

**COMMISSION OF THE EUROPEAN COMMUNITIES**  
Directorate-General for Fisheries

**Regional, Socio-Economic Study  
in the Fisheries Sector**

**ΕΛΛΑΣ**

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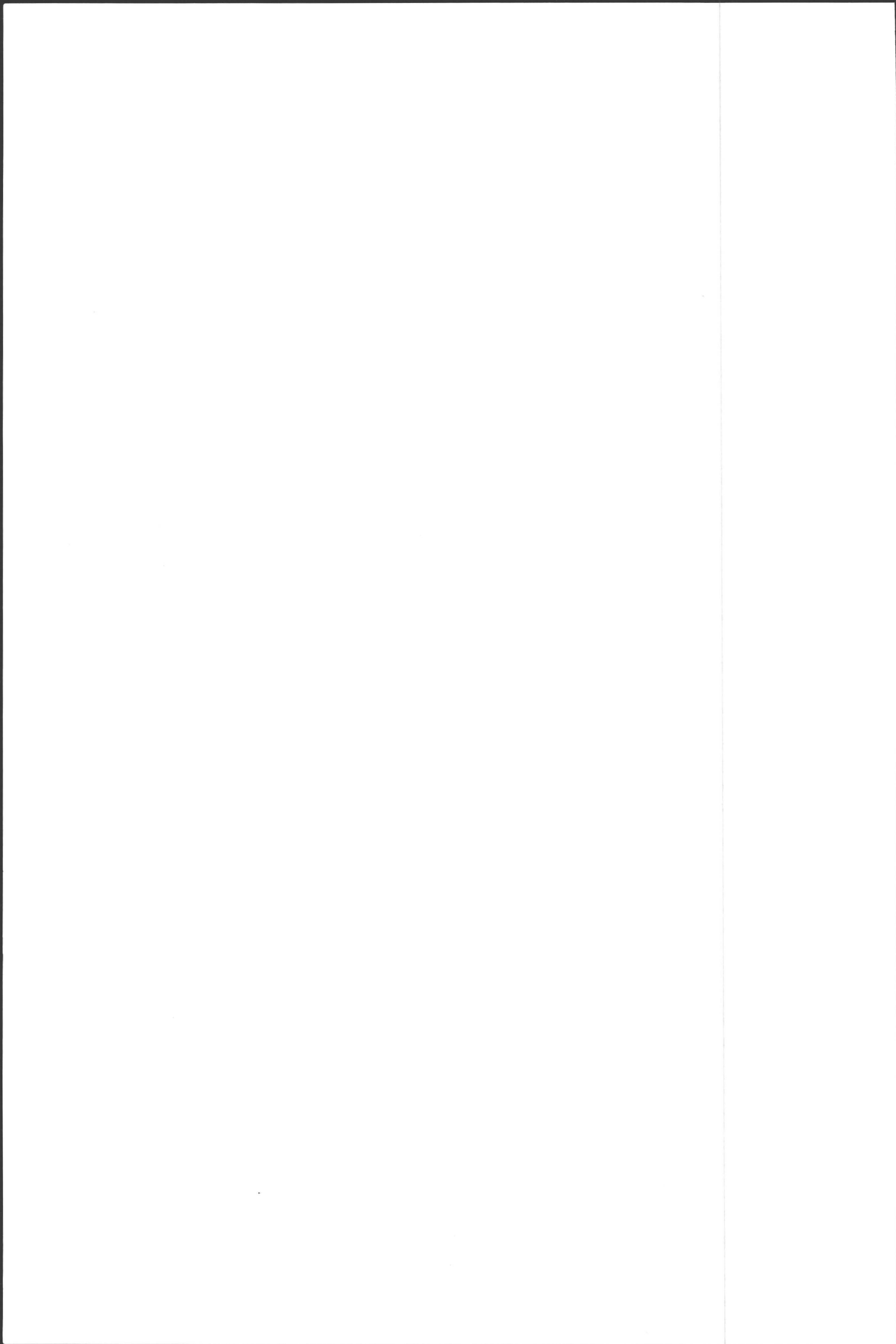
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## ΠΕΡΙΛΗΨΗ

