each company can count on its own particular group of customers, to whom it applies its prices within certain limits. In comparison to the system of perfect competition, the pre-requisite of market transparency and product homogeneity is missing here. Unlike the system of monopoly competition, where competition between single companies can be observed, oligopoly competition refers to a competition system between more or less organized groups of companies. In this respect cooperative societies or producers' associations can be

[3] The term to refer to this concept is, in this case, structural interdependence. Individuals who cannot influence other individuals' behaviour make their decisions regardless of other subjects' behaviour. In this case, each individual behaves as if he or she were isolated.

[4] The term to refer to this concept is, in this case, strategic interdependence. Individuals can influence other individuals' behaviour and thus make their decisions taking other subjects' behaviour into adequate account. The study of strategic interdependence poses further problems in comparison to that of structural interdependence. A tool for analysis must therefore be developed (theory of games), aiming at conceptualising and helping the decision-maker to make his or her choices in such a context.

considered oligopolistic enterprises, which through the promotion of products that can be recognized through labels, certifications, etc., or by means of standard commercial agreements are able to increase their bargaining value and thus reach a position of price-makers (Messori, 1992; Saccomandi, 1999).
Finally, it can be observed that while the commercialisation of processed fish products shows problems that are common to the entire food sector, i.e. excessive supply fragmentation, fresh fish distribution also faces problems that are intrinsic to the products themselves: the perishable nature of fish and the strong species differentiation, for example, require different quantities and size and thus deeply influence the commercialisation of fish products in Italy.
Producers' associations are very poorly represented at the initial stage of the commercial process. Hence producers are forced to place their supply on the fish markets either individually or by means of private agreements with selling agents and wholesalers, who play a fundamental role in order to collect and distribute their production in consumption centres. This reality, together with that of import groups (very few in the case of fresh fish), is the only example of supply polarization. Moreover, wholesale fish markets are not so inclined to guarantee homogeneous criteria of price formation and the habit can be observed to sell outside the market. Against this background wholesalers have acquired a bargaining power, which allows them to have a strong influence on the process of price formation. Particularly owing to the limited information available, products prices are set by the meeting of supply and demand in the single markets, irrespective of the quantities exchanged and the prices applied in other market structures. In this respect, the markets' operational characteristics and the bargaining relations between operators play a fundamental role in setting the sale price.

3. Production according to various statistical sources

Data by the Italian National Institute for Statistics ISTAT give the possibility to carry out an historical analysis of the sector's productions from 1951 to 2000. In the period examined the volume of fishery production registered an increasing trend, though with different intensity depending on the decades considered.
It should be observed that in the decade between 1960 and 1970 a 44% increase in the number of motor fishing vessels, a 95% rise in the tonnage used in the sector as a whole, and a growth of over 120% in HP were registered, whereas production increased by 31%.
This means that the strengthening of productive structures and the capital increase were not counterbalanced by a significant growth in productivity, probably because of the approaching of the constraint represented by resource availability. The specific nature of renewable natural resources, which are the object of fisheries as an economic activity, suggests that resource exploitation can, in the best hypothesis possible, be equal to the rate of reproduction capacity of the same resources, thereby making any investment implying the overcoming of such a limit useless and unproductive. In most recent years these issues have been summarized by the concept of sustainable fisheries[5].

[5] The task of a sustainable fishing activity cannot be limited, as often advocated in literature, to the respect for the equal value to be attributed to resource exploitation and resource reproduction capability. The task of sustainable production – and thus of sustainable fisheries – shall necessarily have to be the self-equipment in order to produce the maximum satisfaction possible in terms of food needs, bearing in mind the necessary constraint of a balance between energy and environment, where the flows of consumption for resources used in

Data on national production show that production expansion has not been steady. The entire period can in fact be divided into two distinct phases: a first phase of steady growth, ending around the middle of the 1980s, and a following phase of a decline in production, during which the previously reached productive levels were gradually eroded, till they reached the levels of the 1950s.
In the period between the mid-1960s and the mid-1980s national production was constantly around values over 300,000 tons and reached its peak in 1985 with almost 400,000 tons. From 1985 onwards an inversion of the trend in production expansion was registered; a decreasing trend started, until such levels were reached in the year 2000, that were close to the levels of 1951.

The fall in national production[6] seems to be due in particular to a reduction in small pelagic species (-30%) and in demersal fish (-57%). The category of tuna fish has experienced a different trend, registering a steady reduction until the end of the 1980s and a subsequent rise, also with surprising annual increases, in the 1990s.
The productive trend for molluscs has been steadily increasing, becoming two and a half times greater in the period examined, though the "squids, octopuses and cuttlefish" category experienced a decrease at the beginning of the 1990s.

Consistently with the production trend in physical terms, data on national production expressed in value (1995 Italian lira; 1 Euro: 1936.27 Italian lira) also show growth until the mid-1980s and remained relatively stable afterwards. The increase in value of molluscs and crustaceans counterbalance the value reduction of fish, thus contributing to the stabilization of the overall production value.

Unfortunately ISTAT's statistical findings do not offer any information about another fisheries sector, i.e. aquaculture. For this reason, our analysis has been integrated with information provided by two authoritative sources, i.e. ISMEA (Service Institute for the Food and Agricultural Market) and IREPA (Economic Research Institute for Fisheries and Aquaculture). The data provided by the two sources are highly disaggregated and refer to a number of variables that we deemed necessary to consider and compare, in order to provide a

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production, referring to each production period – one year, one generation, etc. – must be in deficit and the flows of products for the same period must be in surplus.
From this point of view it is clear that the current *plafond* of energy and environmental resources can no longer be considered as an unlimited flow of resources both in terms of time and quantity, as in fact is the case today. It must be considered for what it actually is, i.e., using some of Georgescu Roegen's basic concepts, a "fund of services" whose potential capacity of renovation over the period must always be preserved; in other words we must always provide for the preservation of that capacity of the fund to produce, in any new period, at least the service flows of resources that were consumed in the preceding period. This does not only mean that the energy-environment fund can in no way be used for production, but also that we must always provide for the creation of "maintenance" flows that are as much as possible allowed by the earth as an anthropic system and serve as tools for the recapitalization of the earth's essence. Let us think in this respect about the enormous intervention possibilities to re-establish the properties of the environmental fund, i.e. those properties labelled by Ricardo as the "originary and indestructible properties" of the soil; these possibilities refer, in other words, to the capacity to constantly reproduce its flows of services, i.e. fertility in the case of soil.

[6] The Italian National Institute for Statistics ISTAT divides the fisheries sector's production as follows:
Fish: Anchovies, sardines and mackerels; tunas; total fish
Molluscs: Common squids, octopuses and cuttlefish; total molluscs
Crustaceans

more detailed and significant framework of the rationale dominating the market in the fish sector.
As emerges from the following figure (Figure 1 and Figure 2), the data provided by ISMEA seem to show significantly higher values in terms of both productive volumes and value.

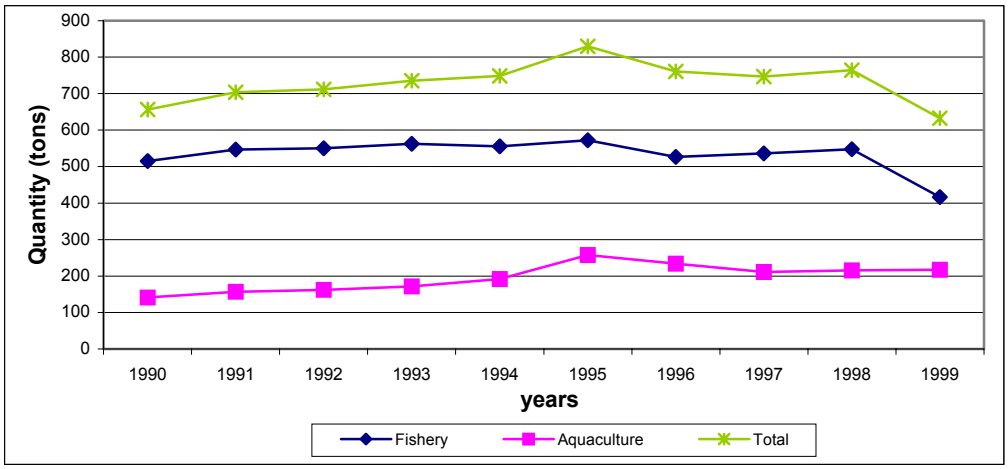

Figure 1. Italy. Production of fisheries and aquaculture in volume (tons). Source: ISMEA, IREPA.

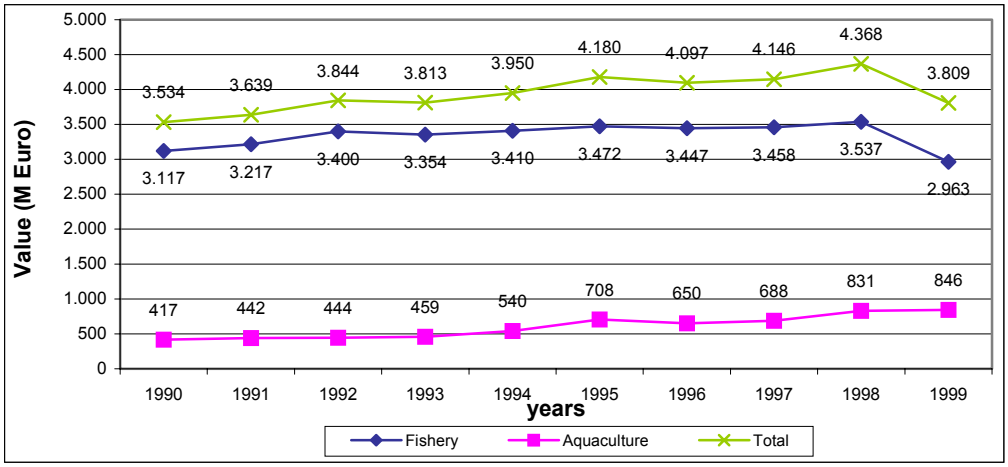

Figure 2. Italy. Production of fisheries and aquaculture in value (billion Italian Lira). Source: ISMEA, IREPA.

Although the historical data cover a shorter period in comparison to the series of information processed by ISTAT, they seem however more likely. It thus emerges that fishery sector production in 1999 was around 463000 tons (as against the 259,730 tons registered by ISTAT), corresponding to a value of almost 3000 billion Italian Lira (as against the 1,388 billion Italian Lira registered by ISTAT). In the same year aquaculture contributed to the overall production with 217000 tons and 846 billion Italian Lira.
Within this framework, aquaculture represents 34% of total production in terms of volume and 22% in terms of value and is able to counterbalance, at least partly, the decreasing trend registered by fisheries production.
As a matter of fact, in the period considered fisheries registered a decreasing trend, both when examining volumes referring to physical production and data referring to monetary values. Conversely aquaculture increased by over 50% in terms of physical production, by

over 100% in terms of the value obtained from the sale of the species produced by the same sector.
Thanks exactly to this positive trend the overall production of the enlarged sector registered a fall of just 3.5% in terms of volume and of even 7.5% in terms of value.

A much more detailed analysis allows furthermore to highlight the incidence of Adriatic productions on total national production.
As shown by the Figure 3, although Italian fishery activity is carried out along the country's entire 7,600 km of coasts and in over 800 landing ports, the role played by Adriatic fisheries is undoubtedly predominant, as most of the national fish products are obtained from the Adriatic and Sicilian coasts.

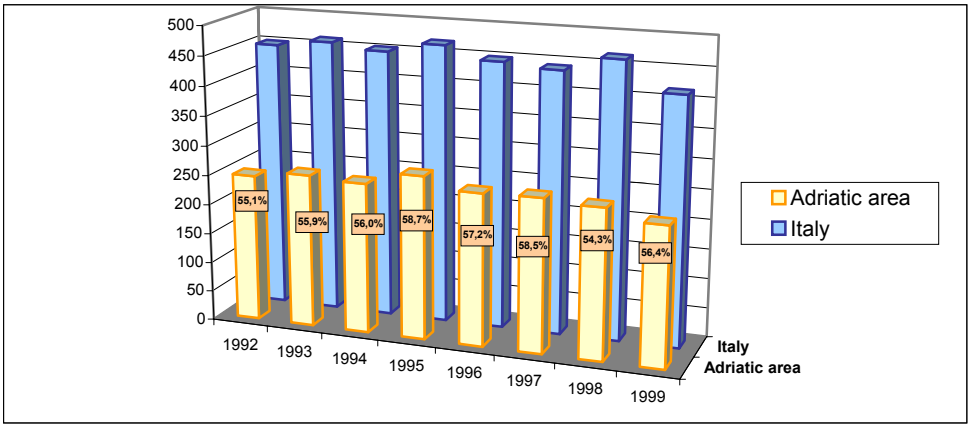

Figure 3. Impact of Adriatic fisheries on total national fisheries (volume). Source: IREPA data.

In 1999 Adriatic production made up for 56.4% of the sector's physical production and for 44.6% of the total of its value.
This incidence was higher with particular reference to some specific species[7], as is the case of molluscs, which in the Adriatic alone made up for 72% of the total volume and 65% of the total value, and of clams, representing as much as 99% of both the national total volume and value.
Within the Adriatic basin production was mainly centred along the coasts of the Middle (40%) and Upper Adriatic (34%); this applied in particular to the production of clams, representing almost the entire national production in this area.

4. The productive mix

In the analysis of the sector's performance the productive mix plays a particularly important role. This is due to two main reasons. Each of the different species making up the productive mix has a certain price, which reflects the demand expressed by final consumption and the processing industry. In order to know the value of production it is thus necessary to know the productive mix, i.e. the quality and quantity of catch, but also the prices at which production is exchanged (Figure 3a).

[7] Species' classification in the various categories, carried out by ISMEA and IREPA, is as follows: anchovies, sardines, other fish, clams, molluscs (clams excluded), crustaceans.

This kind of analysis would fundamentally require a truthful and reliable system of price recording. Yet unfortunately, the three sources entrusted with data collection do not provide statistics recorded on the markets, which are able to reflect price fluctuations over time and space and thus offer a detailed picture of the several and different local realities; rather they

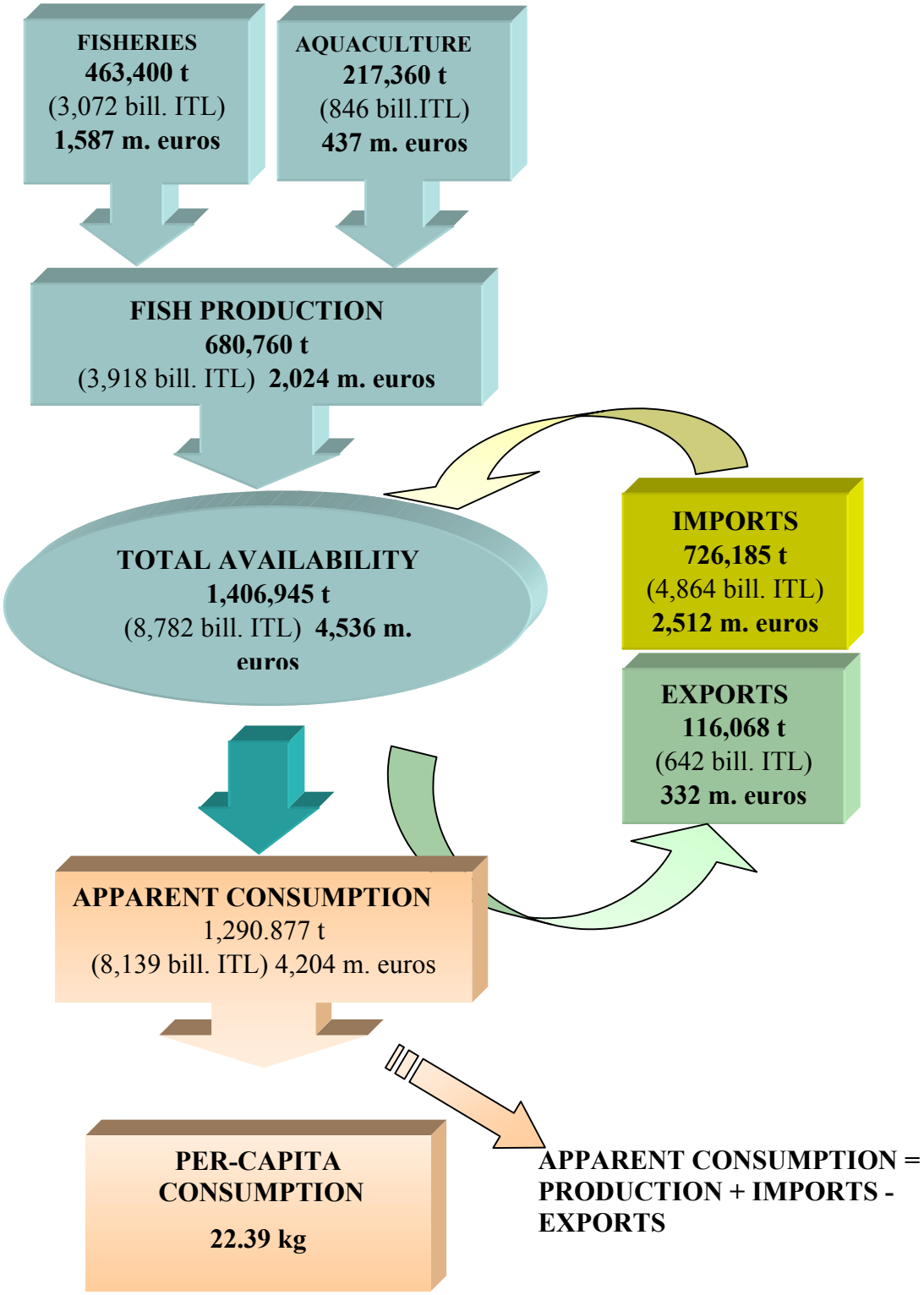

Figure 3a. Production, imports, exports and consumption in Italy (1999). Source: Data processed by ISMEA on the basis of different data sources, 1999.

provide values which are obtained by the division of the values of the gross saleable production by the figures referring to physical production.

The second reason fostering a detailed analysis of the sector's productive mix is has to with foreign trade. The productive mix shows the deviations between qualitative/quantitative national production and market demand, thereby indicating the rate of coverage of domestic demand by national production and the subsequent need for imports.
As shown in the remaining sections of this paper, in this case too, knowledge of the detailed data not only of national products, but also of aquaculture and imported products would be extremely useful. This would allow for recording and representing of the rationale of the ongoing process, which sees the replacement of domestic production by aquaculture and imported products.
Although some brief information on the composition of national production have already been produced at the beginning this paper, data referring to the last ten years are shown in the following section. As clearly emerges from the following figure (Figure 4), the sector's production mainly refers to species included in the "other fish" category, which registered a 12.3% reduction in the period from 1992 to 1999. In 1999 this category accounted for almost 45% of the total physical production

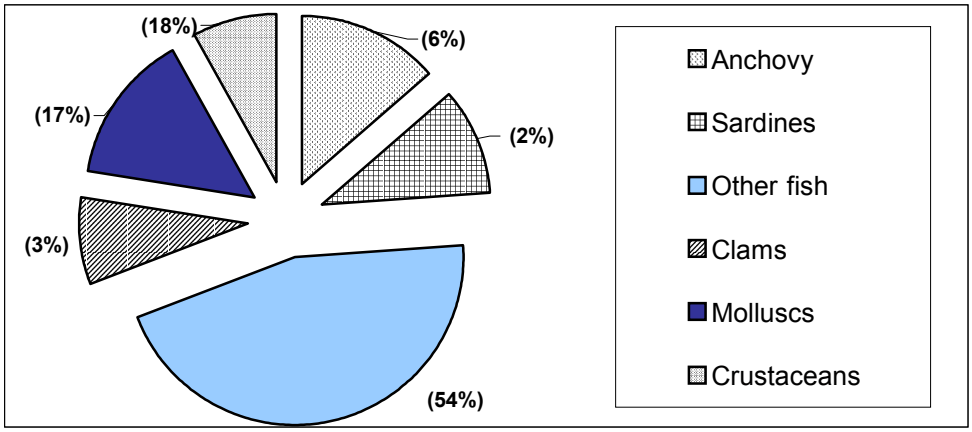

Figure 4. Italy. Productive mix in terms of quantity and % value incidence. Year 1999. Source: Elaboration of ISMEA and IREPA data.

and over 50% of the total production value. This is mainly due to the composition of the category, especially made up of demersal fish species of a higher value. In the same period, 1992-99, a reduction in the catch of all categories was registered. The only exceptions were sardines (+9.1%) and anchovies, with an increase of 62%. In 1999 these two categories made up 11% and 14% of physical production and just 2% and 6% of the overall production value respectively.
Molluscs and crustaceans show the largest incidence on the productive mix. The two categories of species together make up about 35% of the value of Italian production thanks to a strongly supported demand and consequently high sale prices.

There are unfortunately very limited data on the productive mix of the aquaculture sector. As already observed, the sector plays an increasingly important role within national production owing to the improvement in production performance and the subsequent ability to counterbalance, at least partly, the negative results registered by fisheries. In the period

examined, aquaculture registered a 53.9% growth in physical production and an increase of over 100% in its corresponding value.
The sector's total production is divided into fish production and mollusc production. Interestingly it should be observed that each category's physical production and corresponding monetary values are inversely proportional. Aquaculture makes up slightly more than 30% of the sector's physical production, but in the same period it accounts for 64% of its value. Conversely, mollusc aquaculture represents almost 70% of the total production volume, but just 36% of its value.
On the basis of these data, a further increase of fish culture is hence expected, even if this was not the case in the 1992-99 period, in which fish production and mollusc production variation were respectively of 33% and 34%. A more detailed distinction shows how the production of the fish culture sector is mainly focussed on species of higher value and that are most appreciated by consumers, such as European sea bass and sea bream (registering quantitative increases of 220% and 414% respectively), to the detriment of species like eels and mullets, which show relatively stable or even decreasing quantities (mullets: +1.97%; eels: –4.83%).

5. Prices

After a description of the productive mixes of the two sectors making up the whole fisheries sector, a detailed analysis of their corresponding prices should be carried out, both with reference to national and imported products.
As already observed, however, the information available on these aspects is scarce and does not allow us to carry out thorough and detailed analyses. Conversely, it is also evident that the price level obtained by producers on the market is crucial to determine both the companies' income levels and the income of the sector as a whole.
Table 1 shows the different species' prices in the period examined. Substantial deviations and the marked variability of prices do not allow the stabilization of company profits and the reduction of the risks associated with the fishing activity, which should be primary objectives of the policies for the sector.

Table 1. Italy. Prices (Italian Lira per kilo) per single species. Years 1992 – 1999.

	1992	1993	1994	1995	1996	1997	1998	1999	1992–1999 %var.
Anchovies	3,968	4,027	3,981	2,934	3,734	3,105	3,225	2,958	-25.4%
Sardines	807	770	806	769	836	875	1,101	1,232	52.7%
Other fish	7,634	6,980	7,101	7,181	7,293	7,317	7,680	8,604	12.7%
Clams	3,059	2,462	2,861	3,124	2,157	3,307	3,623	2,300	-24.8%
Molluscs	6,335	6,050	5,777	5,922	6,865	7,418	7,842	8,383	32.3%
Crustaceans	11,881	13,598	14,295	16,076	16,529	16,369	16,033	15,931	34.1%

Source: IREPA.

Prices are unstable not only over time, but also and especially in their spatial dimension. As highlighted by Table 2, in the Adriatic regions in 1999 alone the different species were quoted at prices with a variation that was sometimes well over 100%, depending on the

different local realities. In this respect, the following paragraph will show the difference between the average prices quoted in the different Adriatic fish markets.

Table 2 – Adriatic Sea. Prices (Italian Lira per kilo) per single species (for the Adriatic Sea the mean value is reported). Year 1999.

	1999					
	Apulia	Abruzzo/Molise	Marche	E. Romagna	Triveneto	Adriatic Sea
Anchovies	2,182	3,660	1,563	1,655	1,733	**2,159**
Sardines	540	800	837	1,335	1,203	**943**
Other fish	7,260	8,428	9,383	7,342	8,292	**8,141**
Clams	3,408	1,353	2,148	4,154	2,030	**2,619**
Molluscs	12,571	8,168	5,400	6,494	6,544	**7,835**
Crustaceans	15,483	22,304	17,699	9,828	9,524	**14,968**

Source: Elaboration of IREPA data.

The strong price variability seems to be linked to the organisational and functioning methods of the Italian trade and distribution system. It is known that the trade of fish products was liberalised with law no. 125/59, which abolished the obligation for producers to sell through the market at the conditions set by the previous norms. The aim was to allow producers to sell at the highest prices possible existing outside the local market.

In this way national fish products pass along a whole series of competing commercial channels, which together with the fragmentation of landing ports and the low bargaining power of producers towards wholesalers and retailers, contribute to the creation of an extremely fragmented and variable price system for fish products.

Imported fish products travel along other commercial channels, established by a restricted group of importers who quote their prices within an oligopolistic system. Moreover, fish products bound for the processing sector pass along other trade channels. Very often processing companies themselves tend to establish a direct relationship with producers, in order to obtain better guarantees of continuity in the provision of the fish products they have to process. In this case a regime based upon agreed prices is established.

Such a varied and variable price system for fish products does not always correspond to systematic, detailed and reliable information allowing highlighting the role played by prices in the sector's development.

The general framework of the national distribution system has been recently further worsened by the process of market globalisation, which gives dealers the possibility to buy almost all species of fish products at any time, on any market and at increasingly competitive prices. National products, which are not supported by an adequate fisheries policy based on qualitative differentiation, run the risk of being exposed to the excessive pressure of global competition.

Unfortunately, in this case too no reliable information on foreign prices has been available for a sufficiently long period of time, so as to allow the analysis of the impact of price dynamics of imported products on the prices of national products.

Statistical sources do not provide data directly registered on the market, which are able to reflect the spatial and temporal price fluctuations and thus offer a detailed overview of the several and diverse local realities; rather they provide average values that refer to a small group of big national markets. These values are used to determine the value of production both at a national and at a regional level and contribute to describe the sector's macroeconomic picture. Such a description is of little interest, when considering the secondary role played by the fishery sector at national level.

It would otherwise be extremely useful to have detailed information highlighting the sector's most important elements, i.e. the evolutionary dynamics of the single realities, companies' profitability, etc., at local level, where fisheries play a really significant role as an economic activity (Figure 6).

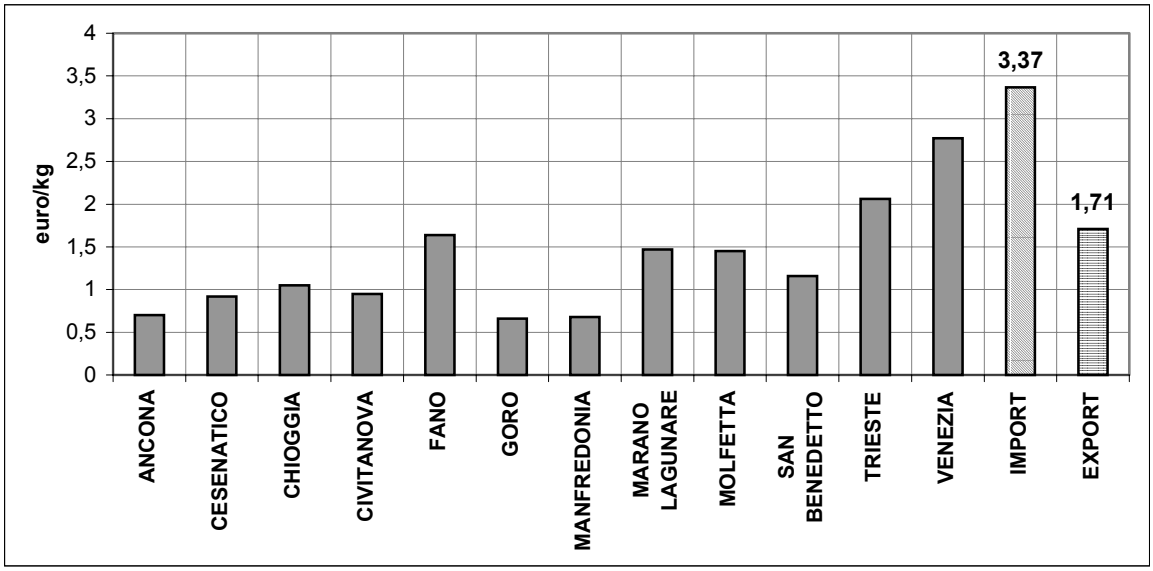

Figure 6. Comparison of the anchovies average prices of some wholesale fish markets of the Adriatic Sea with import-export prices - Year 2000. Source: Elaboration of IREPA data.

6. The role played by wholesale fish markets in the Adriatic Sea

Experience has shown the presence of important roles that the private sector cannot spontaneously take on or, in other words, cannot play in the short term. One of the consequences of this could be the failure to reach the potential benefits offered by the system. Products can theoretically be marketed along two main channels of commercialisation: private or public sale; the latter is generally carried out by auction and, as in the case of national auctions, on wholesale fish markets.

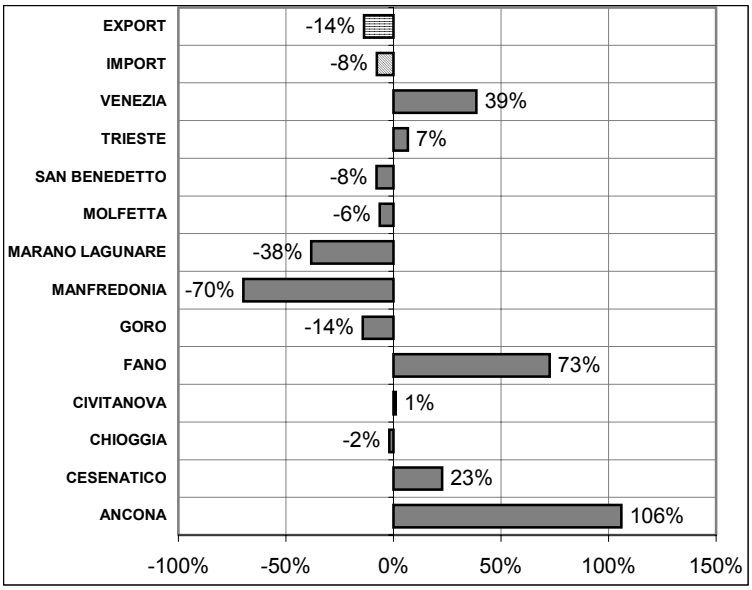

Figure 7. Percentage Variation 1998 / 2000 of the price of anchovies in some wholesale fish markets of the Adriatic Sea. Source: Elaboration of IREPA data.

In Italy wholesale fish markets were first established with the approval of law no. 1487 of 12th July 1939, which foresaw the obligation to establish a wholesale market for fruit, vegetables, meat and fish products exclusively within mercantile structures managed by the municipalities. This allowed the establishment of an institutional network of wholesale distribution, located near the production centres and the main consumption centres. From the point of view of an interventionist policy, as was the one adopted by the government at that time, fish markets played a role of protection for both producers and consumers by pursuing three main objectives:

a) Organizing outlet channels for catches, which was no longer left to the free initiative of producers, thereby achieving the indirect effect of stabilizing producers' income;
b) Organizing hygiene and quality controls on the one hand and the achievement of transaction transparency on the other, to the advantage of consumer protection;
c) Carrying out controls over transaction tax yields and the systematic collection of data on the sector's activities.

Over time, the excessive bureaucratisation, the lack of links between the various markets and the subsequent scarce circulation of information, as well as the inadequacy of the structures and services offered have all contributed to strongly diminish the role of these institutions. This led to the liberalization of wholesale trade with law no. 125 that was passed in March 1959; wholesale trade was to be admitted either on *ad hoc* markets or outside the markets themselves. The malfunctioning of wholesale fish markets thus led to the creation of a private distribution network.

There are at present 13 Adriatic fish markets, divided into production and mixed markets, e.g. Trieste market. In spite of the awareness that the 2000 trend of commercialisation of fish products has to be analysed with due consideration of that year's main events (mucilage, cost for fuel oil, BSE crises), it can undoubtedly be stated that markets sharply increased their annual turnover in comparison to previous years and this could lead us to rethink and revalue their role. It should be noted here that the positive results obtained, also in terms of

commercialised quantities, are to be attributed to foreign productions that have been imported to counterbalance a temporary lack of products or increase turnover (Figure 7).
For the objectives of our study, a particularly interesting analysis was carried out on the comparison between the average prices quoted on Adriatic fish markets. The analysis was carried out both on the total of traded fish, and on some specific species, i.e. anchovy, hake, squid, cuttlefish, sole and mantis squillid.

Table 3. Commercial trend of the main production fish markets

Markets	Quantity (tons)	Value (000 Italian Lira)	Average price (Italian Lira /kg)	1999 – 2000 % var.
Ancona	1,534.5	15,855,657	10,333	12.7
Cesenatico	2,369.4	8,948,611	3,777	25.1
Civitanova M.	1,414.5	12,575,971	8,891	13.6
Fano	915.8	7,163,067	7,822	10.2
Goro	3,010.8	10,873,214	3,611	-2.0
S. Benedetto del T	2,651.5	12,499,885	4,714	-3.7

Source: ISMEA.

Table 3 clearly shows that Goro is the most important Adriatic market in terms of traded quantities, followed by S. Benedetto del Tronto. Yet in terms of value Ancona's market has totalled over 15 billion Italian Lira, thus establishing itself as the strongest among the other Adriatic markets. It can be observed that the average prices quoted are remarkably different between Adriatic markets; also each market's trend, expressed in terms of percentage variation, is similarly different in comparison to the tendency registered the year before for the above mentioned reasons. Price fluctuations for fresh fish show large variations depending on fish species. An example is given by the following charts referring to one pelagic species, i.e. anchovies. The charts show that the production decline registered in 2000 brought about a strong revaluation of sale prices, e.g. of even +106% in Ancona, thus counterbalancing the losses suffered by operators because of the reduction in quantities. Prices are obviously diversified depending on import prices. A very similar situation, although less emphasized, can be observed for the Venice, Fano and Cesenatico markets. Average import prices, which show a generalized diminishing trend, are above the local product's highest price in comparison to previous years and are around 3.3 euro/kg in 2000. By way of conclusion, it can be observed that the use of different bargaining systems (manual or electronic auction, direct bargaining) and the presence of different types of operators (producers, auctioneers, brokers, wholesalers and retailers) characterize the commercial dynamics at the local level and differently influence price determination in this way. Therefore, the quotations of the different fresh fish products mainly vary according to species, quality and size, as well as the normal interplay between supply and demand, but at the same time they are highly dependant on geographical and contract peculiarities and on the commercial structures where bargaining takes place. Within this framework, the sector's commercial operators have established a distribution network that is well structured on the territory, in order to adapt their organizational structure to the market's characteristics; this leads to greater market segmentation on the one hand, and, on the other hand, to the possibility of offering consumers extremely differentiated products both in terms of species and quality.

7. Consumption

As emerges from the following table, per-capita consumption of fish products has registered an increasing trend in the last decade, passing from 20.8 kg in 1990 to 23 kg in 1998. This growth has largely been supported by imports, which have registered significant increases and taken on an increasingly consistent role in supplying domestic demand and meeting the needs of final customers. It is in this respect appropriate to present a brief analysis of consumption with reference to the main types of products. The historical series available is not long, yet the data provided by ISMEA-Nielsen allow us to highlight some important features of fish consumption in Italy. As for the year 1999, Italian consumers clearly indicated their preference for frozen and deep-frozen fresh fish, whereas conserved fish and "dried, salt and smoked fish" just represented little more than 20 % of total consumption in terms of volume and around 25% in terms of value.

Table 4. Italy. Consumption calculated on the basis of the total availability method (000 tons).

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Internal production a)	656	704	712	736	748	830	761	747	764
Imports b)	593	633	604	581	582	600	622	762	774
Exports b)	65	72	74	87	98	107	116	131	130
Internal consumption	1,184	1,265	1,242	1,230	1,232	1,324	1,267	1,378	1,409
Consumption per-head (kg)	**20.8**	**22.3**	**21.8**	**21.5**	**21.5**	**23.1**	**22.1**	**22.0**	**23**

Source: A) IREPA, ICRAM, ARPI; B) ISTAT.

Between the categories "fresh and defrosted fish", "frozen/deep-frozen loose fish" and "deep-frozen packed fish" the former prevailed, making up alone 55.2% of total consumption in volume and 52.1% of national consumption in terms of value. Figure 8 shows the major species identified within the groups that have proved to be of particular interest for the analysis. The data provided refer to the purchased quantities, whereas consumer spending was obviously proportional to the "value" of the species and the degree of processing undergone by the product (in the case of frozen/deep-frozen and packed products). The most important species represented in the category "fresh and defrosted fish" were demersal fish species, i.e. sea bream, hake and European sea bass, which made up about 30% of the total. They were followed by mussels and clams, representing approximately 26% of the overall category of molluscs. An important role as for fresh and defrosted fish consumption was also played by pelagic species – anchovies and sardines – that made up about 15% of the total.
In 1999, still within the category of frozen/deep-frozen fish, Italian consumers showed a preference for packed products, accounting for about 57% of purchases within the category, as against 43% of purchases of frozen and/or deep-frozen loose fish. Finally, the absolute prevalence of tuna fish within the group of "conserved fish" should also be observed (Figure 9). Tuna fish accounted alone for almost 90% of the total consumption of conserved products in Italy; out of this figure, tuna fish in olive oil represented almost 90%, whereas just 10% referred to natural tuna fish. Consumption data referring to other conserved fish categories were of no significant importance for the Italian market.

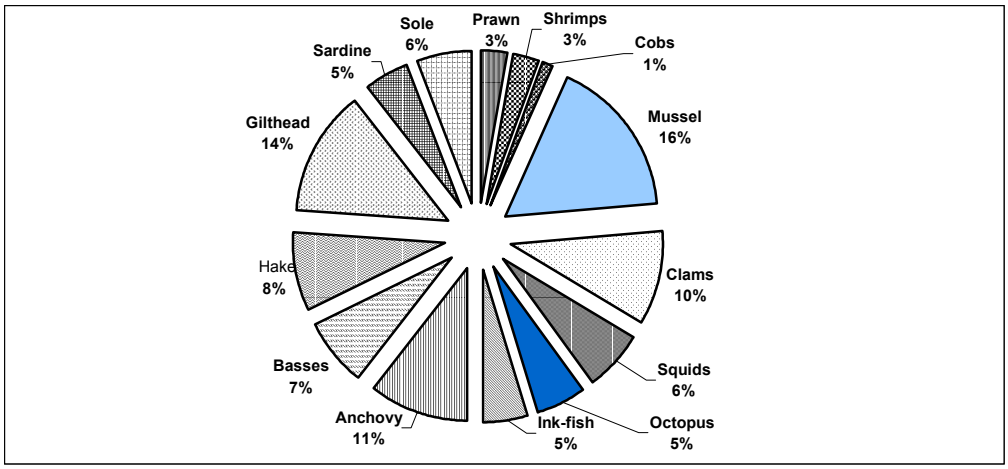

Figure 8. Italy. Domestic purchases referring to the main fresh and defrosted natural fish species in Italy (tons). Year 1999. Source: ISMEA, IREPA data.

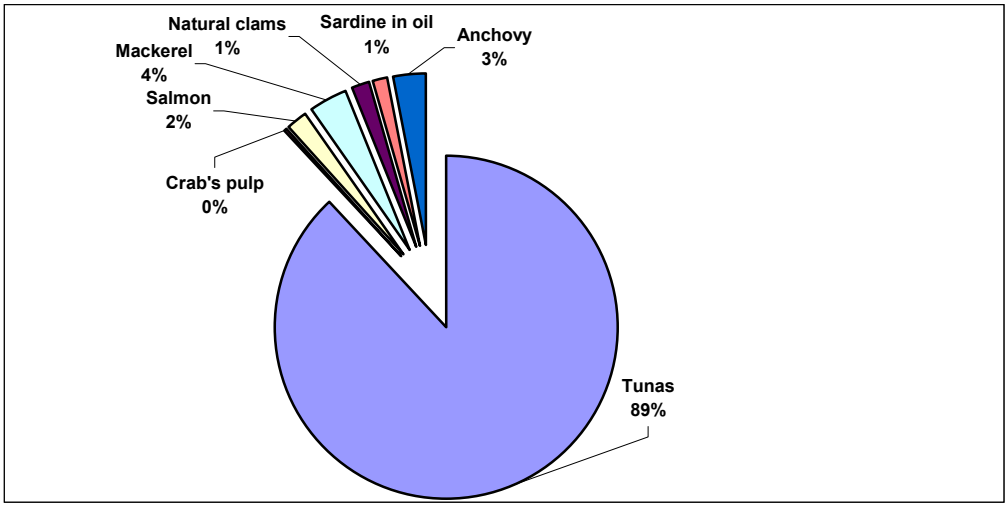

Figure 9. Italy. Purchases of conserved fish (tons). Year 1999. Source: ISMEA, IREPA data.

8. Foreign trade

A large part of national consumption is covered by increasingly substantial imports. As shown by Tables 5 and 6, in the period examined the rate of self-provision fell by an additional 7 %, reaching 50% in 1998, in terms of both volume and value.

Table 5. Italy, Foreign trade indexes (tons).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1990 – 1998 %var.
Production	656,000	704,000	712,000	736,000	742,000	830,000	761,199	747,484	764,121	16.5%
Imports	593,564	634,512	605,376	581,554	582,111	600,397	621,901	761,587	774,291	30.4%
Availability	1,249,564	1,338,512	1,317,376	1,317,554	1,324,111	1,430,397	1,383,100	1,509,071	1,538,412	23.1%
Exports	67,720	72,471	74,099	87,462	97,843	106,664	116,472	130,686	129,578	91.3%
Balance	-525,844	-562,041	-531,277	-494,092	-484,268	-493,733	-505,429	-630,901	-644,712	22.6%
Movement	661,284	706,983	679,475	669,016	679,954	707,061	738,373	892,273	903,869	36.7%
Apparent consumption	1,184,000	1,256,000	1,219,000	1,229,000	1,227,000	1,323,733	1,266,628	1,378,385	1,408,833	18.9%
Normalized balance	-79.5%	-79.5%	-78.2%	-73.9%	-71.2%	-69.8%	-68.5%	-70.7%	-71.3%	8.2%
Rate of self-provision	55.4%	56.1%	58.4%	59.9%	60.4%	62.7%	60.1%	54.2%	54.2%	-1.2%
Rate of import coverage	11.4%	11.4%	12.2%	15.0%	16.8%	17.8%	18.7%	17.2%	16.7%	5.3%
Import propensity	50.1%	50.5%	49.7%	47.3%	47.4%	45.4%	49.1%	55.3%	55.0%	4.9%
Export propensity	10.3%	10.3%	10.4%	11.9%	13.3%	12.9%	15.3%	17.5%	17.0%	6.7%

Table 6. Italy, Foreign trade indexes (bill. Italian Lira).

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1990 – 1998 % var.
Production	3,534	3,659	3,844	3,813	3,935	4,180	4,097	4,146	4,368	23. 6%
Imports	2,876	3,256	3,170	3,277	3,515	3,878	3,897	4,413	4,913	70.8%
Availability	6,410	6,915	7,014	7,090	7,450	8,058	7,994	8,559	9,281	44.8%
Exports	272	294	301	397	458	558	571	648	651	136.0%
Balance	-2,604	-2,962	-2,869	-2,880	-3,057	-3,320	-3,326	-3,765	-4,262	63.7%
Movement	3,148	3,549	3,471	3,674	3,973	4,436	4,468	5,061	5,564	76.7%
Apparent consumption	6,139	6,620	6,713	6,686	6,992	7,500	7,423	7,911	8,630	40.6%
Normalized balance	-82.7%	-83.5%	-82.7%	-78.4%	-76.9%	-74.8%	-74.4%	-74.4%	-76.6%	6.1%
Rate of self-provision	57.6%	55.3%	57.3%	57.0%	56.3%	55.7%		52.4%	50.6%	-7.0%
Rate of import coverage	9.5%	9.0%	9.5%	12.1%	13.0%	14.4%		14.7%	13.3%	3.8%
Import propensity	46.9%	49.2%	47.2%	49.0%	50.3%	51.7%		55.8%	56.9%	10.0%
Export propensity	7.7%	8.0%	7.8%	10.4%	11,6%	13.3%		15.6%	14.9%	7.2%
Opening grade	43.5%	45.8%	43.8%	44.8%	45.8%	46.9%				
Terms of trade	0.83	0.79	0.78	0.81	0.78	0.81		0.85	0.79	-0.04%

Although Italian exports registered a substantial increase (of 91.3% in volume and 136% in value), this rise was not enough to counterbalance the level of imports, which also registered growth, even if to a lesser extent.
However, the balance still remained markedly negative and the sector presented a worse performance, with a balance negative variation of 22.6% in terms of volume and over 60% in terms of value. The strong deficit can be seen in almost all categories being exchanged in foreign trade.

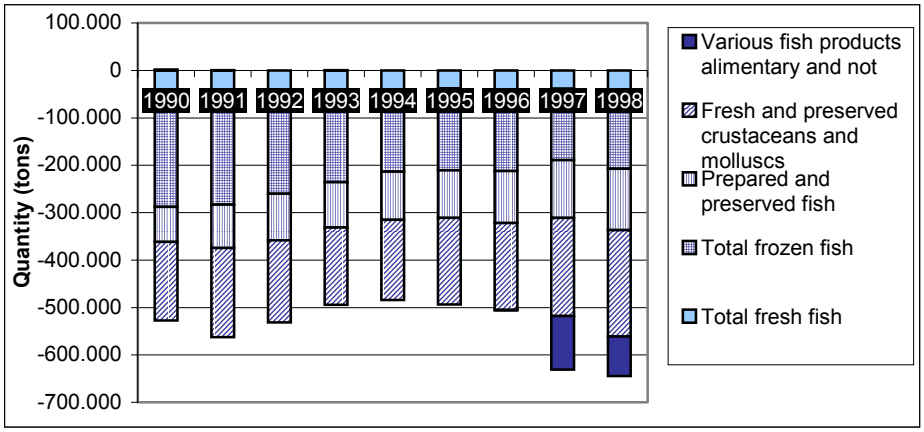

Figure 10. Italy, Foreign trade balance per categories (tons). Source: ISMEA, IREPA data.