Στα πλαίσια αυτής της μελέτης εξετάζονται οι κυριότεροι κοινωνικοοικονομικοί παράγοντες που χαρακτηρίζουν τις δομές και την ανάπτυξη του τομέα της Ελληνικής Αλιείας και των υδατοκαλλιεργειών. Ιδιαίτερη έμφαση δίνεται στον προσδιορισμό και τον χαρακτήρα γεωγραφικών ζωνών με μεγάλο βαθμό εξάρτησης από καθαρά αλιευτικές ή και δευτερογενείς δραστηριότητες. Με βάση αυτό τον προσδιορισμό, επιχειρείται επιμέρους ανάλυση και αξιολόγηση των κοινωνικοοικονομικών επιδράσεων από την εφαρμογή της Κοινοτικής Αλιευτικής Πολιτικής στην Ελλάδα.

Οι δομικές αλλαγές που προήλθαν από την εφαρμογή της Κοινοτικής Πολιτικής οδήγησαν σε ελεγχόμενα επίπεδα αλιευτικής ικανότητας χωρίς όμως να επιτευχθεί ο στόχος της εξισσορόπησης των αλιευτικών αποθεμάτων με την αλιευτική ικανότητα. Πιο συγκεκριμένα, ο ελληνικός αλιευτικός στόλος αυξήθηκε, μεταξύ 1983-1990, με ετήσιο ρυθμό 5% και αυτή η αύξηση προήλθε κυρίως από τον τομέα της παράκτιας αλιείας. Αντίθετα, η αλιευτική παραγωγή μεταξύ 1988-1990 χαρακτηρίζεται από έντονη πτωτική τάση, που οφείλεται κυρίως στην μείωση της παραγωγής στην μέση αλιεία και σε μικρότερο βαθμό στην μείωση της παραγωγής στην υπερπόντια αλιεία. Η παραγωγή της παράκτιας αλιείας παρέμεινε σταθερή. Σαν αποτέλεσμα η παραγωγή κατά σκάφος μειώθηκε, ιδιαίτερα στην παράκτια αλιεία όπως επίσης και οι δείκτες παραγωγικής ικανότητας στην αλιεία. Σε συνδυασμό με έναν αυξανόμενο αριθμό εργαζομένων στην θαλάσσια αλιεία συμπαίρνεται ότι η ελληνική αλιεία χαρακτηρίζεται από αυξανόμενο κόστος.

Προτείνεται μία μείωση του αλιευτικού στόλου όλων των κατηγοριών της τάξης του 13% μέσα στην επόμενη πενταετία και ορίζονται συγκεκριμένα "μέτρα στήριξης" ώστε να αποφευχθούν οι αρνητικές επιδράσεις από την εφαρμογή της Κοινοτικής Αλιευτικής Παραγωγής. Πιο συγκεκριμένα, προτείνεται στήριξη του τομέα των υδατοκαλλιεργειών και του τουρισμού ενώ παράλληλα οι αγροτικές δραστηριότητες και η παραγωγή από την καλλιέργεια λιμνοθαλασσών θα έπρεπε να προωθηθούν. Επίσης, το δίκτυο διανομής των προϊόντων όπως και οι συνθήκες διατήρησής τους πρέπει να βελτιωθούν και να ενισχυθούν οι ομάδες παραγωγών στον τομέα της αλιείας.

### ABSTRACT

The study examines the socio-economic aspects of the Greek fishery and aquaculture sector. Its focal point is to identify and characterize geographical zones highly dependent on fisheries and ancillary activities in Greece so that the socio-economic impact of EEC-policy implementation could be analysed and assessed.

The structural policy implemented in the sector gradually allowed for the monitoring of the fishing effort without succeeding to balance out the existing resource stocks and the fishing effort. More specifically, the study shows that the Greek fishery fleet has been increasing during 1983-1990 at a rate of 5% annually reflecting mainly the development of the coastal fisheries category because of the addition of new vessels. On the other hand, overall production during 1988-1990 follows a strong decreasing trend, due to reduced production of the medium fisheries category and, to a lesser extent, to the decrease in production of the Atlantic fisheries category. Coastal production remained constant. It is deduced that there has been a decrease of the catch per vessel especially in the coastal fisheries category and also a drop of the catch per effort indices. This fact, combined with a continuously increasing number of those employed at sea fisheries, accounts for a growing inefficiency of the fishery sector.