The improvement in the balance of fresh and frozen fish imported quantities, registered in the period examined, does not mitigate the worsening balance that was registered for the same categories in terms of value (Figure 10). Consistently with what was observed about the eating preferences of Italian consumers, there was also a substantial worsening in the balances referring to “prepared and tinned fish” (76% negative variation in terms of volume and 97% negative variation in terms of value) and “fresh and conserved crustaceans and molluscs” (50% negative variation in terms of volume and 97% negative variation in terms of value).
Figure 11 confirms Italian consumers’ eating preferences. They mainly refer to species, whose national production is in deficit, i.e. thus unable to cover domestic demand, or less

competitive in comparison to other countries' production. Within total imports, imports of tuna fish are the most relevant ones (24%).

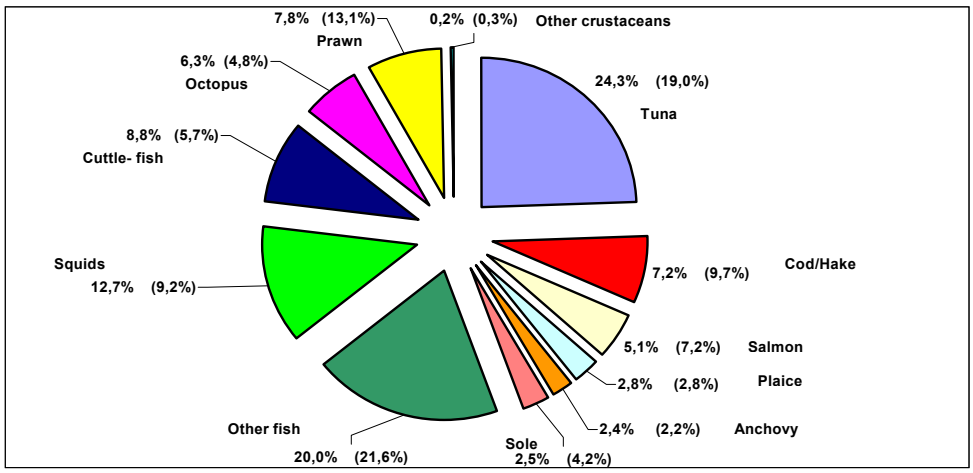

Figure 11. Italy, Imports per species in quantity and percentage values. Year 1998. Source: ISMEA database.

This category is followed by imports in the category "other fish" (20%), mainly composed by valued demersal species, which are particularly demanded on the Italian market. Imports of prawns also play an important role; prawns generally come from developing countries, where labour costs are low and prawns as processed products are offered at a much higher price in comparison to Italian or European products.

On the other hand, 27% of Italian exports are made up of "anchovies and sardines" – small pelagics – i.e. species that are sold at very low prices on the market in comparison to the valued demersal species.

Export composition, with reference to the various exported species, is very important as for the prices that can be quoted for these species (Figure 12).

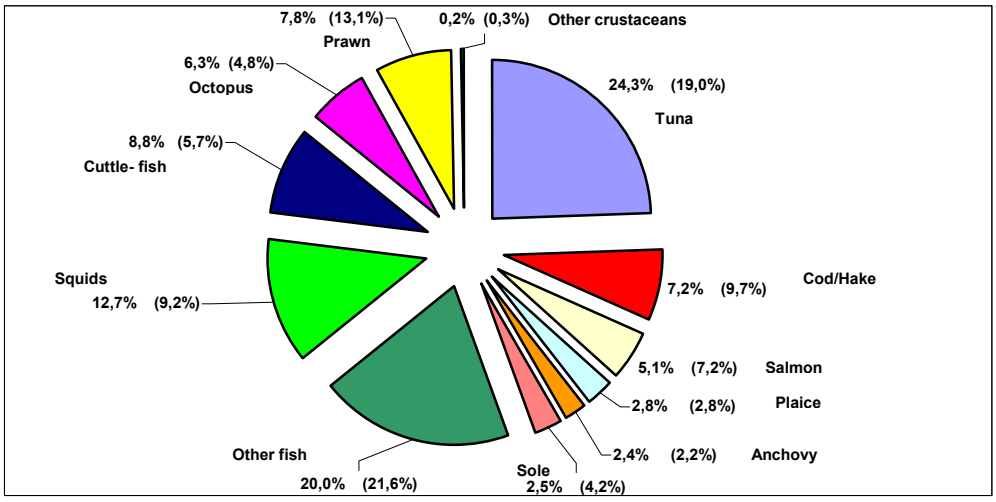

Figure 12. Italy, Exports per species in quantity and percentage values. Year 1998. Source: ISMEA database.

It can be thus observed that the species "sardines and anchovies", which made up almost 30% of total export volume in 1998, were just slightly over 11% of their value.

Conversely, the category "other fish" accounted for 28% of the exported volume and for over 30% of its value. Similar observations can be made for tuna fish, which have been particularly demanded by the processing industry in the last few years, and for the group "other molluscs". Italy's main trading partners are the countries of the European Union, as far as both export and import markets are concerned. In the period observed, increases in both European exports – 85.6% in terms of volume and 142.15% in terms of value –, and imports – 71.4% in volume and 93.6% in value – were registered. The balance for foreign trade of fish products referring to countries outside the European Union has slightly grown in the period examined, thanks to a substantial increase in exports towards non EU-countries; for the latter, a positive variation amounting to 135% in terms of volume and over 160% in terms of value was registered (Figure 13).

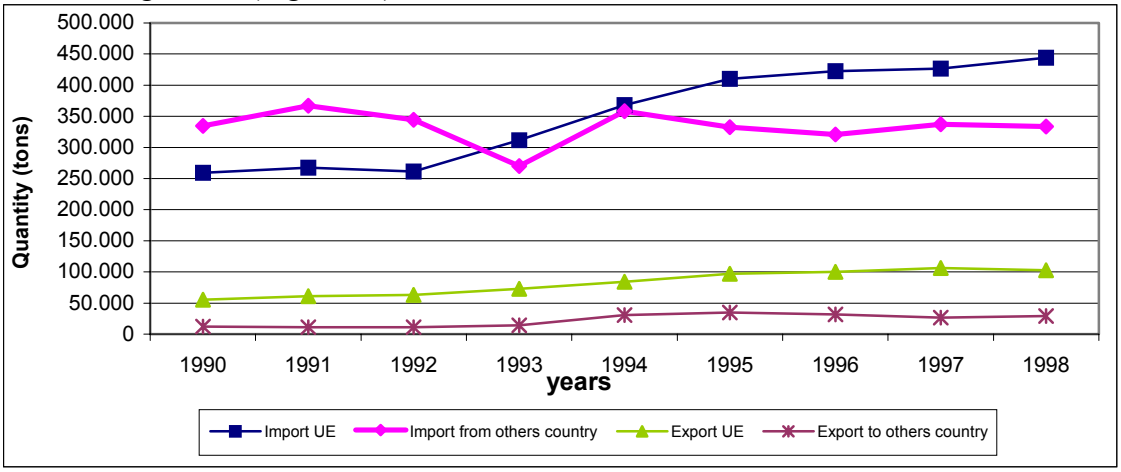

Figure 13. Italy, Imports and exports in terms of volume. Source: ISMEA.

Spain is Italy's main trading partner among European countries, both as a sale market and as a market of origin for imported products. In the period examined a sharp rise in exports, as well as in imports from Greece was registered, with the country thus becoming Italy's main trading partner together with Spain and some North European countries. Conversely, the UK market and especially the Portuguese one have gradually lost their importance. In terms of value, the categories of crustaceans/molluscs and conserved fish play a predominant role in imports, followed by fresh and frozen fish. Total imports in 1999 were 2500 million euros and registered an increase of about 1.5 % as against the previous year (Figure 14).

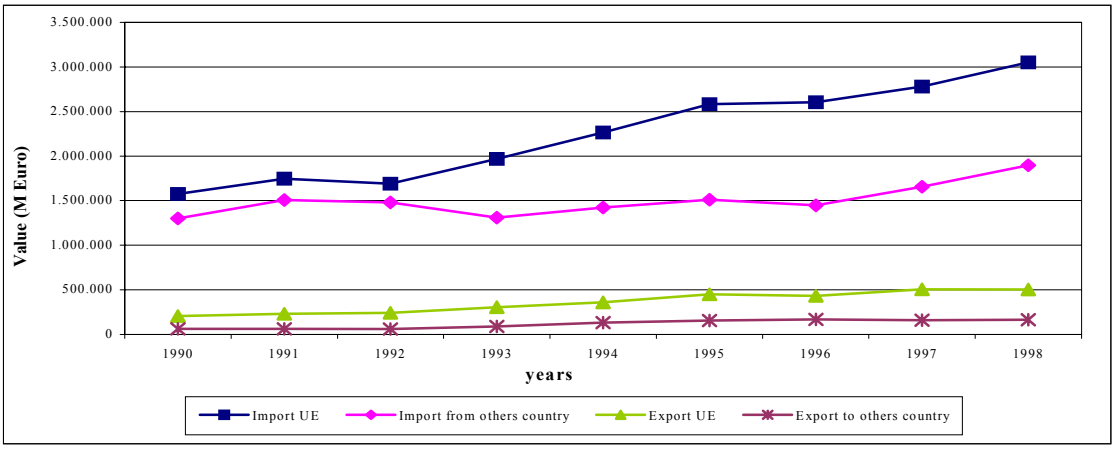

Figure 14. Italy, Imports and exports in terms of value. Source: ISMEA

As for average prices per single fish category, fresh fish play the most important role (5.06 euro/kg) in comparison to frozen fish (2.30 euro/kg) and crustaceans/molluscs (3.19 euro/kg). The latter species in particular registered negative variations in comparison to 1998 with -7%. This figure is, among other things, perfectly in line with the well-known market law of the balance between supply and demand. Quantitative imports of this fish category increased by 2.7% in the same year.
The contribution by each fish species has certainly varied over the last few years owing to the available quantities, price dynamics, as well as many other factors. Generally speaking, tuna fish trade has experienced no variations, with a slight decrease in terms of value in the late 1990s. Aquaculture development, for example, has radically affected the composition of import flows. Currently imported demersal species are to a large extent aquaculture fish and the continuous availability of the products, together with their markedly lower unit price in comparison to the price of sea products, have positively affected import flows.
Conversely, molluscs, especially cephalopods (octopus, cuttlefish and squid) among them, are taking on an increasingly relevant role in international sea fish trade, thereby replacing cod and sole in quantitative terms. Products coming from third countries, especially from Africa, are imported to Italy as frozen fish. Together with molluscs a substantial quantity of demersal species (dentex, sea bream, stone bass, European sea bass or spotted sea bass, etc.) is also imported.
Imports of crustaceans have grown too, owing in particular to the increase in imports of caramote prawns that have doubled as against 1998. Also imports of Norway lobsters and European lobsters have registered an increase, whereas imports in prawns have experienced a marked quantitative reduction.

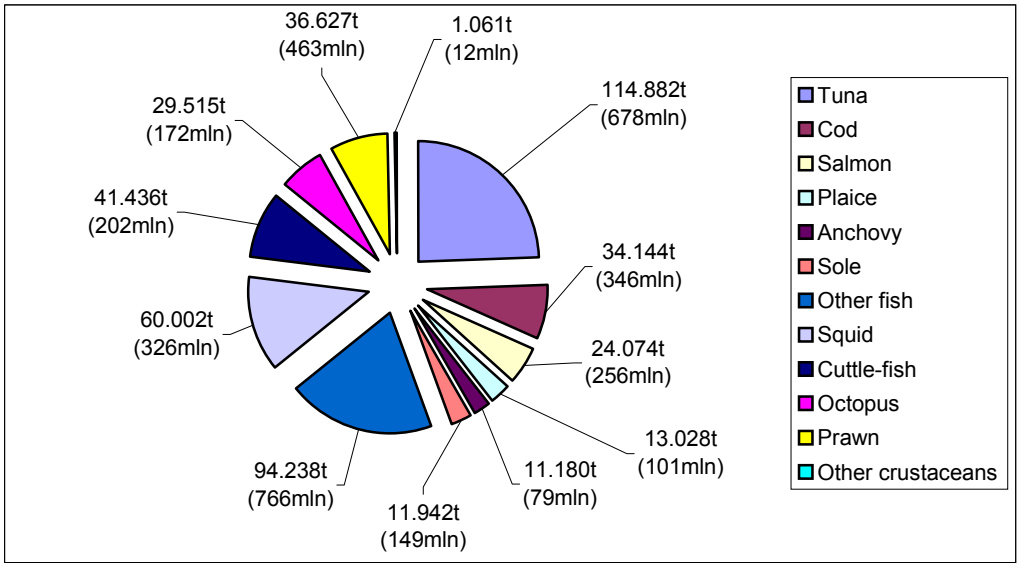

Figure 15. Imports of main species (1994-2000). Source: Elaboration of ISMEA data.

Figures 15 and 16 clearly indicate the role played by the “other fish” category (demersal species), making up for about 24.5 % of total imports, as well as by common squid (7.3%), octopuses (6.6%) and cuttlefish (4.8%). Moreover, the 2000/98 variation highlights the positive variations registered by all categories of molluscs and crustaceans and the corresponding crisis of cods and tuna fish, the former in terms of imported quantities and the latter in terms of value.

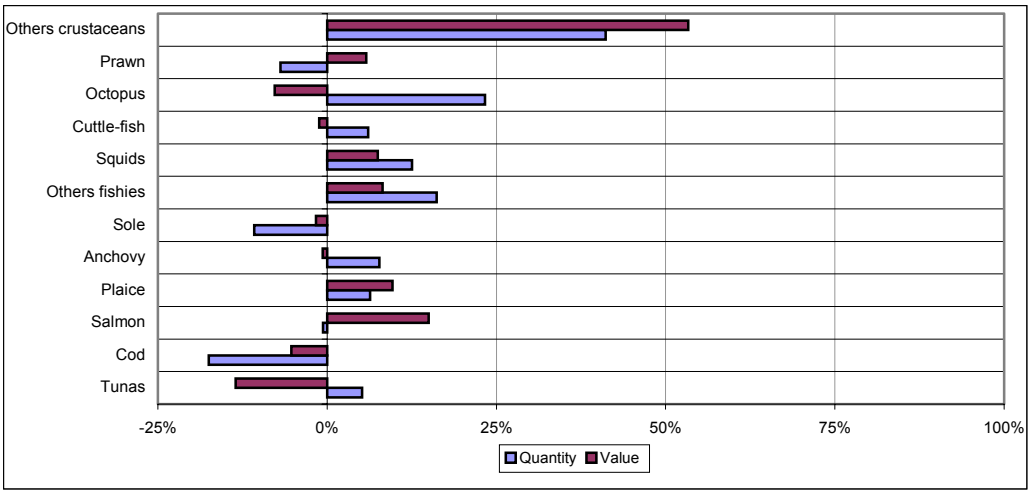

Figure 16. Variation 1998/2000 of main species imports. Source: Elaboration of ISMEA, IREPA data.

9. Trade in the Adriatic area[8]

A brief analysis of Italian trade relations with its main Adriatic partners in terms of Italian imports and exports was also carried out. Out of the total of Italian trade exchanges with the rest of the world in the year 2000 Slovenia, Albania and Croatia represent just 0.99% of total imports in terms of quantity 0.57% of total imports in terms of value, and account for 5.48% of total exports in quantitative terms and 4.62% of total exports in value.

The trade trend with these countries has been extremely variable in the last decade, as far as imports are concerned. Conversely, exports have registered extraordinary evolutions, especially with Albania and Slovenia, whose trends are clearly shown in the charts and its corresponding table. Table 1 shows import and export trends from 1993 to 2000 for the four Adriatic countries, whereas the charts refer to the trend for each single country.

The sharp decline from 1993 until now in Italy's commercial relations with Croatia is particularly evident. Imports have fallen from about 10000 tons in 1993 to little more than 6000 tons today. Such a drastic reduction occurred between 1993 and 1994. In percentage figures the period of time examined experienced a reduction in orders of - 36%. 1999 imports from Croatia were about 6.700 tons, thus registering a positive variation of 15% as against the previous year.

Another negative quantitative variation was registered in 2000 because of the war, thus negatively affecting all Italian imports with a total reduction of 34.5% in terms of volume. As for value, a decline was registered between 1998 and 1999 (-7.6%), following a substantial drop in average unit prices that also affected imports from EU-countries, albeit to a lesser extent. Conversely, the total import value registered in 2000 has grown. The drop in supply, owing to extraordinary events that are external to the market, brought about a sudden increase in average unit prices.

Exports from Italy towards Adriatic countries totally accounted for 7.600 fish tons, divided into Croatia, Albania and Slovenia. Although imported quantities did not exceed 8000 tons, the overall value of Italian exports towards the markets on the Eastern Adriatic shore

[8] All the following data have been provided by ISMEA

exceeded the value of the products imported from Adriatic countries in the same year (18,567,000.44 euros as against 15,617,000.44 euros).
Exports to Croatia underwent a substantial drop, whereas Slovenia accounted for almost 50% in terms of value of Italian exports towards Adriatic countries in the 2000.
In relative terms Adriatic countries make up about 6% of total exports in terms of volume. This percentage is growing, even if the growth is inferior to the increase in exports to other Mediterranean countries, such as Greece (10.3%) and Spain (41.5%). Like the trend observed for imports, exports also show quite remarkable fluctuations from year to year. In years of higher imports, exports obviously registered exactly the opposite trend. As a matter of fact, in 1999 exports fell and went up again in 2000. The negative variation mainly referred to Croatia, which registered a 26% drop as against 1998, although it has always been Italy's main trade partner among Adriatic countries. Italian fish purchases especially from Albania grew, instead, (+30%), while imports from Slovenia registered a very slight decline (-1.7%). The same trend was also observed in terms of value. This year Italy's foreign trade balance with Adriatic partners has been positive.

9.1 Italy – Croatia

Among Adriatic countries, Croatia is Italy's main trading partner. As a matter of fact, in the year 2000 almost 80% imports from Adriatic countries came from Croatia (see Table 7, Figures 17 and 18, 19 and 20). Croatia becomes considerably less important when it comes, however, to Italian exports. As a matter of fact, among Adriatic countries Slovenia plays a predominant role, being an outlet market for over 53% of the value of Italian exports (see Table 8, Figures 21 and 22).

Table 7. Imports from Adriatic countries (tons).

	1993	1994	1995	1996	1997	1998	1999	2000	% var. 1993-2000
Croatia	10,096	7,423	6,467	7,103	7,435	5,864	6,743	6,405	-36.6%
Albania	990	767	667	809	904	1,228	1,225	1,455	47.0%
Slovenia	385	155	299	173	317	217	165	212	-44.9%
Total	**11,470**	**8,345**	**7,432**	**8,086**	**8,656**	**7,308**	**8,133**	**8,071**	-29.6%

Source: ISMEA

Imports from Adriatic countries (000 Euros)

	1993	1994	1995	1996	1997	1998	1999	2000	% var. 1993-2000
Croatia	19,568	17,237	16,082	14,824	13,488	10,736	9,917	10,312	-47.3%
Albania	1,600	985	1,318	1,938	2,955	3,628	4,206	4,658	191.2%
Slovenia	394	221	242	343	575	370	241	647	64.3%
Total	**21,561**	**18,443**	**17,642**	**17,105**	**17,018**	**14,734**	**14,363**	**15,617**	-27.6%

Source: ISMEA

As far as trade between Italy and Croatia is concerned, it can be observed that imports of small pelagics, particularly "anchovies/European anchovies", have registered a positive trend, in terms of both quantity and value.

Figures 19 and 20 show that quantity and value fluctuations of pelagics over time (anchovies/European anchovies and sardines) are inversely proportional, i.e. increases in quantity correspond to rises in value, and vice versa.

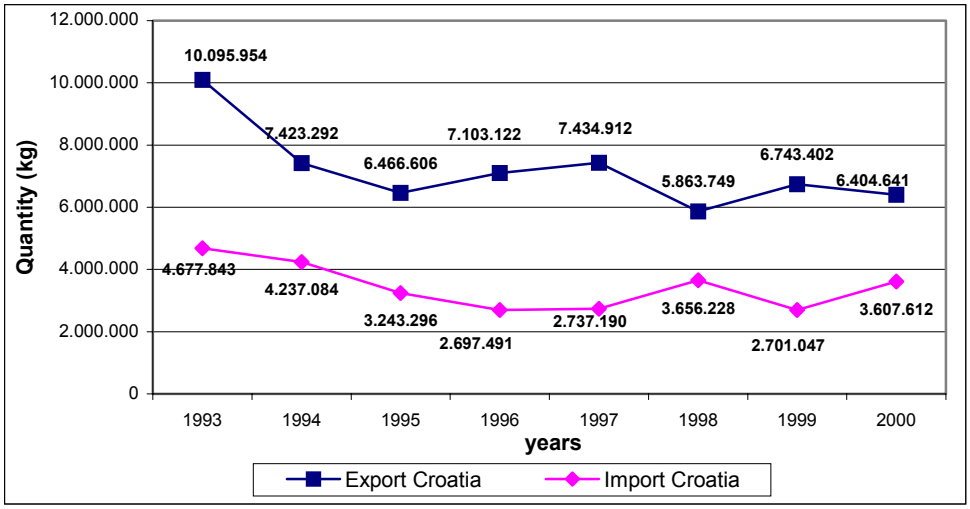

Figure 17. Italy, Trade relations with Croatia (quantity in kg). Source: ISMEA data base.

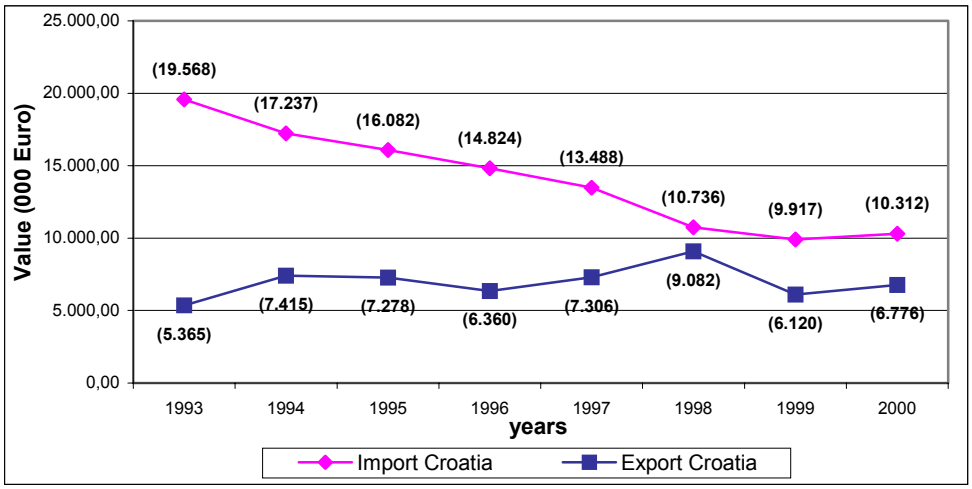

Figure18. Italy, Trade relations with Croatia (value in 000 Euros). Source: ISMEA data base.

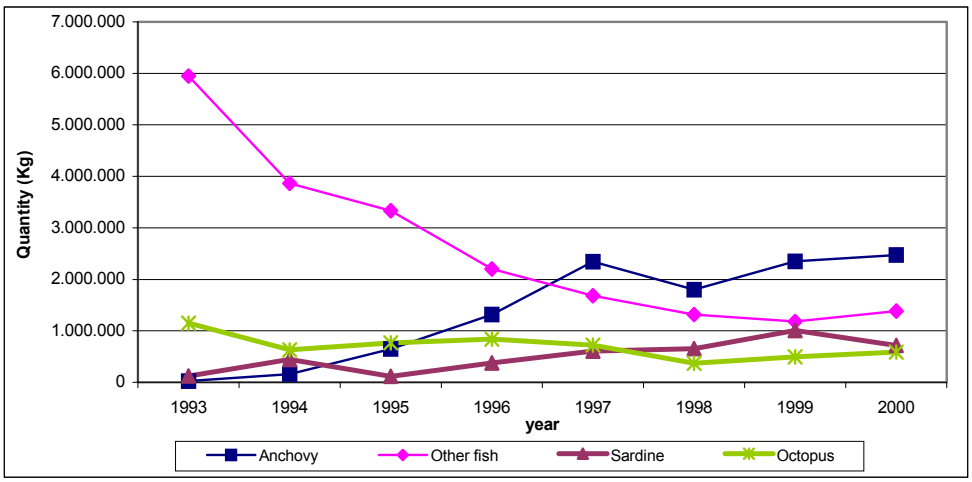

Figure 19. Imports from Croatia: most traded fish species in Italy (quantity in kg). Source: ISMEA data base.

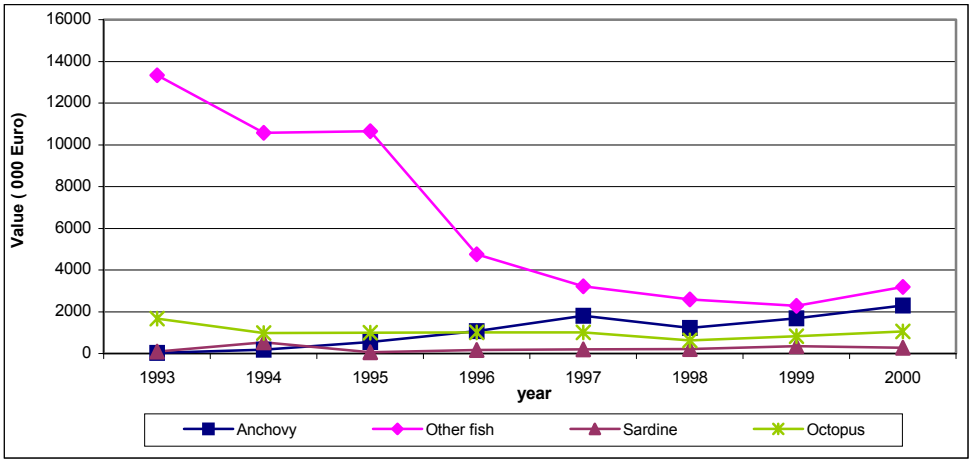

Figure 20. Imports from Croatia: most traded fish species in Italy (value in 000 euros). Source: ISMEA database.

Table 8. Exports to Adriatic countries in volume (tons).

Countries	1993	1994	1995	1996	1997	1998	1999	2000	% var. 1993-2000
Croatia	4,677.84	4,237.08	3,243.30	2,697.49	2,737.19	3,656.23	2,701.05	3,607.61	-22.9%
Albania*	44.63	48.52	216.60	893.41	1,554.89	1,778.76	2,313.81	2.138.64	
Slovenia	1,683.00	2,099.89	2,291.68	2,242.04	1,554.89	2,077.18	2,041.11	1,870.12	11.1%
Total	6,405.47	6,385.49	5,751.58	5,832.94	5,846.97	7,512.16	7,055.97	7,616.37	18.9%

Source: ISMEA

*Data referring to exports to Albania are considered in terms of percentage variations starting from the year 1997.

Exports to Adriatic countries in value (000 Euros)

Countries	1993	1994	1995	1996	1997	1998	1999	2000	% var. 1993-2000
Croatia	5,364.83	7,415.16	7,278.39	6,359.61	7,306.27	9,082.79	6,120.26	6,776.46	26.3%
Albania*	37.28	74.07	247.16	949.99	1,420,81	1,791.21	2,270.70	1,867.27	
Slovenia	3,591.34	6,185.68	7,544.93	8,325.98	1,420,81	9,906,46	9,840.37	9,923.71	176.3%
Total	8,993.45	13,674.91	15,070.48	15,635.58	10,147,89	20,780.46	18,231.33	18,567.44	106.5%

Source: ISMEA

As for the most traded fish species, the most interesting fish categories within exports from Italy to Croatia are “fishmeal” and “tuna fish”. The category of “other fish” includes the most valuable fish species from a commercial point of view; as for this category, Italian exports to Croatia are rather stable in terms of quantities, yet they have registered a decrease in terms of value.
As for tuna fish, the trend of Italian exports is positive; Croatian demand for this kind of product is growing and the following section will show that such a growth is even more remarkable in the case of Slovenian demand.
As to the other categories of fish products coming from Croatia on the Italian markets, sea breams and European sea basses are not particularly relevant in terms of quantities or overall value. However the following Figure are worth observing, because sea bream and European sea bass are the also two major aquaculture fish species coming to Italy from Croatia and are therefore particularly interesting to examine, e.g. with reference to Italian exports of fishmeal (Figure 21, 22, 23 and 24).

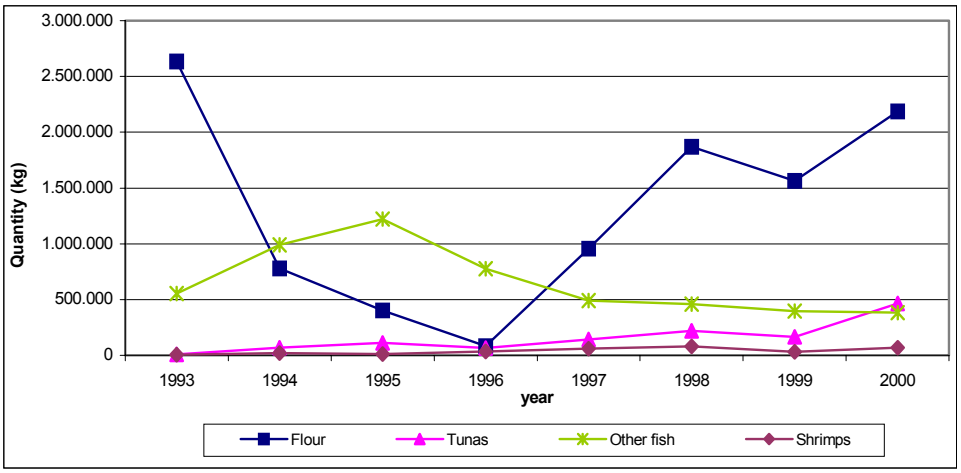

Figure 21. Exports to Croatia: most traded fish species from Italy to Croatia (quantity in kg). Source: ISMEA database.

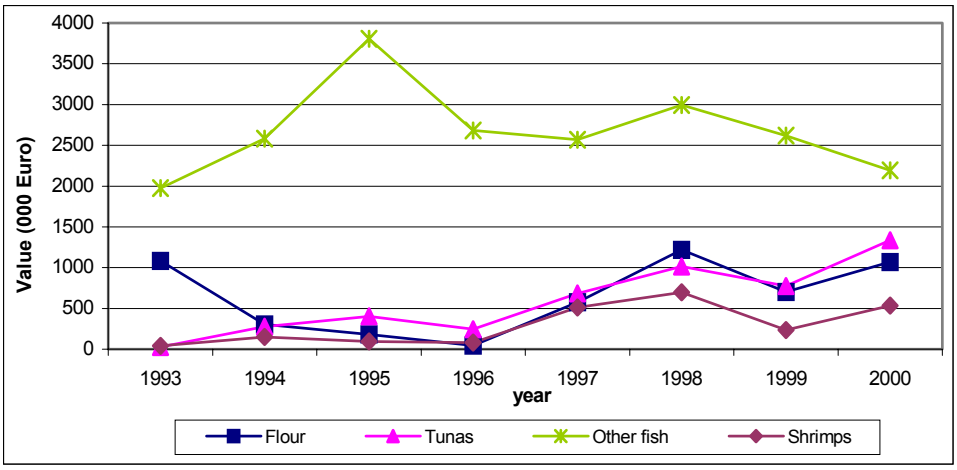

Figure 22. Exports to Croatia: most traded fish species from Italy to Croatia (value in 000 euros). Source: ISMEA database.

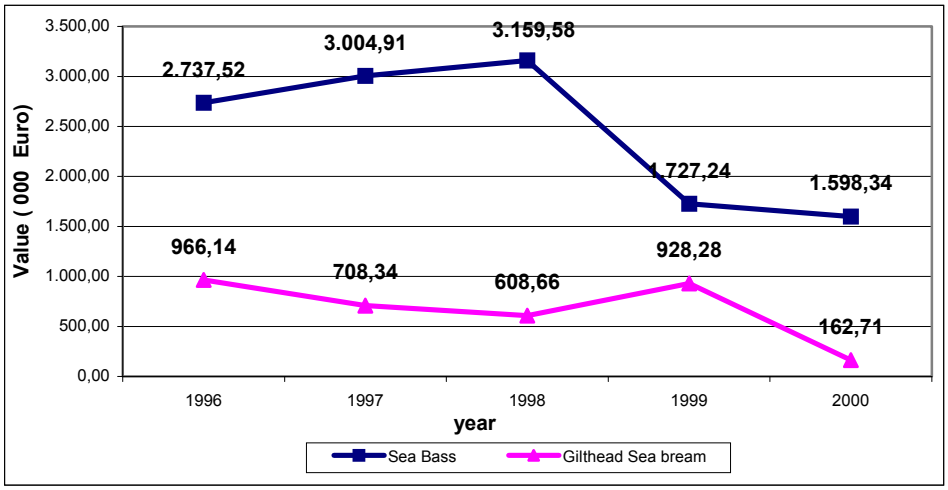

Figure 23. Imports from Croatia: comparison between the most traded fish species in Italy, which are most suitable for aquaculture (quantity in kg). Source: ISMEA database.

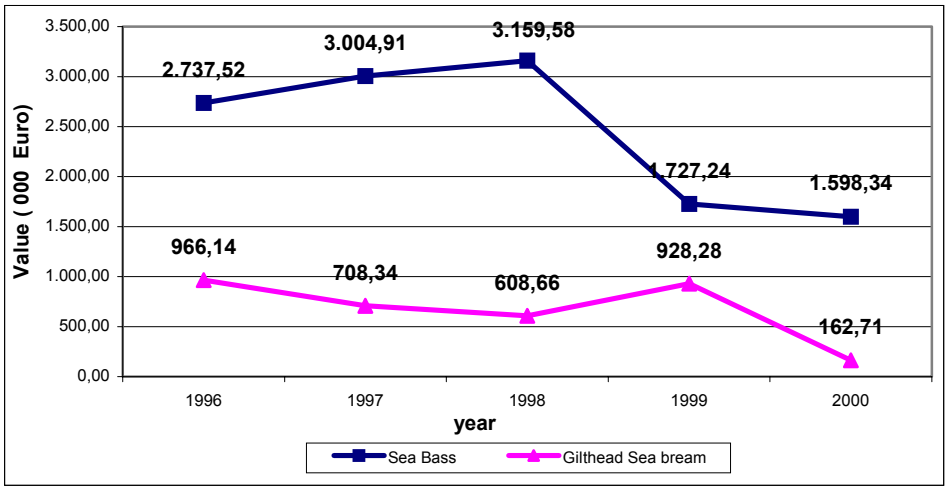

Figure 24. Imports from Croatia: comparison between the most traded fish species in Italy, which are most suitable for aquaculture (value in 000 euros). Source: ISMEA database.

9.2 Italy – Albania

In absolute terms, Italian exports to Albania showed a positive trend until 1999. In 2000 an inversion of the trend was registered because of the decline in exports of small pelagics, which was not counterbalanced, either in value or in quantities, by the increase in the exports of "other fish". Imports from Albania also registered an increasing trend. It should be noted that in 1994 an opposite trend was registered with reference to price variations as against the variations in imported quantities, whereas imported volumes and import values have shown the same trend throughout the whole period examined. The following Figures (Figures 25, 26, 27, 28, 29 and 30) show the trends described above. In the period examined, the substantial increase in imports of "anchovies and European anchovies" has determined a positive import trend, in terms of both quantity and value, in spite of the decreasing trend registered by the category of "other fish".
Italian exports to Albania show that the "anchovies and European anchovies" species account for almost all fish quantities exchanged between the countries, both as imports and exports.

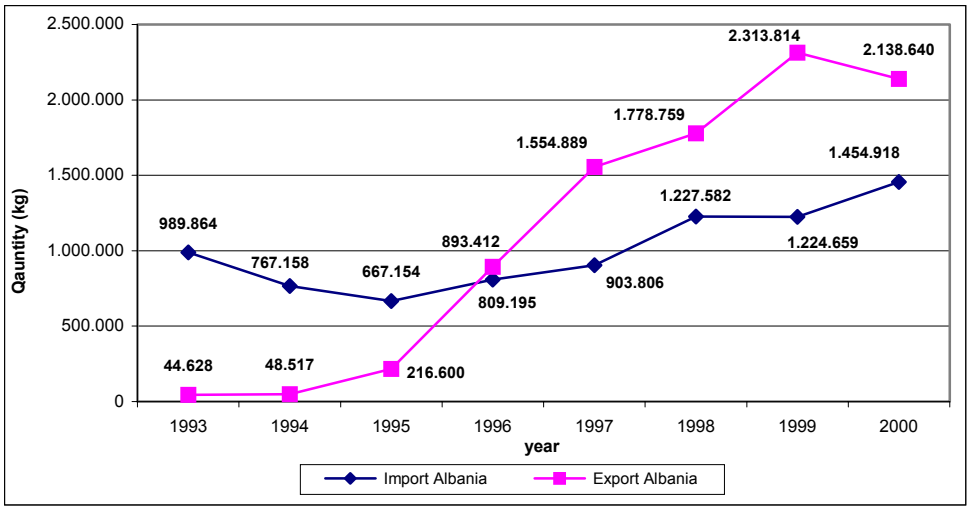

Figure 25. Italy, Trade relations with Albania (quantity in kg). Source: ISMEA database.

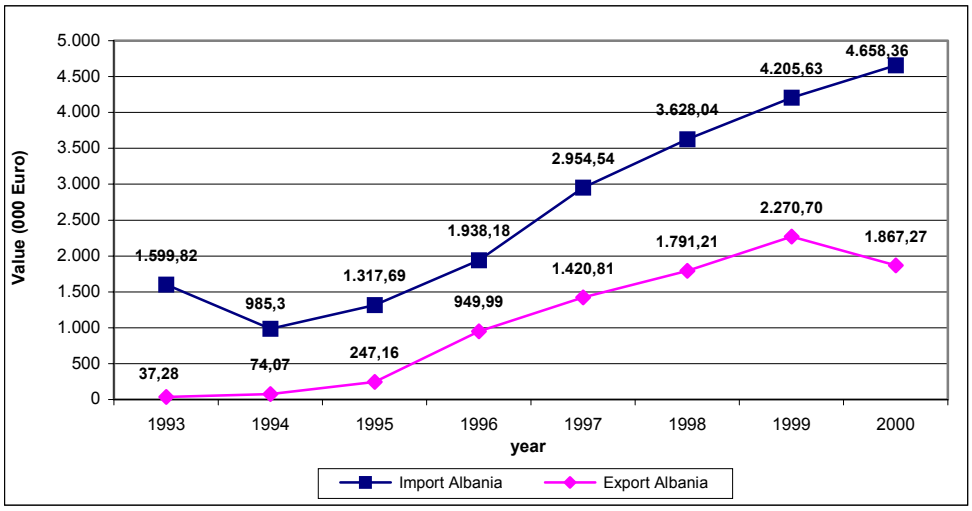

Figure 26. Italy, Trade relations with Albania (value in 000 euros). Source: ISMEA database.

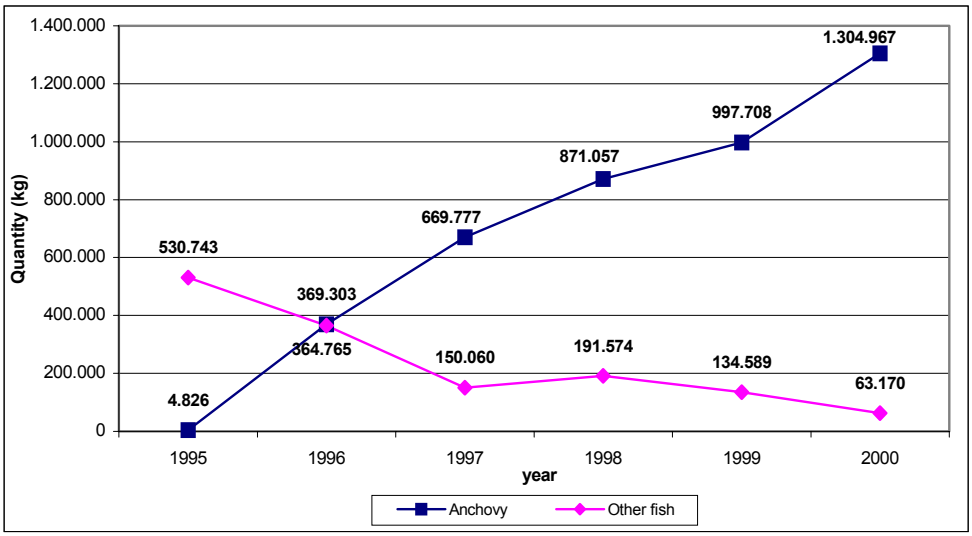

Figure 27. Imports from Albania: most traded fish species in Italy (quantity in kg). Source: ISMEA database.

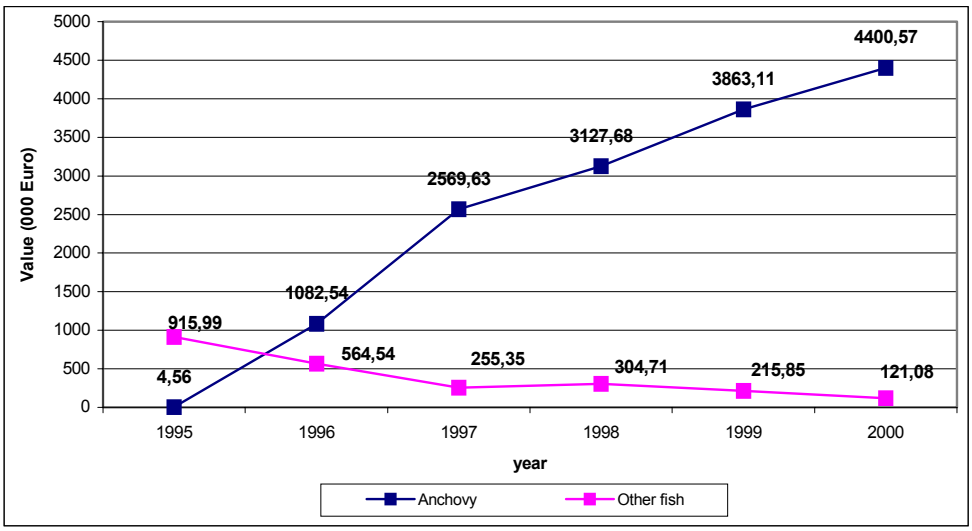

Figure 28. Imports from Albania: most traded fish species in Italy (value in 000 euros). Source: ISMEA database.

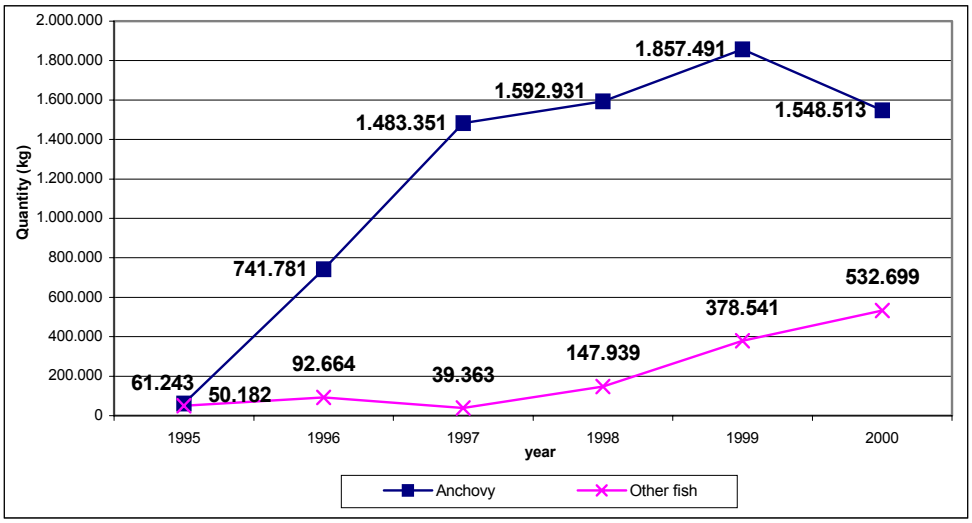

Figure 29. Exports to Albania: most traded fish species from Italy to Albania (quantity in kg). Source: ISMEA database.