A reduction of 13% for the fleet of all fishery categories is proposed for the next 5-year period and specific "support measures" are defined, which may be implemented in order to avoid the negative socio-economic effects arising from the implementation of the Common Fisheries Policy. More specifically, assistance may be granted for reconversion operations, mainly to the sectors of aquaculture and tourism. Producer organizations have to be encouraged and the marketing conditions should be improved, especially the preservation facilities. Also, parallel to fisheries, agricultural activities should be supported as well as production from traditional lagoon farming.



## ABSTRACT

L'étude porte sur les aspects socio-économiques du secteur grec de la pêche et de l'aquaculture. Elle vise en particulier à identifier et à caractériser les zones géographiques de la Grèce fortement dépendantes de la pêche et des activités connexes afin de permettre une analyse et une évaluation de l'impact socio-économique de l'application de la politique commune.

La politique structurelle mise en oeuvre dans ce secteur a permis progressivement de suivre l'effort de pêche sans réussir à instaurer un équilibre entre les ressources halieutiques et l'effort de pêche. L'étude montre plus particulièrement que la flotte de pêche grecque s'est développée entre les années 1983 et 1990 à un rythme de 5 % par an, correspondant essentiellement au développement de la catégorie des pêcheries côtières par suite de la mise en service de nouveaux bateaux. D'autre part, la production globale entre 1988 et 1990 subit une tendance fortement décroissante causée par une réduction de la production de la catégorie des pêcheries moyennes et, dans une moindre mesure, par la baisse de la production de la catégorie des pêcheries atlantiques. La production des pêcheries côtières est restée constante. On en déduit que les prises par bateau, particulièrement dans la catégorie des pêcheries côtières ont diminué tout comme les prises par indice d'effort. Ce fait, combiné avec une augmentation constante du personnel de pêche en mer, explique l'inefficacité croissante du secteur de la pêche.

Il est proposé une réduction de 13 % de la flotte de toutes les catégories de pêche pour la période des cinq prochaines années ainsi que des "mesures de soutien" spécifiques pouvant être mises en oeuvre en vue de prévenir les effets socio-économiques négatifs de l'application de la politique commune de la pêche. Plus particulièrement, une aide peut être accordée pour des opérations de reconversion, principalement en faveur des secteurs de l'aquaculture et du tourisme. Les organisations de producteurs doivent être encouragées et les conditions de commercialisation améliorées, particulièrement ce qui touche les installations de conservation. Parallèlement aux activités de la pêche, l'agriculture devrait aussi être soutenue tout comme la production de pisciculture lagunaire traditionnelle.

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**GLOSSARY OF ABBREVIATIONS AND DEFINITIONS**

A.B.G.	Agricultural Bank of Greece .....
C.F.D.	Common Fisheries Policy .....
EL.KE.P.A.	The Greek Productivity Centre .....
E.TA.N.AL.	The National Company for the Development of Fisheries ..
F.A.O.	Food and Agriculture Organization .....
G.R.D.	Greek Drachma .....
G.D.P.	Gross Domestic Product .....
G.F.P.	Gross Fisheries Product .....
G.R.T.	Gross Registered Tonnage .....
I.M.B.C.	Institute of Marine Biology of Crete .....
N.A.T.	Naval Insurance Foundation .....
M.I.Ps	Mediterranean Integrated Programmes .....
N.M.R.C.	National Marine Research Centre .....
N.S.S.G.	National Statistical Service of Greece .....
I.K.A.	Social Insurance Foundation .....
O.E.C.D.	Organization of Economic Cooperation and Development ..
S.A.	Society Anonymous .....
T.A.C.	Total Available Catch .....



## PREFACE

This Report on the Greek Fisheries and Aquaculture Sector was prepared by the Foundation of Economic and Industrial Research (IOBE) on behalf of the Commission of the European Communities -Directorate General for Fisheries- Directorate "Structures".

The Fisheries and Aquaculture Sector constitutes a policy area where progress has been very slow and difficult and it has recently drawn attention and criticism. This study is designed to contribute, from the Greek perspective, to the reconsideration of the Common Fisheries Policy by the Commission.