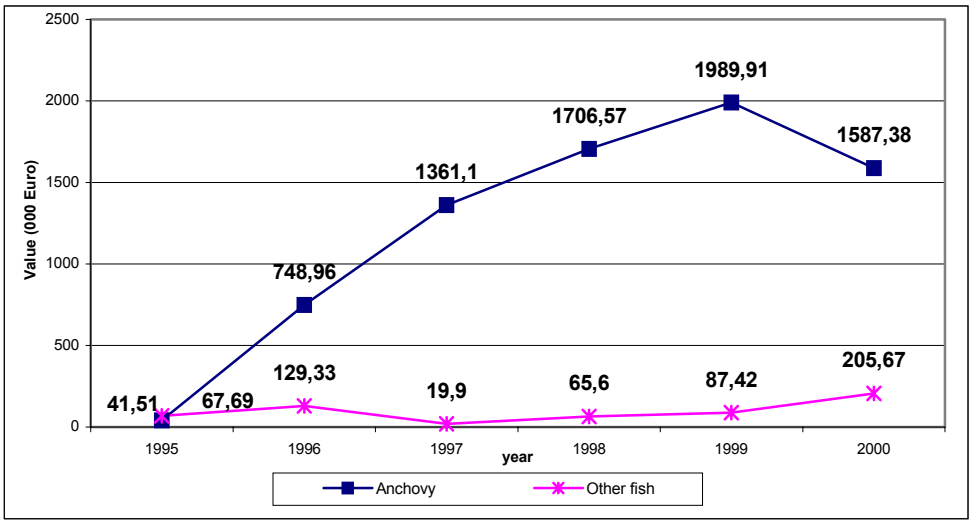

Figure 30. Exports to Albania: most traded fish species from Italy to Albania (value in 000 euros). Source: ISMEA database.

9.3 Italy – Slovenia

The study of import/export data between Italy and Slovenia shows how the most interesting subjects of analysis refer to Italian exports. In this respect Slovenia is taking on an increasingly important role for our country, also thanks to its close geographical position. Figure 27 and 28 show the composition of Italian fish exports towards Slovenia. Tuna fish whose trend, in both quantity and value, has steadily grown over the years considered mainly composes these exports.

This category is followed by group of "other fish" in the various species, cods included, whereas common squids, over 700 tons of which were exported in 1993, account for a very modest share of exports' entire value in 2000. On the whole Italy exported almost 1800 tons for a total of about 10 million euros in the year 2000. Within the framework of Adriatic commerce Slovenia is a very significant partner, if we consider the country's demand for Italian fish products; yet this is not the case for Slovenian supply, probably owing to the country's few kilometres of coast.

The lack of data for the whole period examined and their availability for the year 2000 alone allow us to sum up the information on Italian imports to Slovenia as shown in Table 8. Although exports increased by 11% as against 1993, it is yet worth noting that they registered a negative variation in comparison to the two-year period 1998-99. Statistical data indicate a fall in exports both in terms of quantities and of value as against 1997.

This is probably to be attributed to the many years of war. As for the characteristics of exported products, Figures 29 and 30 highlight the total lack of pelagics to the advantage of species like common squid, Norway lobster, tuna fish and other fish, notably demersal species.

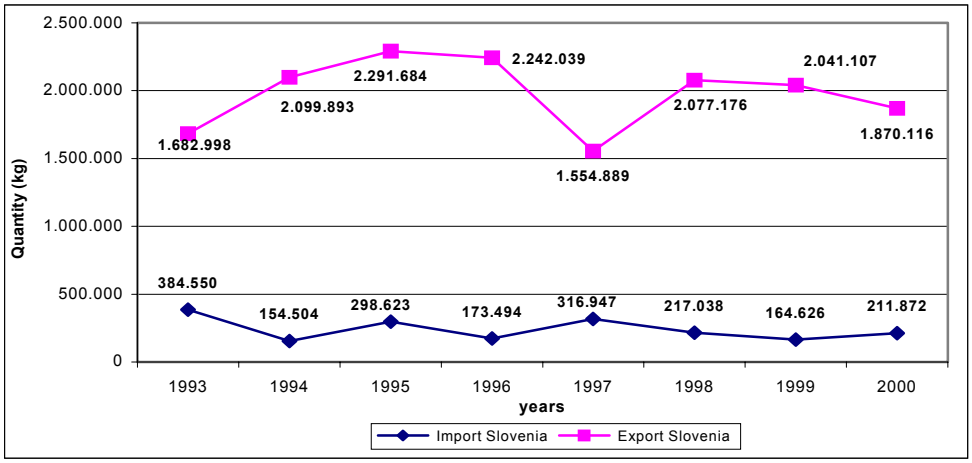

Figure 31. Italy, Trade relations with Slovenia (quantity in kg). Source: ISMEA database.

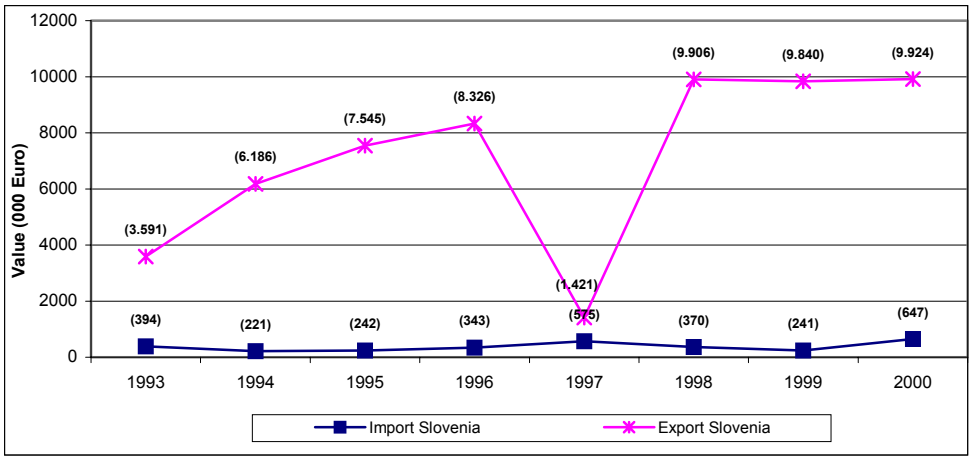

Figure 32. Italy, Trade relations with Slovenia (value in 000 euros). Source: ISMEA database.

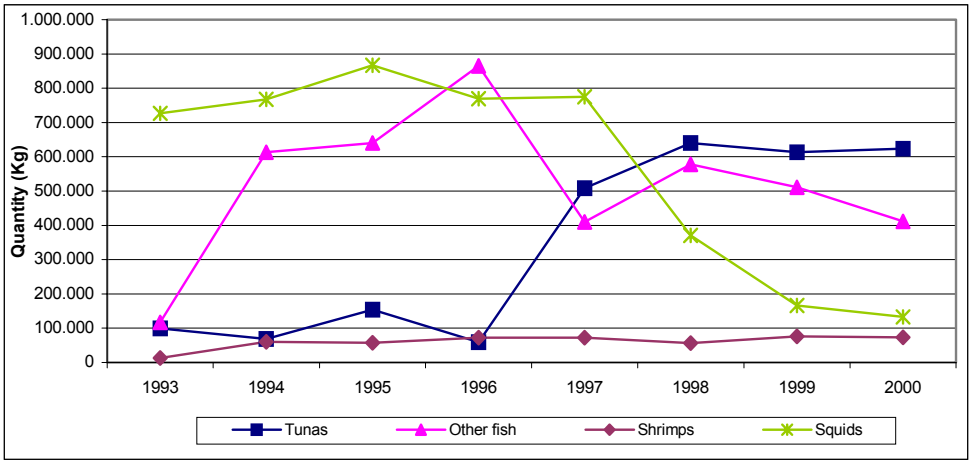

Figure 33. Exports to Slovenia: most traded fish species from Italy to Slovenia (quantity in kg). Source: ISMEA database.

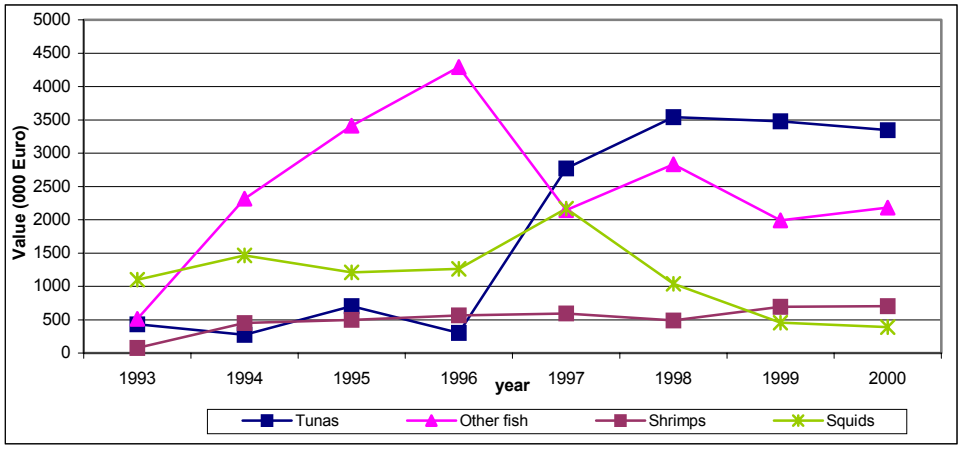

Figure 34. Exports to Slovenia: most traded fish species from Italy to Slovenia (value in 000 euros). Source: ISMEA database.

Table 9 – Imports from Slovenia: most traded fish species from Slovenia to Italy in 2000. Source: ISMEA database.

Species	Kg	000 euros	% of total imports	
Tuna	84.829	455,42	39,84	70,41
Anchovy	53.406	36,04	25,2	5,57
Octopus	21.564	32,48	10,17	5,02
Cuttlefish	15.504	24,92	7,31	3,85
Other fish	13.388	29,4	6,31	4,54
Sardine	7.714	8,09	3,64	1,25
Total imports	**211.872**	**646,75**	**100**	**100**

10. Conclusions

The objective of this study was to describe the main features of the Italian fish market – production, consumption trends, dynamics of sale prices, imports and exports' structure, fish products' trade in the Adriatic basin – in order to show the major trends of the sector, whose contribution is known to be scarcely relevant at a macro-economic level, but can be extremely important at a local level.

After a first phase of expansion, since the mid-1980s the supply of fish products has registered a decreasing trend, bringing the production of the latest years back to the same levels of the early 1950s. The gradual decline in quantities is linked to environmental degradation, but also and especially to the excessive exploitation of resources. The development of aquaculture plays a particularly important role; in the 1990s the sector increased its physical productions by over 50% and doubled their value. Aquaculture is estimated to be the fisheries sector's productive area with the greatest growth potential. This is thanks to the fact that aquaculture's productive processes can be carried out leaving, to a large extent, environmental constraints aside and therefore with methods which are much more similar to those adopted by the manufacturing system. Moreover, aquaculture production techniques allow full control over environmental conditions and hence the possibility to obtain a safe product from a qualitative point of view.

The division of supply into over 800 landing ports, the organizational and functioning methods of the trade and distribution system, as well as market globalisation lead to an unstable and fragmented price system both from a temporal and spatial point of view, which contributes to a large extent to limit the companies' decision-making and thus slows down the process of modernization in the sector.

Consumption registers an increasing trend and, consistently with the indications provided by the main economic doctrine, the growth in per-capita incomes corresponds to the replacement of "poor" products with "rich" ones. In this way consumers' preferences are more directed towards fresh products and the most valuable species.

Consumption increase and the progressive decline in production, which is only partly counterbalanced by aquaculture development, are largely supported by imports. The rate of

self-provision has decreased over the last few years and stabilized around 50%. In line with the eating preferences of Italian consumers, imports mainly refer to species whose domestic production is in deficit or less competitive in comparison to foreign productions. Italy's main trading partners are the countries of the European Union, as far as both export and import markets are concerned.

Finally, trade within the Adriatic basin was also considered. This was done because of the important role played by Adriatic fisheries, providing the largest quantity of Italian fish products, of the relevance of commercial exchanges with Adriatic coastal countries, as well as of the problems linked to the use of shared resources and the need to identify processes of fisheries joint management within the Adriatic basin. The brief data referring to the percentage variation of trade between Italy and the other Adriatic coastal countries show a reduction in the overall traded quantities in the period between 1993 and 2000. This is to be attributed, in particular, to a contraction in the trade relations with Croatia, in terms of both quantity and value, which alone make up for almost half of the Italian trade with Adriatic countries. Conversely, trade with the other two Adriatic partners is increasing. In the light of the trade relations that are being established over time, it is believed that a joint strategy for the management of Adriatic resources should be envisaged; such a strategy should be able to detect the peculiarities of Adriatic productions, mainly consisting of fresh products, and guarantee for them to be well recognizable among consumers, who are too often influenced by the asymmetric information on the supply of products imported from non EU countries (Adriatic countries excluded) with qualitative features that are very different from those of local products. Economic theories suggest that, similarly to other agricultural products or commodities, fish products are also subject to price fluctuations in the short and long run. This is due to quantities that are in surplus or deficit in comparison to the predicted normal value, as well as to the essentially rigid demand, which causes prices to fluctuate more than proportionally in case of even small variations of the quantities offered.

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Fish market and quality strategy in Ancona: a support for sustainable fishing

Adele Finco*, Alessandro Maurizi*

Abstract
The need for sustainability has proved to be increasingly relevant in the last few years and since the 1992 Rio Conference has found an adequate normative response in many areas of human activity, with appropriate measures being taken. It is now urgent to find suitable methods for the fishing sector too.
Modern consumer awareness of and attention towards the quality of products have given the market new momentum in the exploration of ways to ensure product traceability and improved information through certification.
This case study aims at presenting the strategic market choices taken by the Ancona fishery, based upon the quality certification of the fish product, with quality giving economic advantages and being an incentive to reach sustainability within the sector.

1. General framework

The sustainability objectives referring to fish as a natural resource can be included in the general management objectives of reducing fishing effort indicators, which aim at reducing overexploitation of the main fish stocks, as well as regulating not only catch volumes but also the equipment and techniques used for the fishing activities. This adds to the overall uncertainty about the real conditions of stocks especially in the Mediterranean Sea, which is characterized by the presence of many different species, each with its own peculiar evolution dynamics.

From the point of view of the market the objective is to improve the value of fish products and at the same time maintain productivity of the sector operators. Product enhancement covers a large variety of concepts, ranging from food safety, product traceability, quality and overall consumer satisfaction. In the light of new events such as the BSE crisis or the market expansion of genetically modified organisms, modern consumers have become increasingly aware of the problems linked to food safety and try to defend themselves from the related risks by choosing products that are guaranteed and marked with quality labels.

The concept of responsible management of fisheries has therefore to be intended as both as sustainable management, i.e. aimed at maintaining the quality, availability and diversity of fish resources in sufficient quantities for present and future generations, and as management from an economic point of view, within the framework of food safety, poverty reduction and long-lasting development.

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The community market has started dealing with these aspects with the implementation of the new regulations (EC Reg. no. 104/2000, EC reg. no. 2065/2001)[1] on the marketing of fish products, which are included in the more general framework of the Common Fisheries Policy (CFP). The market evolution that these regulations aim to achieve bring producers and consumers closer, as it focuses on the quality of products and the identification of their origin as tools of competitiveness and sustainability for the fishing activity.
EC Regulation no. 104/2000 aims at guaranteeing a new balance between supply and demand, strengthening competitiveness of the transformation industry and increasing information available to consumers on the availability of fish products on the market. This document is based on a whole series of considerations on the ongoing evolution in the fish sector and, more generally, on the main guidelines of the common fisheries policy. It is therefore evident that from the point of view of the EC the implementation of a common market organization, also including eastern European countries in the future and thus AdriaMed countries too, can favour the stability of the same markets, the qualitative and quantitative adjustment of supply to demand, the enhancement of products on the market, the improvement of production profitability, as well as a smoother implementation of sustainable development.
From the new viewpoint of the common market, Producers' Organizations (PO)[2] represent the supporting elements of the same common market and have acquired a fundamental importance thanks to the new regulation: they should guide the production of their members according to market needs, thus adjusting supply to demand and favouring the optimal valorisation of catch in order to achieve a rational and sustainable use of resources.

This is probably one of the major innovations for Producers' Organisations, which now have the task to decide upon an "operative programme" every year at the beginning of a fishing campaign; the programme is made up of a number of forecasting measures, which are mainly aimed at planning the assigned quantities and regulating supply in advance, so as to adjust catch to market needs. The planning of fishing means avoiding the capture of species that are scarcely demanded or not demanded at all. Producers must foresee market needs not only in terms of quantity, but also in terms of quality and regularity of supplying. More regular and better quality fish landings will result in advantages for producers in terms of prices, for dealers in terms of supplying and for consumers in terms of a better quality/price ratio. To this end, EC Regulation no. 2065/2001 foresees the implementation of common marketing norms for fishery and aquaculture products starting from 1st January 2002. For fresh or frozen products, in particular, the higher degree of diversification of the offer forces producers to provide consumers with a minimal amount of information on the main characteristics of their products.

[1] The need for a new regulation was also stressed in the *Green Paper on the future of the CFP*, which in particular asks to pay more attention to the aspects of safety and public health in the field of fisheries in order to guarantee consumer protection.
[2] Producers' Organizations are made up by fishermen or fish breeders, who freely get together in order to adopt measures aimed at guaranteeing the best marketing conditions for their products. Joining these organizations is voluntary and their creation dates back to the first years of the common fisheries policy in 1970. The definition given of "producers' organization" in the EC regulation no. 104/2000 is that of any juridical subject, set up upon the initiative of a group of producers of one or more products, whose aim is in particular to ensure the carrying out of a rational fishing activity and the improvement of the sales conditions of its members' products.

In order to facilitate the identification of fish products throughout the whole commercialisation process, the same products will be accompanied by a document containing three main pieces of information: the species' commercial name (or, together with it, also its scientific name), the production method (fishery or aquaculture product) and the area where it has been caught.

2. Ancona's Adriatic Fishery

Ancona's fishing sector has developed from 1940 until today thanks to the work of the "Cooperativa Pescatori Motopescherecci" (1941), which for long time has acted as head and reference point. The cooperative was then followed by the "Associazione Produttori Pesca" (1973) and "Consorzio Pesca Ancona" (1993). The clam sector gave itself in turn its own organization thanks to the creation of the Consortium "Co.Ge.Vo." Ancona s. r.l. (1995).
The Ancona fishery is today managed by three cooperatives:

- The Association (Organization) of Producers;
- The Consortium, which represents a commercial cooperative and includes all fishing companies that are member of the Association of Producers;
- The Cooperativa Motopescherecci, gathering all operators of the fishing sector (from ship-owners to fishermen).

All fish caught by the fishing companies is placed on the market along three main channels, which are the following:

1. Fish market managed by the company Mer.it.an. Almost 60% of the fish of bottom trawlers is marketed through this market (demersal species and sometimes small quantities of pelagic species), with average sales of approximately 7 million Euro Sales are made by rising auction and take place only in the morning from Tuesday to Friday; buyers are mainly the small local retailers.
2. Fish market managed by Consorzio Pesca Ancona. This is the market for 100% of pelagic catch, 40 % of the catch of bottom trawlers and 100% of clams. Fish is sold to Italian wholesalers and EC dealers (mainly from Spain, Greece and France), as well as to the large scale distribution (e.g. to the Italian COOP); sales are made by rising auction and take place only in the afternoon from Monday to Friday. The consortium is in charge of the commercialisation of the fish of Ancona's 72 companies, as well as of the production of the 5 fishing vessels of the Fano fishery, which operate in Ancona.
3. Other markets. A small quantity of production is marketed at seasonal intervals on the municipal markets of Pesaro and Cattolica where sales are made by electronic falling auction.

In compliance with the EC Regulation no. 104/2000, the Ancona fishery mangages its own fishing activity through an *Annual Operational Plan*. Fleet production includes anchovy, sardine, mullet, hake, red mullet, cuttlefish, sole, spotted mantis squillid and clam. The fishing activity is carried out on mandatory days at fixed hours, going from Monday morning at 5 am to Thursday at 10 pm (in case of bad weather conditions any fishing days missed may by caught up on Friday).
In order to achieve a certain balance between supply and demand, thus reducing the risk of a collapse of prices and to ensure the correct management of resources, the fishing of pelagic

species takes place on 4 days of 15 working hours each every week, (unless recovery days are required). Owing to the strong demand from Spain and Greece for fish, one additional day of fishing activity every month is foreseen during the months of February and March. For demersal species, 72 fishing hours per week are foreseen, unless hours have been missed. From September to December the number of fishing hours may be reduced in the case of bigger catches. Furthermore, the Ancona fishery has always been in favour of, and currently implements, a "biological closure" each year for fisheries carried out with bottom trawlers and for the catch of clams.
The marketing strategy adopted during the 2001 fishing season by the Producers' Organization of Ancona involved both pelagic and demersal species. The Producers' Organization applies EC purchase prices and below such prices it commits itself to collect the products from the market in order to obtain the transfer aid.
Catch quotas have been defined for all pelagic species, whose sales must be made by auction on the market managed by Consorzio Pesca. This allows control over fishing days and quotas foreseen by the catch plan, as well as the certainty of operating on a stable market. The concentration of all production into a single distribution channel also facilitates the system of control foreseen by the quality improvement plan, which was implemented by Consorzio Pesca in 2001.
Also the marketing of demersal species is carried out by auction and it generally does not face any particular market difficulty; it is however necessary that in periods of greater catch (from September to December) some fishing vessels provide their production directly to the market managed by Consorzio Pesca so as to keep prices constant against the framework of a remarkable growth in supply. This is because demand is extended to the national, EC and big distribution markets, which are for example very poorly represented in the Mer.it.an.

Since January 2001 Consorzio Pesca has implemented a quality improvement plan thanks to the creation of the Quality Label *"Fresh Quality Fish – Consorzio Pesca Ancona"*.
The label is based upon disciplinary measures, which provided for the adoption of a self-control plan for the protection of hygiene norms during the various phases of fishing activity. By adhering to the disciplinary norms, producers commit themselves to guarantee that their fishing vessels comply with certain technical and structural prerequisites and to adopt standardised and hygienically controlled fishing procedures, in order to offer the market a quality-controlled fish product of higher commercial value.
The above-mentioned disciplinary measures require producers to implement the following actions:

- *Improvement of safety and health on board the fishing vessels:* measures and training courses, which are aimed at improving the life and working conditions on board the vessel, including the provision of specific clothing items, such as wetsuits, boots for bridge and below deck;
- *Use of high-tech machinery and equipment, also to promote quality and hygiene.* In particular, it is necessary to guarantee the following: adequate systems of catch refrigeration and conservation (storage rooms, chilled water and ice production), provision of homologated bays, proper tables etc.;
- *Guarantee of high quality products with the denomination of origin:* identification of the fishing area (sea zone between Pesaro and Pedaso, in the strip between 3 and 20 miles from the coast) and respect for the limits set;

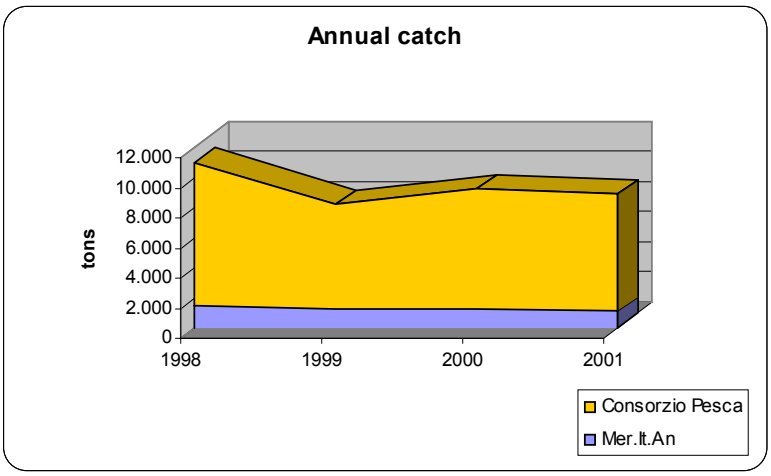
- *Certification of product quality, which is aims to improve supply to the markets, as well as normalizing the conditions under which fish products are stocked, processed, transported and landed.* The Veterinary Service of the Ancona Local Health Unit "U.S.L. no. 7" acts as quality guarantor and controller, thereby carrying out daily controls and checking the implementation of procedures and the products on sale.
- *Improvement of hygiene and safety conditions for the health of workers:* norms on landing activities, fuelling and maintenance of fishing boats in case of docked vessels, execution of port operations and services, marketing activities and operations of product processing in the port through the provision of vehicles for ice transportation, homologated loaders, boards, food polyethylene;
- *Guarantee of environmental quality:* this is to be implemented through quotas of reduction of both catch and fishing days;
- *Implementation of the self-regulation system as an organization procedure aimed at achieving high quality standards in the production process:* this is to be implemented through counselling, training and the use of hardware and software equipment for the management and development of procedures;
- *Accessory Information Technology activities and equipment for analysing and maintaining the Quality Label:* this is to be achieved through the hiring of personnel responsible for project control and implementation, as well as the purchase of IT equipment;
- *Training and information on product hygiene, safety and health:* this is to be implemented by organizing proper training courses;
- *Information and dissemination campaign on the product:* this is to be achieved by means of specific publications and advertisements.

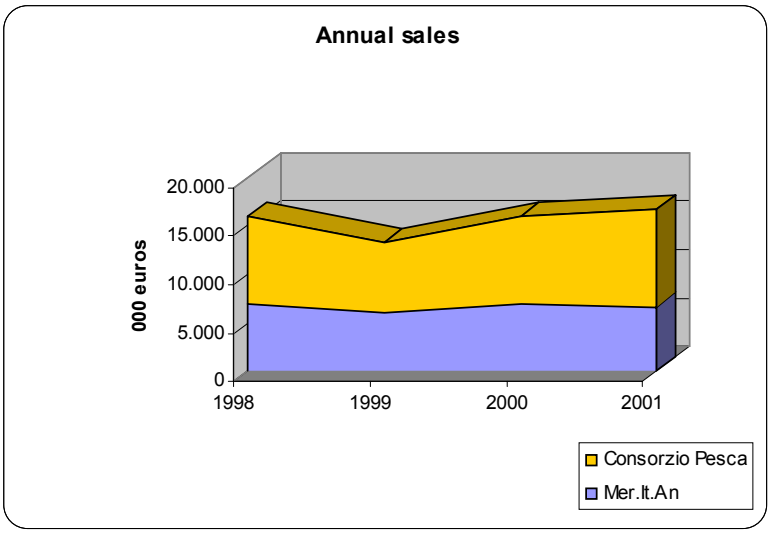
The Quality Label realized by Consorzio Pesca is a collective label, which unites all operators of the Ancona Producers' Organization. Consorzio Pesca's strategy for the near future is to offer the market a certified product, which is thus guaranteed by a third Certification Body.

3. Analysis of fish markets of the Ancona fishery

The study of the catch and price trend within the Ancona fishery has been carried out with reference to the two local fish markets, the one managed by Mer.it.an and the one run by Consorzio Pesca. The resulting data refer to the overall situation of the fishery. After a first analysis of the trends, attention was focussed on Consorzio Pesca's fish market, trying to evaluate the repercussions on catch and prices caused by the introduction of the Quality Label. Data were provided by Ismea for the Mer.it.an market, and by Consorzio Pesca itself through its monthly reports for the corresponding market. The data that have been analysed refer only to "closer coastal fisheries", which is characterized by the use of bottom trawls and floating nets; all information referring to "local coastal fisheries" and the fishing of clams, which represents an independent sector of the fishing activity, have not been considered in the survey. Table 1 shows the summarized data referring to the fish market catch and sales of the Ancona fishery from 1998 to 2001 respectively. In the four years examined average catch quantity is around 9,000 tons per year and sales amount to approximately 16 million euros.

Approximately 86% of catch is commercialised on the Consorzio's market, whereas the remaining part is sold on the "Mer.it.an" market. Sales are more or less equally distributed between the two fish markets, with Consorzio Pesca making up for about 55-56% of the total with the exception of 2001, in which the corresponding figure was over 60% (Figures 1 and 2). In 2001 about 80% of total catch refers to pelagic fish with total sales of over 7.6 million euros (45% of the total with a rising trend); over the years, sales of demersal fish have increased too, and even if these species have been characterized by markedly lower catch in comparison to pelagics (12% in 2001), the total sales registered amount to about 5.1 million euros (31% of the total), thus showing a strikingly higher collective value. The catch figures referring to crustaceans and molluscs are more or less the same, but the former have registered higher sales (2.3 million euros in 2001), which has varied over the years; sales of the latter have remained more or less constant – 1.6 million euros. In quantitative terms, figures referring to 2001 catch are as follows: about 7,000 tons for pelagic fish, all marketed by Consorzio Pesca, which holds the monopoly; a figure slightly higher than 1,000 tons for demersal fish, more or less equally distributed between Mer.it.an and Consorzio; approximately 400 tons and 300 tons for crustaceans and molluscs respectively.





Figures 1 and 2. Catch and sales of the Ancona fishery.

Table 1 - Catch and sales of the Ancona fishery

Annual catch of theAncona fishery (tons)							
	1998	**1999**	**Var. 98/99**	**2000**	**Var. 99/00**	**2001**	**Var. 00/01**
Pelagic marine fish	8.815	6.150	-30,2%	7.200	17,1%	7.016	-2,6%
Demersal marine fish	1.411	1.250	-11,4%	1.204	-3,7%	1.093	-9,2%
Crustaceans	387	456	17,9%	465	1,8%	404	-13,1%
Molluscs	375	332	-11,3%	310	-6,8%	318	2,6%
Total	**10.988**	**8.189**	**-25,5%**	**9.179**	**12,1%**	**8.831**	**-3,8%**
Mer.it.an	*1.481*	*1.224*	*-17,4%*	*1.252*	*2,3%*	*1.086*	*-13,3%*
Consorzio Pesca	*9.506*	*6.965*	*-26,7%*	*7.927*	*13,8%*	*7.745*	*-2,3%*
Annual sales of the Ancona fishery (000 euros)							
	1998	**1999**	**Var. 98/99**	**2000**	**Var. 98/99**	**2001**	**Var. 98/99**
Pelagic marine fish	7.745	4.990	-35,6%	6.557	31,4%	7.673	17,0%
Demersal marine fish	4.332	4.068	-6,1%	4.613	13,4%	5.128	11,2%
Crustaceans	2.325	2.524	8,6%	3.074	21,8%	2.338	-23,9%
Molluscs	1.607	1.607	0,0%	1.743	8,4%	1.621	-7,0%
Total	**16.009**	**13.190**	**-17,6%**	**15.987**	**21,2%**	**16.761**	**4,8%**
Mer.it.an	*7.006*	*6.057*	*-13,5%*	*6.967*	*15,0%*	*6.650*	*-4,5%*
Consorzio Pesca	*9.003*	*7.133*	*-20,8%*	*9.019*	*26,4%*	*10.110*	*12,1%*

Source: Finco (unpublished)

When considering total catch composition from 1998 to 2001, it can be noted that the percentages relating to the single fish categories are almost constant: pelagic fish make up about 80%, demersal fish on average for 13%, whereas the remaining quantity is more or less equally distributed between crustaceans and molluscs (Table 1).

The year 1999 represented an unusual case, as it was characterized not only by the usual biological closure, but also by a stop to the fishing activity due to the war[3] for almost 3 months in total. The most evident consequence of the prolonged closure was a quantitative reduction of catch of pelagic fish: as a matter of fact, catch diminished by about 2,700 tons with a corresponding variation of 30.5% in comparison to 1998. The change for demersal fish was less significant, with a variation of 11.4%.

The analysis of total catch of the Ancona fishery over the years shows a slight falling trend: irrespective of the 25% reduction in 1999 because of the prolonged closure of the fishing activity, the 2000 recovery was only 12%, and a further 4% reduction was registered in 2001. This shows that catch figures have not been able to come back to the levels of 1998 (Table 1, Figure 1).

Generally speaking, however, catch reduction affected all fish species, especially crustaceans (-13.1% in 2001), then demersal fish (-9.2%) and eventually pelagic fish too (-2.6%). Molluscs did not follow this trend and registered a 2.6% increase in catch.

[3] The third quarter of 1999 was characterized by a reduction of the activity for fisheries with bottom trawls and floating nets, owing to the war closure that lasted from 14th May to 31st August.

Furthermore, the fall in total catch was not homogeneously distributed between the sales carried out on the two fish markets. In comparison to the year 2000, the Mer.it.an market registered a drop in catch of over 13%, whereas Consorzio Pesca suffered a reduction of slightly more than 2%.
Against the background of these data two remarks can be made: on the one hand the fall in catch may be the result of normal population dynamics; on the other hand the slight 4% reduction registered in the last year may be the consequence of a policy, which is more focussed on sustainability and where market objectives do not lie in the increase of caught quantities, but rather in the quality of the offered products. Besides, the difference between the two markets could imply that quantities caught, and thus also sales, are now shifting towards Consorzio Pesca, i.e. towards quality and large scale distribution.

The analysis of the annual sales of the fish markets of the Ancona fishery (Table 1) stresses that sales exceed on average 16 million euros, with a 4.8% increase registered in 2001 (from 15.9 million euros in 2000 to 16.7 million euros in 2001). The same trend is reflected, even if in a different way, by the sales of the single fish markets: while the Mer.it.an market has more or less maintained its value 7 million euros (and even if a slight decrease was registered in 2001), Consorzio Pesca has seen its revenues increase over the years, reaching over 10 million euros in 2001.
The analysis of the sales of the last four years shows that the 17.6% reduction that was registered in 1999 because of the prolonged closure was then largely recovered thanks to the 2000 sales (+21.2%) and to the 4.8% increase in 2001. Yet this growth was not evenly divided between the two fish markets, rather it showed remarkable differences between the two. In the 1998/1999 variation, the fish market managed by Mer.it.an lost about 13.5% in terms of sales (from 7 to 6 million euros), whereas the loss suffered by Consorzio Pesca was much more substantial, amounting to 20.8% (from 9 million euros in 1998 to 7.1 in 1999).
The 1999 sales loss was recovered in 2000 in a much more evident way by Consorzio Pesca (+26.4% in sales) and in a much less decisive way by Mer.it.an (+15%). The fundamental difference was registered in 2001: in this year sales by Consorzio Pesca continued to go up by 12.1%, whereas those by wholesale market went down again by 4.5%.
The differences emerging from the comparison between the sales by the two fish markets in the Ancona fishery are evidence of the fact that over the last few years something has changed in the management of sales, and that this is not to be attributed to a different type of purchasers alone. Irrespective of the catch trend, the sales tendency shows the strong influence exerted by the Consorzio on the economy of Ancona's fishery, with this influence being felt even more if we consider the 12.1% increase in 2001 in relation to the new quality-oriented policy.
In order to highlight the market trend or in any case evaluate the effects of the introduction of the Quality Label by Consorzio Pesca, it is particularly interesting to analyse the development of catch and sales of this fish market, as shown in Table 2 and in the Figure 3 and 4.

Table 2 – Catch and sales of Consorzio Pesca Ancona

Catch (tons)					
	1998	**1999**	**2000**	**2001**	**Var. 01/98**
Pelagic marine fish	8.737	6.074	7.131	6.939	*-20,6%*
Demersal marine fish	599	625	587	561	*-6,4%*
Crustaceans	112	166	126	119	*5,9%*
Molluscs	58	101	83	126	*116,9%*
Total	**9.506**	**6.965**	**7.927**	**7.745**	***-18,5%***
Sales (000 euro)					
	1998	**1999**	**2000**	**2001**	**Var. 01/98**
Pelagic marine fish	7.663	4.925	6.476	7.537	*-1,6%*
Demersal marine fish	725	1.021	1.027	1.214	*67,6%*
Crustaceans	311	692	798	699	*124,9%*
Molluscs	304	494	718	659	*116,6%*
Total Sales	**9.003**	**7.133**	**9.019**	**10.110**	***12,3%***

Source: Finco (unpublished)

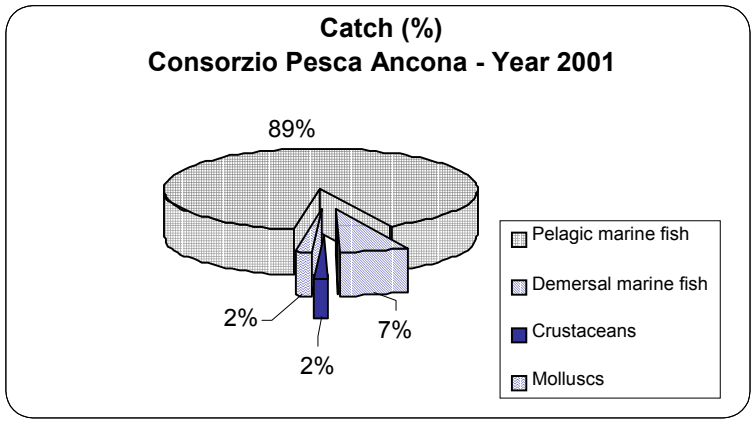


Figure 3. Catch of Consorzio Pesca Ancona, 2001.

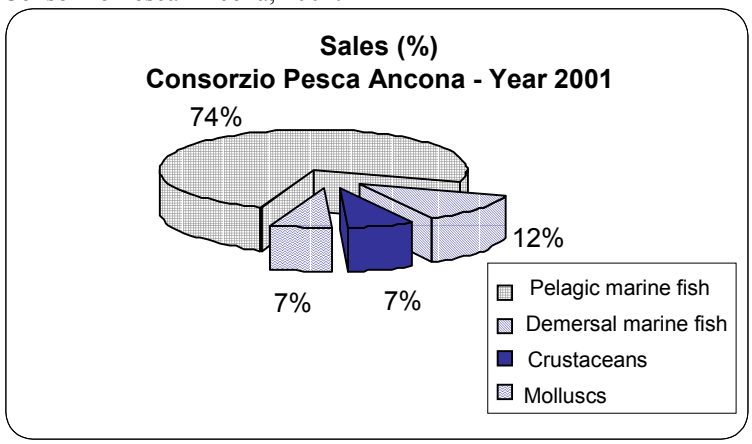


Figure 4. Sales of Consorzio Pesca Ancona, 2001.

Pelagic species are the main product of this fish market. In 2001, these species registered almost 7,000 tons of catch (89% of the total) for total sales of 7.5 million euros (74% of the total). While the quantities of these species fished registered a fall of over 20% against 1998, the corresponding sales decreased by only 1.6%, thus testifying to a certain price increase. The catch trend registered for demersal fish has been more or less constant in the four years

examined (-6,4% in comparison to 1998), while molluscs and crustaceans have shown more variable trends. Considerable increases have been registered for all these categories of fish. On the basis of these considerations it is particularly interesting to analyse price percentage variation between 2000 and 2001 in relation to catch variation. This allows some remarks to be added on the implementation of the Quality Label and to check the strategy of a price increase of the product from the point of view of an optimal management of the resource itself (Table 3, Figure 5).

Table 3 - Quantity, average price and sales of the main pelagic species of Consorzio Pesca Ancona.

	2000			2001			Variation % 2001/2000		
	Tons	Euro/kg	Sales (000 euro)	Tons	Euro/kg	Sales (000 euro)	Tons	Euro/kg	Sales (000 euro)
Anchovy	5.918	0,99	5.874	5.243	1,24	6.524	-11,4%	25,3%	11,1%
Sardine	979	0,48	470	1.335	0,54	719	36,4%	12,0%	52,8%
Mackerel	84	0,73	62	51	1,34	68	-39,3%	82,2%	10,7%
Total Pelagic Marine Fish	**7.131**	**0,91**	**6.475**	**6.939**	**1,09**	**7.537**	**-2,7%**	**19,6%**	**16,4%**

Source: Finco (unpublished)

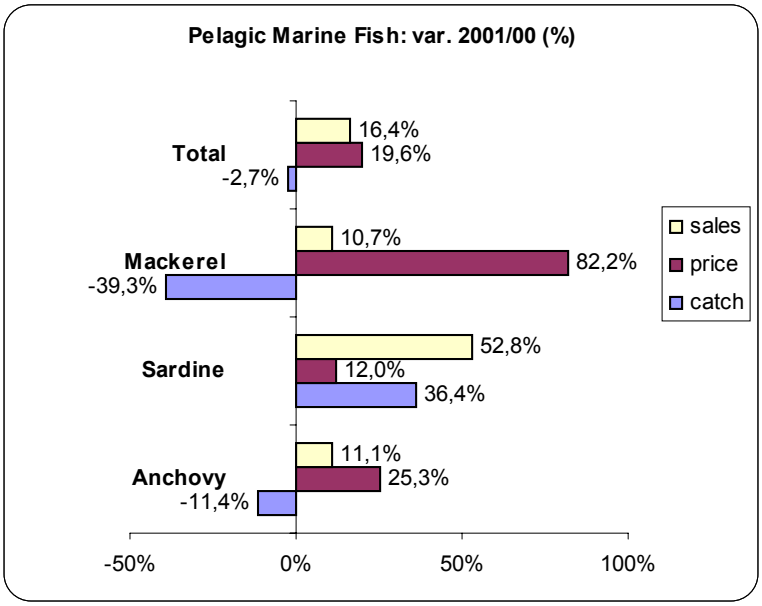


Figure 5. Percentage variation of catch and prices of the main pelagic species.

The data collected show that anchovies are the most represented species from a quantitative point of view (almost 5,000 tons in 2001), followed by sardines (almost 1,300 tons in 2001). The reduction in total catch, which was unequally distributed between fish species (-11.4% for anchovy, -39.3% for mackerel and +36.4% for sardine respectively), was countered by a general increase in prices, with positive repercussions on total income (+16.4%). The 19.6% growth in the average price of pelagic fish (from 0.91 to 1.09 euro/kg), is divided into single increases, which are more than proportional in comparison to the catch percentage variations; in this framework the 82% increase in the price of mackerel (from 0.73 to 1.34 euro/kg) and the 25% increase in the anchovy (from 0.99 to 1.24 euro/kg), leading to a sales growth of 10.7% and 11.1% respectively, are particularly significant. This tendency towards price

growth may be due to various causes: partly to the market law that leads to a price increase after a reduction of the quantities offered, partly to inflationary phenomena, and partly also to the introduction of the Quality Label, which brought about a further improvement in the value of the whole supply chain. To support these considerations, the graph illustrated in Figure 6 shows the increase in sales to the large scale distribution that was registered by Consorzio Pesca in the first nine months of 2001; the positive trend is clear. The higher profits obtained on the market by quality products as against conventional products could thus make up for the lack of profits due to minor catch and, as a consequence, to a minor fishing effort. On the other hand it should not be under estimated that, according to the law of demand, a price increase is accompanied by a proportional adjustment of supply in the medium term, that will have to be avoided through the regulation of the sector: this regulation will in any case have to be taken into account by the qualitative disciplinary measures of Consorzio Pesca. The problem of fish imports from other markets, especially from foreign ones, still remains open. This is a variable, which will necessarily have to be taken into consideration in the drafting of any future strategy.

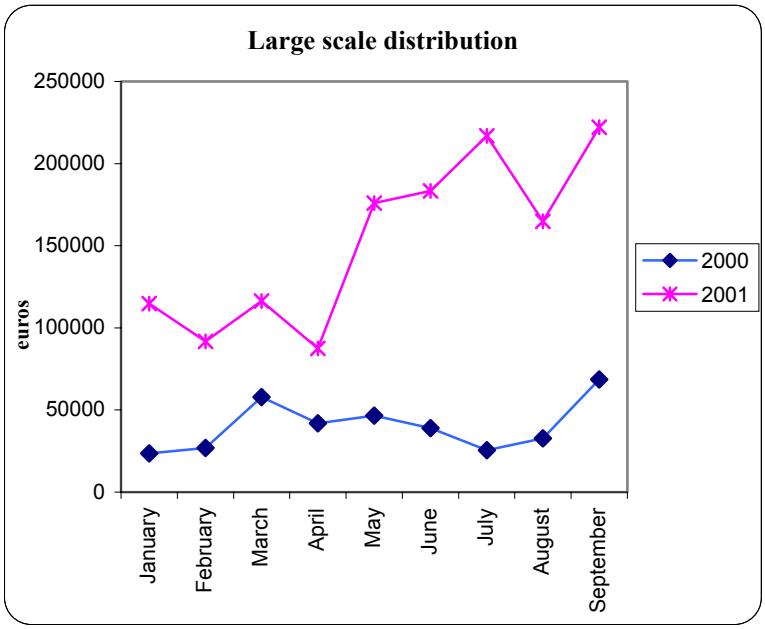


Figure 6. Trend fish sales from Consorzio Pesca to the Coop distribution chain.

4. Conclusions

By way of conclusion it can be stated that the supply of a high quality product, marked with a label, can represent an excellent strategic choice from the point of view of both market and marketing, as well as an ideal support to achieve sustainability in the sector. The use of a label of origin could also be extended to a wider geographical area, like the entire Adriatic basin. The analysis of the economic results of Consorzio Pesca's Quality Label clearly shows that the large-scale distribution plays a fundamental role through its supply chain approach, as it supports the promotion of the product and guarantees the respect of the final standards of quality and correct information towards consumers (advertising). The study has in short stressed that a quality strategy can help achieve three simultaneous objectives: consumer satisfaction, thanks to the provision of a guaranteed, well recognizable and high quality fish

product; the achievement of producers' economic objectives, as producers are able to apply a higher price; and lastly, a sustainable use of fishery resources, which are in this way subject to an optimal management regime.

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Market and marketing of the fish products in a small marine district: Termoli case

Maria Forleo*, Angela Di Nocera*

Abstract

The study shows the market and marketing problems of the fish products in the Termoli marine area. The direct survey carried out has underlined that the issue is not so much that of determining a market for the product, it is more the search for the most favourable market for local production. Advantages can be obtained through more efficient distribution channels and value enhancement policies that may place the product for fresh consumption in a high quality and price market segment.

1. The survey: aims and methodological aspects

This study# shows the first results of research carried out by the University of Molise at the Termoli marine area in the first quarter of 2002. The aim of the research is to carry out a wide-ranging analysis of the fishery's features, to identify its strong and weak points, the sector prospects in this area above all with regard to the employment trends. The direct survey has considered a wide range of themes including many sides and problems of the fishing industry in the fishery.

As regards the output structures we have interviewed all the vessel owners working in Termoli harbour while all the traditional retail outlets of the city have been considered with regard to the marketing. Some representatives of the local productive world have also been listened to as key witnesses of the trends characterizing the Termoli fishing scene.

In the following pages we shall deal in particular with the theme of fish product distribution in the local market.

The research we give an account of in this report is part of a current of studies the University has developed for some years; special mention is given to the direct survey of the socioeconomic features of the fishing industry, carried out in the same fishery about ten years ago with the help of the fishermen's organizations. Therefore this study intends to analyse the local situation according to a further interpretation identifiable in the analyses of the changes that have affected Termoli fishing businesses and the local fish products market in the last decade.

Perhaps it is needless to point out that the method of the direct survey, although it may be lacking in terms of generalization of results, still is the only useful methodology to highlight ways and changes which cannot be grasped through the data analyses given by the official statistical sources.

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#The report shows some preliminary results of research carried out by the Molise University for Termoli Fishing, Tourism and Sea Business Development and Technological Innovation Union. Angela Di Nocera drew up paragraphs 2 and 3; the remaining parts should be credited to Maria Forleo.

2. Output structures, fishing activities and techniques in the Termoli fishery

Seventy-two boats, thirty-four of which having the trawling licence, are registered at the harbour office, (IREPA data, 1999).
The direct survey has concerned boats with an average tonnage of about 44,5 GT and a power of 22 kW. Therefore they are fishing boats of considerable size, bigger than the Italian average of 11,7 GT, for a power not greater than 80 kW (ISMEA data, 1999). The output structures studied have a power even greater than the average of the Molise fleet that, however, is among the highest in Italy[1], considered the significance of the trawl fleet.
Most of the boats (about 60%) carry out coastal fishing, but there are several vessels qualified for the so-called Adriatic fishing – about one third of the total - while only three fishing boats – 9% of the total – sail on the open sea, having a deep-sea fishing licence[2].

The catch work therefore takes place within a short distance of the coastline (none of the output units carries out operations of primary processing of fresh fish) mostly using the traditional Adriatic systems: trawling (60% of the enterprises owns a trawling licence), fixed gear (25%), hydraulic dredgers (13%).

The composition of the output is related to the specialization of the boats: each gear is for the catch of some groups of species. The fishing enterprises registered at the local fishery, using mostly trawlers and hydraulic dredgers, have opted for an output of demersal species: Cephalopods, some excellent species of white flesh fish (above all hake) and molluscs[3]. Yet the number of the production units licensed to use these systems tends to lessen because of the community and state policies bent on controlling the fishing effort. Even recently the Clams Plan, passed by DM 21.7.98, has ordered a cut of the hydraulic dredger units registered at the Termoli harbour office.

The use of fishing with light has become very rare, like in the whole region of the Middle and Lower Adriatic: the use of this technique, affected by the weather conditions, is currently limited to the months when the stocks of anchovies, sardines and mackerel – the main target of this fishing sector – are most abundant. In the other seasons of the year the migratory movements of the shoals of anchovies and sardines compel fishermen to do constant shifts,

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1 Currently the Molise fleet has an average tonnage of 33 tons and a power of 187 kW (IREPA 1999).

2 *The local coastal fishing* is carried out within 6 miles from the coastline, in the waters in front of the seaside villages, by fishing boats of small tonnage and sometimes without any infrastructure ashore. It is a kind of versatile fishing, since it makes use of multiple fishing tackle fit for the catch of several species of stock, practised by family concerns, with small crews made up of no more than four people, who can put out to sea for no more than twenty-four hours.
The close range coastal fishing is carried out within twenty miles of the coast by vessels of bigger tonnage, up to 80 tons, and bigger crews (3-8 people). These are above all for the catch of excellent demersal species, using mostly the trawling system.
The deep-sea fishing, practised on the open sea, beyond the continental shelf, needs an industrial organization using vessels of considerable tonnage and bigger crews who can put out to sea for more than a month.

3 Both the systems, which are not very selective, are also used in coastal areas and are responsible for intensive exploitation of the fishing areas. Indeed they involve a remarkable actual effort (measured through the death rate of the fish species) especially in sensitive areas like the coastal ones, where there are often breeding areas and nurseries.

increasing the freight costs so as to make the activity uneconomical also considering the low commercial value of anchovies, sardines and mackerel.
In the following graphs (Figures 1 and 2) we have reconstructed the development of the fishing sector in the Termoli fishery using ISTAT data[4].

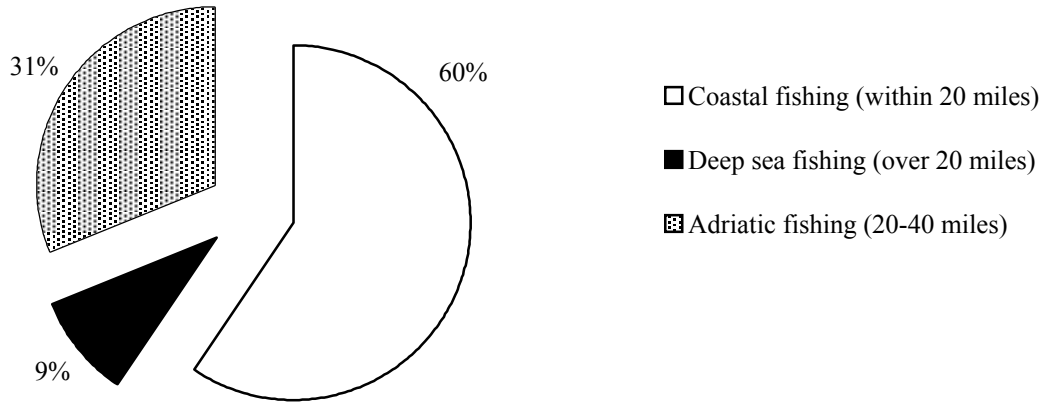

Figure 1. Impact of the different fishing typologies.

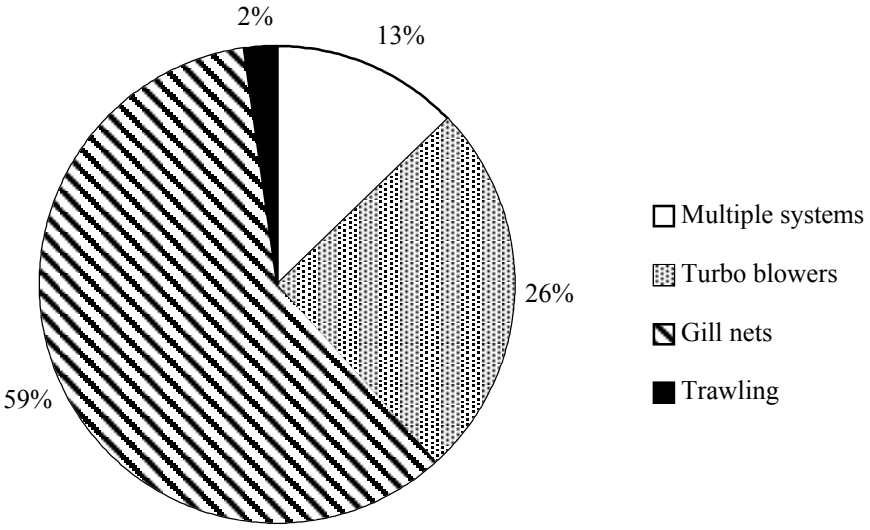

Figure 2. Impact of the single fishing systems.

[4] The National Institute of Statistics gives data about the discards, outcome of statistical findings carried out by associations directly interested in the production of information about fishing: fishermen's co-operatives, fish markets, harbour offices, "adjusted" by means of evaluations that include in the total even those quantities the statistical finding misses for various reasons. The information is divided and published by single coast, by administrative region and by harbour office. Therefore they refer to the quantities unloaded locally by the operators of the Mediterranean and Oceanic fishing industry, even though marketed somewhere else or for the direct sale or home consumption.
The data about the catches are published yearly in the book dedicated to the hunting and fishing Statistics, divided by region and species. The latter are described accurately enough– they are 47 – afterwards grouped in the following wider categories: anchovies, sardines, mackerels; tunas; other fish; squids, octopuses, cuttlefish; other molluscs; crustaceans. The same information is also given for each month of the year and, only for the big groups of species, published by single sea section. Anyway the quality of the data on the catches is related to the method of evaluation of the share of catch that does not reach the fish markets.

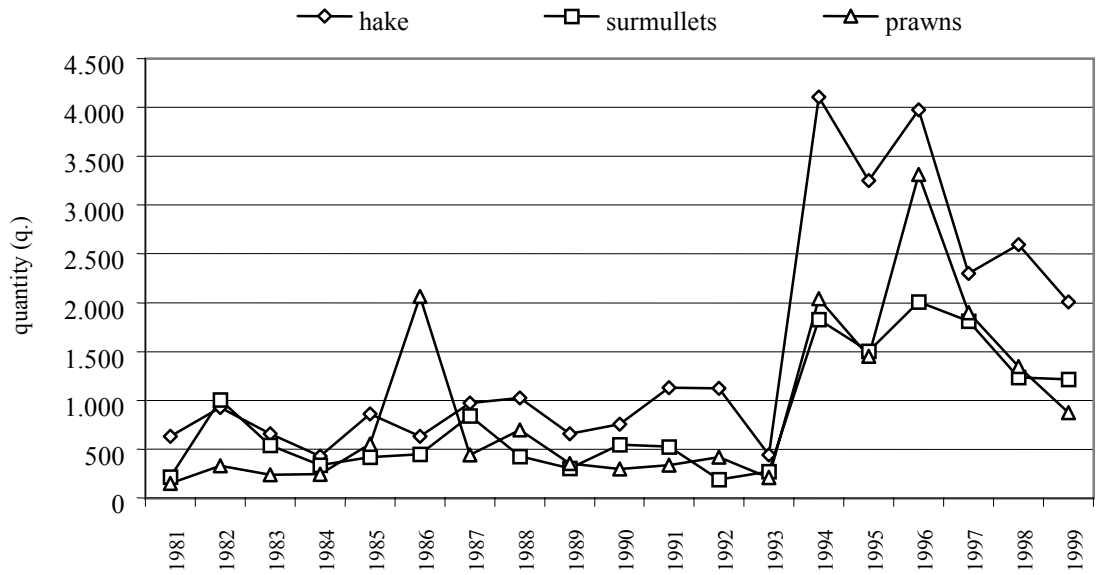

Figure 3. Termoli fishing output.

A tendency seems to be common to all the main groups of species: a rising trend – typical of the latest years – which follows a period marked by lower output levels, (Figure 3).

This is valid for the *molluscs* but for *crustaceans* and *small pelagic fish. Hake, surmullets, prawns and octopuses,* today the most interesting species for the economy of this sector, show a similar progress, (Figure 4).

The output of anchovies, sardines and mackerel (Figure 5) is marked by the usual cyclic trend due to ecological and biological factors, however known only in part. Indeed the stock of small pelagic fish fluctuates considerably, probably due to climatic and environmental conditions (changes in temperature, different input of fresh waters, changes in salinity) that affect the availability of plankton.

In particular, in the Adriatic an actual slump in the output of anchovies took place between the end of the '80s and the beginning of the '90s. Yet this slump was not due to the intensity of the fishing effort[5] and also involved in the Termoli fishery. Anyway, recent data about the catches are evidence of the reformation of the sea stock.

[5] Indeed research carried out on the stock of anchovies within the preliminary studies to the drawing up to the fishing triennial Plans calculate the catch due to fishing to the extent of 20-25% of the available biomass, therefore such that it did not jeopardize the stability of the fish fauna. On the other hand the biomass is very sensitive to the recruiting made up of organisms under the first year of age whose survival is jeopardized by unfavourable natural factors.

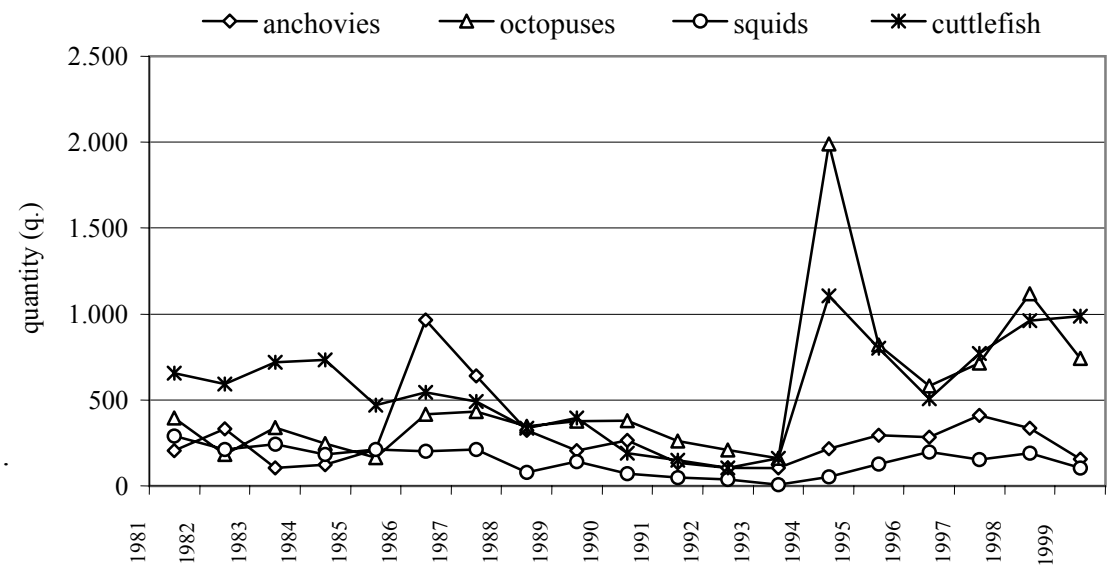

Figure 4. Termoli's marine fishery output.

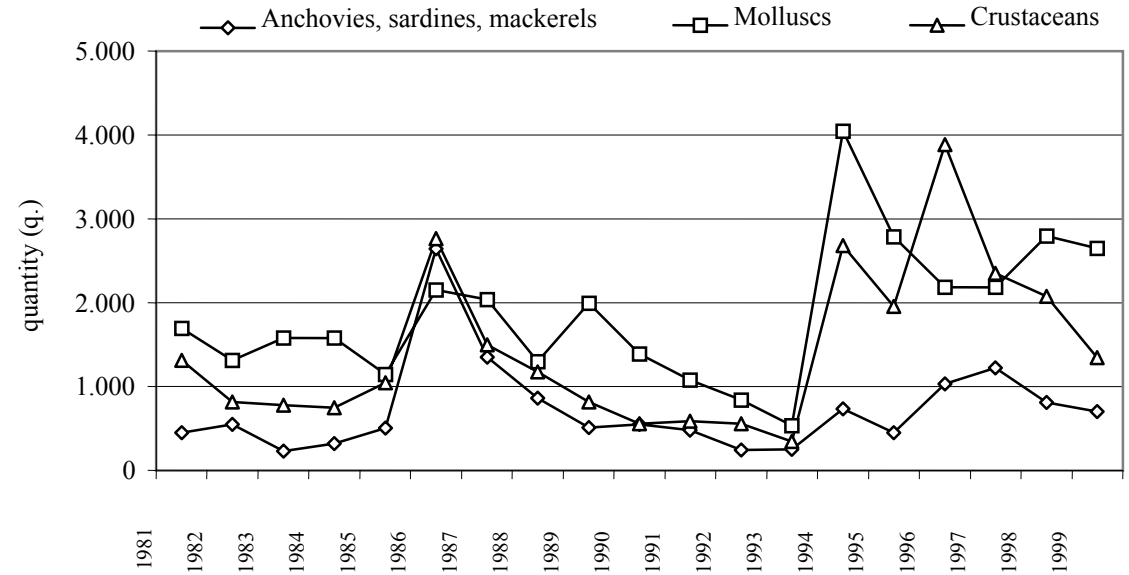

Figure 5. Termoli's marine fishery output.

3. Marketing structures and forms: first results of the survey

The research carried out on the Molise fishery also looks into this theme and, for this reason, puts a specific group of questions to the producers and a questionnaire meant for the retailers.

The survey reveals the fishermen give the task of selling their product to wholesalers or directly to retailers. The two trade channels have the same importance since each of them carries half of the output. Therefore the two trade routes are quite long and fragmented, especially where wholesalers intervene. Moreover, there are no bargaining relations between producers and the processing industry, which could increase especially the incomes related to

the sale of species with low commercial value, e.g. anchovies, sardines and mackerel, in which the Adriatic region is very abundant.

The fish outlet meets almost solely a regional demand, that mostly comes from the lower Molise (70%) and from the inland area of the Province of Campobasso (20%), while only a small share (10%) is for the home (Termoli) market.

Transactions are usually regulated verbally and, but more rarely, on the basis of a contract. The contracts determine the purchases carried out even before the fish is caught. They are purchases of fish with high commercial value and with a good market demand: squids, cuttlefish and octopuses.

Payment is mostly (more than half of the cases) made immediately, yet they grant extensions up to a month for the bigger consignments of goods.

The town market plays a "minor" role in the local fish transactions, as we infer from the importance of the sales outside the market. The structure sells a remaining share of the output, carried out by the smaller firms that, without a refrigeration system, are "compelled" to dispose of the product as soon as possible. Clearly the bonds to the structure development have not been removed entirely, notwithstanding the partial adjustment to the health rules prescribed by the EU[6]. The fish market at present gives only some basic services, car parks, stands to show the goods and packaging machinery at the users' disposal. It has got the EC recognition prescribed by the law after the renovation works even though only for the sale-room and the store[7].

Moreover, we should not forget that the negotiation method, the electronic Dutch auction, damages the sellers very much above all when there are secret agreements among the buyers to push down the price of the goods[8]. We point out that the Dutch auction method sees the auctioneer fix a starting price in order to begin the negotiations. The auctioneer offers ever decreasing prices until one of the potential buyers terminates the negotiations accepting the sale price[9].

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6 We refer to the 91/43 European Community Directive absorbed by the Italian Executive Order 531/92.

7 More information, regarding the turnover and the price of the products too, were gathered through a direct survey about fish markets, carried out by Federcopesca in 1998. From the research it does not emerge that the structure in Termoli has the systems fit to ensure even refrigeration, systems most of the market are equipped with. Therefore it is clear the need to update the market widening the range of services offered. We underline that for instance workrooms for fish manufacturing (Milan), conveyor belts or supplies of purified salt water are available in some premises.

8 We point out that the negotiation mechanisms in force at the wholesale markets are not generally very advantageous for the sellers so that they leave the fish market placing the product outside the market. For instance there is a mechanism of numbers at San Benedetto. This rule means that the ship-owner with a high number, admitted to the negotiations late in the morning, is forced to sell the very perishable product, at particularly cheap prices. This is obvious, therefore most fishermen try to find a market for his own goods as soon as the ship comes back to the harbour getting in touch directly with wholesalers and retailers.

9 It is a method used above all in the markets of the North and Centre of Italy. On the other hand in the South the upward auction is very widespread. It starts from a sort of approximate price, fixed by the auctioneer, on the basis of the offers made by the potential buyers. So the auctioneer plays an important role because he has to choose a sufficiently remunerative price.

Yet we have to underline that a part of the output, though sold through channels outside the market, later "re-enters" in the structure run by the Town Council of Termoli, which also houses the negotiations between wholesalers and detailers and between the latter and the final consumers.

The negotiations outside the market are also advantageous for the buyers who get the fish in the quantity and quality wanted, concluding agreements in advance more or less already formalized or privileged with reliable producers without competing for with other buyers nor being constrained by the rules of the negotiation in force at the structure of the town market.

Finally the direct survey made it possible to gather data regarding the last step of the distribution process, in other words the retail trade, where several small retailers work, considered the still marginal role of the large-scale retail trade. As Table 1 shows, the fishmongers' sales are related especially to the cephalopods, which are abundant in the mid Adriatic area. The species marketed in bigger quantities – calculated on the basis of the weekly average quantities sold – are cuttlefish, squid and octopus, whose sales are still quite unsteady, probably because of the extent of variability of the production. Fishmongers, for instance, state quantities of cuttlefish sold fluctuate between a maximum of kg 26 and a minimum of only kg 10. The sales of anchovy, hake and surmullet are less unsteady, species that also have a meaningful economical importance for the operators of the sector. Moreover, mackerel, gilthead, sea bass, prawn, sole, angler and swordfish are also marketed on the local market in ever more decreasing quantities.

Final consumers above all, 80% of the demand is theirs, but also restaurateurs (17%) turn to retailers who meet a solely local demand, at the most coming from the regional field.

Only a small share of the transactions becomes a formal contract (10%) or is regulated by rules (20%). Most of the sales, which involve above all final consumers, are negotiated through verbal agreements and are paid in cash and there are often negotiations settled even before the product is caught.

According to all the operators interviewed, the market of the fish products could have huge development potentials if the ties affecting its efficient running were removed. Among these, first of all there is the lack of suitable technical structures and a market demand still esteemed poor. However, the market issues are considered the most pressing among the people working in traditional retail: one out of three among those interviewed regards them as the real obstacle to the development of the fishery sector, in order of importance followed by the fiscal and technological obstacles, the labour market problems and the credit ones.

Table 1. Quantities sold at the fishmongers' in kg (weekly averages).

	Max. kg	Min. kg
Anchovies	38	13
Prawns	29	11
Squids	94	10
Cuttlefish	126	10
Cods	33	16
Mackerel	25	21
Giltheads	39	5
Soles	28	4
Anglers	21	9
Octopuses	75	17
Swordfish	11	
Sea basses	37	6
Sardines	3	1
Surmullets	41	6
Molluscs	16	9

On the other hand, none of those interviewed complained about the cheap sale prices, the problem was rather the unsteadiness of the quotations. The latter are vary greatly as they are formed by the meeting of a supply and a demand that is typically local. In particular, the production markets still work in a completely autonomous way, like islands, also indifferent to what happens in neighbouring situations. Electronic informative systems about the prices and the quantities carried could reduce the market flaws affecting its efficiency and foster a greater extent of combination of the supply, if only virtual.

4. Market and marketing problems in the fishery of Termoli

The research at the Termoli fishery, a synthesis of the preliminary results of which we show in this note, sought to analyse strong and weak points, the training and employment needs along the local fish supply chain, though analyzed imperfectly and not in a linear way because of the main elements of discontinuity that mark the route of the product. Moreover, it is better to specify that the local situation refers to the fresh business chain, being the output of Termoli fishing meant for fresh fish consumption and for a local market, at the most regional.

In the following pages we have underlined the aspects related to the market and marketing problems that characterize the fishery studied, referring to a future research report for a more detailed quantity analysis. Here we want conclude with an attempt to set the previously explained considerations in a comprehensive framework, to discuss the past evolution and the possible scenarios of development.

The distribution structure of the local fish product is the first aspect to explain outlining the market features of the Termoli fishery. Trade channels are several and fragmented, as highlighted. Producers, especially the most important ones, keep up business relations first of

all with retailers and wholesalers or, more rarely in the case of smaller firms without preservation systems, they use the structure of the town fish market.
The first results of the direct survey carried out in Termoli, which – we underline – is still under way – have pointed out aspects and problems of the fish market shared by a lot of fisheries.
The Termoli market, partly adjusted to the health rules prescribed by EU, plays a "minor" role as production market. The reasons leading fishermen to prefer the channels of the outside market are several: among these the chance to get more advantageous terms of sale and higher profit margins, not being restrained by the rules of the Dutch auction sale. There would also be the lack of quality facilities among the reasons leading to prefer the outside market. We think such argument is a minor motive as sales outside the market also cannot always ensure services connected to marketing. Passing through the market structure requires the observance of the set of rules – above all sanitary - related to the marketing of the fish products, and the risk that the survey of the transactions may have consequences on the income for fiscal purposes are two more important reasons even if not openly acknowledged.
The limited use of the fish market to sell the products implies that the bargaining power relations are essentially disadvantageous for the producers and this both because of the Dutch auction method, and because of the few buyers taking part in the bargaining who, reaching an agreement among them, can make the product prices fall to quite reasonable levels.
The satisfaction level of the backing services given to the productive activities, the marketing services provided by the local market structure meet with the lowest approval of those interviewed, if we think a good 76% of them consider the services inadequate.
In the final phase of the chain of distribution the small retailers are virtually the only supplying agents considering the still marginal relevance of the organized large-scale retail trade. On this subject we underline that, according to recent data, the nationwide large scale retail trade can absorb much larger amounts than any other retail distribution typology also in the sector of the fresh product sales and not only those which are processed/frozen. Despite the increase in size and the updating of the Termoli fleet, noticed in comparison with the previous survey on the fishery, the quantity of the local output can still be considered small to carry out a change in the distribution structure that is still linked to traditional typologies and to a local market.
The current consumption distribution shows some inefficiency anyway, if we consider that the same traditional retailers complain about the inefficiencies of a not very transparent market where several agents work. It would be interesting to understand how much of the higher prices goes to fishing and how much to distribution, at this stage of market that is marked by high and probably rising quotations, both for reasons concerning the supply of the sector (drop in the catches and increase and rising of the fishing costs activities), and for the conditioning of other foodstuffs concerning the demand.
A further problem of markets and marketing found by the operators regarding the lack of market information above all with respect to the trends of the markets and of the quotations effected in other fisheries.
It is meaningful to point out that the availability of marketing services takes priority among the services whose lack is mostly felt locally. The fishery workers go outside the region to the nearest Adriatic fisheries for the supply of the lacking services. With regard to this, the relations with the fisheries of the Marche Region of S.Benedetto del Tronto and Civitanova

Marche are more intensive than with the fisheries of the Lower Adriatic along the Apulian coast (Manfredonia and Molfetta).
Although it is a small fishery mainly interested in coastal fishing and with an offered output that does not seem to run into difficulties of production in a mostly regional market, those related to the market are among the main problems of the sector felt by about 60% of the ship-owners interviewed.
The answers to the questions regarding the professional competence and needs on the one hand and the training needs on the other hand, are also meaningful. The ship-owners interviewed indicate the market researcher as the professionalism mainly needed in Molise, after professionalism closely related to boats and to the job of catching – mechanics, shipbuilding, materials and equipment supply. As for the training needs, those related to marketing are one of the priorities felt by the Termoli operators.
It follows that the situation of the services and professionalism in the trade sector offered to the productive structures is one of the main elements of weakness of the Termoli sea-fishing industry. Indeed the trade problems are not pointed out with the same emphasis by the sample of farming firms surveyed. Even if they have bigger productive-economical sizes, nationwide outlet markets and wholesale marketing channels, they consider marketing an important field but not a priority one among the training needs of the operators.
After about a decade from a previous survey about Termoli situation, it is evident that also in this small fishery the evolution of the '90s made people aware of the strategic role of a suitable marketing of the product. They have passed from a point of view bent on the productive aspects, mainly the catching at sea, to a point of view interested in the market.
In other product sectors, this change took place contemporaneously with situations of crisis and strong productive competition. The ship-owners of Termoli also complain about the various problems the sea fishing industry is going through and which give an indication of even harder times.

5. Some general comments about the Termoli case

Although the fishing world surveyed is not important in the national scene as regards fleet and catches, we think there are some aspects common to other fisheries with similar structural features, first of all with regard to the economic-productive size. A small fishery that, nevertheless, faces more market problems than the research expected.
In the case of Termoli fishery too, the local supply has no problem in finding *a* market outlet and a demand that the quantities offered. One could think there are not very important problems as regards the market and marketing issue. Yet there is a problem and it is the search for the *best* market outlet and a demand that grants the fish product high quotations.
This is difficult because of aspects related to the supply and to the marketing system of the local output. As regards the first aspect, it has to be noticed that on average the local productive structure is characterized by low diversification with regard to the kind of fishing practised, mainly coastal and trawl fishing.
These structural features obviously affect the output. The quantities caught by the single fishing boats are not of a large size, so the supply looks fragmented at the marketing stage. Moreover, it is a basically homogenous product from a double point of view. It is homogenous as regards the local supply for what said above with reference to the kind of

coastal and trawling fishing and so to the catch areas and to the fish species targeted. This has repercussions on the local competitors. It is also relatively homogenous as regards the species of catch of the next Adriatic fisheries, among which much bigger economic-productive situations stand out. The fragmentation of the supply has some effects in shaping the distribution chain related to sea fishing. First of all, it means that the product is purchased, at least directly, by industries to be processed. It is also probable that the small size of the catch units are among the reasons that did not stimulate locally the carrying out of investments in processing systems. Other effects concern the distribution stage in particular.

As regards the marketing method of the local output, the distribution channels are wholesale and by the traditional retail while there is not modern distribution. The information available from the ship-owners does not permit us to rule out that the local output find an outlet in the modern distribution after the wholesale stage. Obviously this extends the distribution chain and goes beyond fishing in the process of value enhancement.

All these elements, together with the ties deriving from the fresh consumption use of the product, place the fishing businesses in a price-taker position and characterize the whole sector with a structure that partly recalls the theoretical competing pattern.

One of the possible ways generally suggested in the marketing branch is the differentiation of the product on the basis of its quality, in the attempt to gain some margins of power in the pricing and in the bargaining relations with the buyers. Moreover, there is far less fish product available than the domestic demand fostering a substantial and, by now, structural deficit of the home fish balance and one of the main gap items in the agricultural-industrial balance. In a situation where an increase in fishing effort and catches is not expected, the business profitability regarding revenues cannot derive from a quantity growth but from the search for the best chances of improving value and payment of the products.

Ideas like quality and improving value have appeared more recently in the fishing industry than in other agricultural -industrial sectors also with the trend of greater interest in the themes of food safety and consumer transparency.

Value improvement strategies through seals of quality can give a differentiation of the product and answer the requirements of transparency and information about the place of origin and quality of the product. Requirements which have not been properly met so far and which are among the factors depressing fish product consumption.

Greater profitability for the producers can be related to differentiation if the value improvement policy is carried out directly by the fishing workers, not as much individually, as by an association of local producers. Such a statement is not only related to the need to gather a minimum amount of output to justify the charges of value improvement and which may meet the demand with a suitable amount of supply. Indeed, the placing of the product in a segment of high quality needs a high price level to be consistent with the quality standard and also to cover the costs of the policy of value improvement. The chance to raise the prices of the fresh products for final consumption should be compared with the elasticity of the demand. It would be better try to gain a greater share on the distribution margin, more than to count exclusively on a further rise of the final price, considering the high quotations of the products of fisheries catch on the fresh consumption market. Such an attempt can have some chances if the trade partner is associative rather than a single business or if some steps of the distribution are removed.

In the case of the outlet of catches for fresh consumption some factors to play on for the value improvement can be related to the origin/typicality of the resource, to the origin/traditional

type of the product consumption or processing. Other factors of quality can be related to the methods to catch, to preserve, to process the haul in different ways: a quality connected to nutritional features, or to the observance of high sanitary standards in the catch and manipulation of the product, or to a quality tied to the respect of conditions of environmental tolerability and of responsible behaviours in the work of extraction of the resource. It is obvious that such factors can also be combined. However we think that fish product labelling, of recent regulation, prompted by needs for transparency and determination of the product is an essential yet minimal condition from a more comprehensive point of view of value improvement.

Whatever levers are used for the value improvement of the product, it is obvious that a successful strategy of value improvement leads to greater profits; the more single or associated concerns can carry out it in advance and not imitating the competitors.

It is important that the value improvement levers exist in all the steps of the chain of distribution of the fresh product to ensure the consumer a quality product along the entire route from production to consumption. The quality of the distribution chain requires the involvement of the operators in the different steps and the investment in the productive process, in the organizational methods, in the marketing policies to be carried out by concerns in partnership, but also by fisheries and if necessary along the coast.

The sensitivity of the fishing operators has increased compared to the previous surveys. As a result of the survey carried out, the issues related to marketing have appeared with different outlines: as main problem area of the sector and obstacle to development, as basic typology of service for the concerns, as successful critical factor, decisive to outline the future trend of the sector. We cannot rule out too much or unaware "confidence" in the commercial aspects, but certainly it is one of the levers that can influence the socio-economic development of the local fishery and of the whole sector.

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Along the commercialisation chain of the fishery product in Italy - New tasks for wholesale markets aiming to improve the value of the catch and guarantee its health benefits and quality

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Abstract

The role of wholesale fish markets in Italy and their importance for the development of Italian fisheries is presented. The evolution of the market system over the years is illustrated and the value in terms of public interest is underlined, particularly in terms of health benefits and quality.

1. Fish markets

The role of wholesale fish markets has been decisive for the development of Italian fisheries and this importance continues in the new circumstances which have come about following the widespread changes of recent years. The markets are called on to use innovative tools and methods in the task of providing strong, effective support to fisheries as well as to sea farming, particularly in this phase of restructuring and rationalisation of the sector. Clearly this is taking into consideration the new regulations and their implementation in the sector as a consequence of:

- European Union directives and regulations aiming to achieve a common policy which covers all aspects of fisheries, markets and the distribution of fisheries products.
- Challenges which such policies impose on the sector so that it can always be compared on equal terms to the solid economics and strong fishing fleet organisations of the other EU countries.
- The inevitable effects of the relentless internationalisation of the economy, thus also of fisheries, which should, however, be regulated and directed towards the protection of the interests of the world's populations and a wider collaborative agreement which unites the work of fishers from different countries and especially those who work in the same seas, such as the Adriatic and the Mediterranean.
- Initiatives which it is necessary to carry out to increase ecological protection of the sea and to safeguard the fishery resources which are at risk, not only from fishers who use uncontrolled fishery practices or damaging breeding methods, but also from the thoughtless actions of people on the land near to or at some distance from the coast who provoke serious forms of pollution: sewerage, industry, chemicals, farm waste etc.
- The increase in consumption of fishery products and the associated need to modernise and widen the distribution network.
- The consumers' comprehensible demand for hygiene and health guarantees and a fair price for products.

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The most significant regulations on which the organisation of the Italian markets has been based and which have governed wholesale trade of fishery products are:

- "Regi decreti" n° 1771/26 and n°927/29;
- Laws 1487/38 and 125/59;
- Several Regional laws (for the Marche Region this is n°4 of 4/1/80 and n° 29 of 31/08/84)
- EEC Directive n°493/91, which corresponds to the Italian Legal Decree (D.L.) 30/12/92, n°531 and subsequent modifications.

These regulations allowed some Municipal Administrations to organise wholesale fish markets in places where the conditions in terms of fishery landings (on the coast) or fish consumption (inland) had been satisfied. Currently in Italy there are at least 65 working markets.
In 1929 the Town Council of Ancona built the wholesale fish market on the quay of the fishing port; this was rebuilt in 1948 following destruction in World War II. In 1954 the market was equipped with a mechanical auction system and more recently is was modernised and completed with electronic auction equipment and sophisticated computerised information systems. For some years the management of this market has been transferred to a joint venture enterprise made up of the Town Council, local cooperatives of fish workers and boat owners and fish traders' associations.
The value of the product put up for auction on an annual basis is over 7.75 million Euros; there are 193 registered traders, wholesalers and retailers.
In 1996 a second market was set up by a local consortium of fishers' cooperatives, at which bulk species (anchovy, sardine, clam) are sold at a shout auction for a total value of about 129 million Euros; there are 38 registered wholesalers and retailers.
In the beginning, the "market system" worked above all to protect the interests of those who were weakest, the fishers; it also guaranteed quality, price and hygiene for the consumer. This "system" forged the first link in the commercialisation chain of the fishery product, thus facilitating its distribution and consumption at national level, adding value to the catch and influencing the speed with which the fishery sector in Italy has been modernised and improved. These changes began with the gradual mechanisation of the fleet, which led to significant structural and technological changes on board the vessels; the most important are as follows:

- The installation of a new system of propulsion; the previously used sail was substituted by an unusual piece of equipment comprising a steam boiler and propeller.
- The arrangement on deck of the trawl winch and other equipment which is extremely useful for the fishers.
- The creation of an area in the hold equipped with an icebox for the conservation of the catch which has already been put in crates.

Numerous further innovations followed, such as the construction of more suitable, larger vessels, equipped with modern motors, powerful refrigeration systems, the most advanced gear and nets made of very strong synthetic fibres.
The new vessels were steadily equipped with high-level instrumentation for navigational safety as well as electronic devices to detect the seabed and discover shoals of fish.

Development and revitalization has been made possible by studies and scientific and technological research carried out by the Institutes and laboratories of the National Research Council and the University of Ancona.
The improvement of the fleet and the extension of fishery activity along the Italian coast, as well as in more remote seas, have led to a substantial increase in catches. The commercialisation of the catches has only been possible thanks to the presence of markets which offer guarantees to the fishers for the sale of their product, to the traders for the supplies and to the consumers for a fair price.
An overview of the Italian fishery sector, in very general terms, can be obtained from the following table:

Catch	1931 Currently From fish farming	140350 t 550000 t (+291%) 220000 t
Average annual per capita consumption	1931 Currently	5 Kg 23 Kg (+360%)
Motorised fishing vessels	1931 Currently	792 19300 (+2336%)

According to the report of the 6th Fisheries Plan of the Italian Government, (years 2000 – 2002), motorised fishing vessels which have begun operating:

Less than 10 years ago	15%
Between 11 and 20 years ago	30%
Between 21 and 30 years ago	25%
Over 30 years ago	30%

Classifications by gross tonnage:

Under 10 tonnes	83.3%
From 10 to 50 tonnes	11.6%
From 51 to 100 tonnes	3.3%
Over 100 tonnes	1.8%

These data demonstrate that the fishing fleet is rather old, moreover for the most part it is made up of small, family-run artisanal vessels which are forced to operate in the crowded coastal waters. On the other hand, there is a very low number of high-tonnage vessels with the necessary spaces on board to perform a more thorough preparation of the catch.
It is necessary to bear in mind that in order to satisfy national demand, internal production was sufficient until 1951, when production totalled 244900 t; however there has always been some degree of importation from other countries, especially of fish preserved species which are not available in Italy (stockfish, salt cod and herring). Subsequently, the national fishery catch was insufficient to meet demand (in spite of an ever-increasing fleet of motor powered vessels); the contribution of aquaculture is limited, and together with marine fisheries covers

just 53% of the market demand. It has been necessary to resort to importation from abroad which currently amounts to 680000 t (of which about 75000 t is fresh), for a total value of about 2.5 million Euros.
The role of fish markets at the landing ports has been particularly positive, where the solution of the age-old conflicts between fishers and traders has been facilitated through an equity plan. Fishers have managed to release themselves from social isolation and economic disadvantage due to the organisation of the sale of fish by public auction and a cash register/treasury service within the markets, thus ensuring a suitable price is conferred to the product and the reliable, prompt payment of the takings.
The fishers have also been able to take advantage of the "minor credit" offered quickly and without excessive formality by the banking institutes which also manage the cash register service. This advantageous loan scheme, which is governed by Laws of 1926 and 1929, was draw on particularly in the first decades; repayments were made through deductions from the product which the fishers gave to the markets for sale.
In addition to this, for the first time the fishers were able to use other essential structures and services within the market:

- Refrigeration units for the storage of crates of fish waiting to be sold
- Areas to deposit ropes, thread, nets, cables and general equipment from the vessels
- Covered area in which repairs can be carried out to nets and equipment
- Substitution of crates
- Filtered, sterile water to wash and re-pack the fish caught

The importance of fish markets, in general terms and also in terms of the public interest, is further demonstrated by:

- The impartiality and transparency with which the price of products auctioned is decided (the auctions take place using various systems according to the local traditions and conditions, such as shout auction, Dutch auction or those using electronic equipment);
- Open disclosure of the auction price tendencies on a daily basis;
- Veterinary control of the products displayed for sale, thus guaranteeing public health;
- The possibility to have further information (statistics, fiscal etc), which can be useful in the creation of policies and programmes concerning fisheries.

In 1959, thirty years after the first fish markets were set up, the liberalisation of wholesale trade in meat, vegetables, fruit and fish products began. Unfortunately, this step did not solve the problem of the improvement of technology and the reduction of the distribution costs that the fishery sector must bear. On the contrary, it concentrated wholesale trade into the hands of the strongest private economic groups (national and foreign) and also reorganised the role of the markets themselves. The so-called "liberalisation" has in actual fact permitted wholesale trade to take place outside the established markets; this has led to a noticeable reduction in the fishery product brought to public auction, which is subject to legitimate checks of an administrative, sanitary, fiscal, statistical etc. nature. However, even then (1959), there was the need to improve and renew the organisation, equipment and services of the markets as well as to reduce red tape, thus opening the markets up to the responsible and competent participation of the fishers and traders who unite in cooperatives or fishery associations, however this has only begun to take place more recently.

It is worth remembering that, after a long and period of difficulty, the role of wholesale fish markets is also recovering from a legislative point of view following the EC Directive n.493/91 and Italian Legal Decree (D.L.) n.532/92 which has already been mentioned. As a matter of fact, the markets which are demonstrating efficiency in the auction systems and the various internal services, as well as complying with the prevailing hygiene/sanitary laws, could be entrusted with the task of veterinary and quality control of the fishery or aquaculture product to be put into the sales network for consumption.

This is a new opportunity for the fishers who find themselves needing to confer a more acceptable price on their product, thus improving their earnings and recreating the economic balance of their enterprises which has been damaged by various aspects of market dynamics.

In actual fact all costs have increased significantly, while earnings form the fishery catch have not grown so rapidly. It is clear that the initiatives to reduce costs of investment and management of fishery enterprises will need to be carefully studied before taking new directions. Where the improvement of product valuation is concerned, the market structures will once again be able to assist in landing areas where there are no other suitable structures for this purpose.

It is worth noting the existence of specific legal regulations which impose strict sanitary checks on the treatments carried out on foodstuffs of animal origin (including fish), these checks are carried out at all stages: production, conservation, transport and even during sale. This puts the fishers under further pressure, it is to their advantage to offer the consumer a product which is fresh, easily identified, healthy, of high quality and well preserved.

Clearly this will have to begin before capture, by verifying the ecological requirements linked to the fishing zone and then supplying every assurance concerning the hygiene/sanitary conditions on board the vessels where the operations of sorting, washing boxing and conservation of the catch are carried out. To win the race against time and guarantee the freshness of the product, fishers on the larger vessels could carry out further preparation on board, concentrating on the more valuable species due to limited space, in order to make the fish easier to prepare in the kitchen thus making the product more attractive to the consumer and improving its value. These treatments could consist of additional cleaning and packaging in ready-sorted crates for “home use” or “catering”, by species or mixed, to be put directly onto the market.

Operations on board can be carried out with the help of special machines which need not take up too much space. Such machines could package each category of fishery product as vacuum-packs, or in a protected atmosphere by inserting gaseous mixtures into the packaging (oxygen, nitrogen etc.). Preparing the product in this way will guarantee greater standards of hygiene and allow it to be conserved for longer while fresh, even in home fridges.

However not all of the catch can be treated in this way on board, partly because on most vessels it is not possible to install the machinery mentioned. In this case, for those species and the significant quantities which are considered necessary and opportune, these treatments which add value to the product could take place in suitable structures on land; should such places not be available then inactive fish markets (to be adapted) could be used or specifically equipped areas could be found in the working markets. Such circumstances could also see the fishers themselves involved in the post-catch treatments described, managing these structures and machinery through their cooperatives and fishery associations.

Fishery products, which have thus been prepared, packaged and standardized, could receive a trademark which assures origin, quality etc. and which would in all likeliness facilitate

consumption. Furthermore, contacts with operators of large-scale distribution would be made easier, and long-term supply contracts could be drawn up as happened many years ago for the producers of fruit and vegetables, through the relative associations.
A very important sales system, which is even more modern, consists in the sale of carefully prepared and packaged "fresh" fishery products directly to the home (door to door). This distribution method has, until now, been mainly used for frozen products. It is fast and even telematically linked to the customers and can supply all information concerning the products available and gather orders that will be rapidly satisfied. This advanced system arose form the traditional "travelling salesman" who, a few decades ago, used old-fashioned barrows to carry boxes and baskets of fresh fish, molluscs and crustaceans which were kept fresh with ice. However it is important not to neglect the detailed network of retail traders, either in a fixed location or itinerant, which over time has had an extremely important role, one which has been essential for fisheries, in taking the catch away from the coast, therefore making the fish known in every local market, group of houses, hamlet or village. This also allowed strong, trusting relations to be forged between these operators and the consumers in view of the quality and security of the products offered.
Well-tested means of distribution like this need to be continually renewed so that they can become a decisive part of the commercialisation chain of the fishery product; these means also need to be brought into line with the regulations currently in force relative to the preservation and transport of products.
It is worth reflecting on the need for much of the catch from our Seas to receive the recognition offered by one the aforementioned trademarks, naturally following the necessary sanitary and quality controls which are carried out at all stages. That is to say, from the areas of the sea in which the fishers operate, to the fishing/breeding methods, the selection, packaging and preservation right up to the retail outlet.
In order to give the highest possible guarantees concerning the freshness and the quality of the packaged product, and also to prevent any kind of forgery, it is possible to use the same system which for years has been employed with bivalves and gastropods. In this way boxes of fish, molluscs, cephalopods and crustaceans would be wrapped in a nylon sack, sealed and labelled in order to make clear: species, capture area, health certification, weight, price and expiry date. Ideally other solutions will also be sought which could prove to be more convenient, taking into account the guarantees to be given. In order to carry out these operations and the necessary controls, it will be possible to use the systems and equipment in the wholesale fish markets so as to comply with the EC and national laws.
In conclusion, to realise this vast project, important tasks will be given to the fishers' organisations, traders and consumers although clearly concrete legislative and financial support is required from the public institutions and health structures.
In the Province of Ancona (Italy) the A.S.Pe.A. (Special Agency for Fisheries and Agriculture of the Chamber of Commerce, Industry, Crafts and Agriculture of Ancona) which has been active in the sector for many years will have a significant role. However it will be indispensable to carry out a carefully prepared and extremely thorough campaign of information among the various categories of consumers. When commenting on the importance of fisheries for the society and the economy, journalists from the press, television, radio, internet etc will have to remark in particular on the safety, hygiene, freshness and quality of fishery products, detailing their nutritional benefit which their consumption has on the health.

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