The project was coordinated and directed by Professor George Mergos, Head of the Foundation's Sectoral Research Department. The research team included Mrs. Zoe Bakela (Economist), Dr. Alkis Economou (Fisheries Biologist), Mr. Dimitris Economou (Agricultural Economist), Dr. Constantine Papakonstantinou (Fisheries Biologist) and Dr. Anna Giannopoulou (Economist).

## CHAPTER ONE

### INTRODUCTION

#### 1.1 General Overview of the Sector

The Greek fishery sector is characterised by an extended coastline, a large number of small islands and the fact that a high proportion of the coastal areas labour is being absorbed by the fishery sector and its ancillary activities. The gross product value of the fishery and aquaculture sector accounts for 5.4%\* of the Gross Agricultural Product and around 0.9%\* of the Gross Domestic Product. Furthermore, the fishery's sector share in total agricultural employment and in national employment is 3.5% and 1.2% respectively. It must be pointed out that in a number of areas (usually small islands), employment in the fishery sector can reach up to 30 or 40% of the area total.

Despite its small contribution to total employment and income, the fisheries sector assumes an important role for certain areas, especially the islands where there are limited alternative employment opportunities.

In addition, it provides an important direct source of employment (in fisheries and aquaculture activities) but also an indirect source of employment through the ancillary activities of the sector. These include: vessel construction, maintenance and repairing of fishing vessels and their equipment, services to vessels, management and maintenance of port facilities, as well as handling, storage, distribution and processing of fishery and aquaculture products. These ancillary activities constitute an important source of employment for the coastal areas, quite often the only one, so they are of immense social value providing a fair standard of living for the coastal population. The main objective of this study is to examine the socioeconomic effects of the CFP on the Greek Fishery sector in the light of the recent changes which have been taking place. In order to do that, it shall be attempted to identify zones highly dependent on fisheries and a number of socioeconomic criteria will be employed to this effect.

#### 1.2 Problem Identification and Objectives

The focus of the EEC conservation/management model has been the setting of the TAC/QUOTA system which is not applicable to Mediterranean as yet. This system imposes restrictions on some commercially important stocks and distributes them among the Member States together with a package of technical measures aiming at reducing catches of juvenile fish. On the other hand, at the centre of the CFP restructuring policy have been the Multiannual Guidance Programmes (MGPs) which set the targets for fleet capacity reduction. Although the various Community measures have had a general applicability it was soon realized that both systems failed to achieve their objectives. It was also recognised that the nature of fishing activities in the Mediterranean was quite distinct. This called for the introduction of a Mediterranean Common Fishery Policy.

It is the specific geomorphological characteristics and the social structure of the Mediterranean fisheries, together with the culture of its people that require quite distinct methods of resource exploitation and management. The conservation system here, has to be based on technical measures concerning gear and fishing techniques and aim at providing a minimum protection to some species found in coastal waters.

The whole country has been divided into five zones (see Table I) starting with the one having the lowest dependence on fishery and its ancillary activities and ending with the most dependent zone on fisheries according to the

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\* At current 1988 prices

criteria taken into account. Next, zonal analysis is undertaken and appropriate measures are formulated and proposed depending on the specific needs of each area. In recent years, different aspects of the CFP regime have induced some restructuring in the Greek fishery sector. In the context of the Multi-annual Guidance Programme of 1987-1991, strict measures were implemented on the issue of new licences. An official proposal has been put forward, to reduce the size of the small-scale fisheries fleet within the next two years by 2500 vessels, or 13% of the total, with a parallel reduction of the total engine power by 14.720 KW, and a reduction of the tonnage by 3500 GRT.

This study considers that in order for the negative social effects of the CFP to be lessened, especially in the highly dependent on fisheries zones, EEC assistance has to be granted for reconversion operations, especially to the sectors of aquaculture and tourism. Producers organizations have to be encouraged and the marketing conditions improved, especially the preservation facilities. Also, parallel to fisheries, agricultural activities should be supported as well as production from traditional lagoon farming.

### 1.3 Definitions

People directly involved in the fisheries sector fall into the following categories:

Ship-Owners: They are the owners of the vessels and usually offer their labour services during the production process. In fact, they are businessmen who assume the role of the captain in their own vessels. This is not the case with Atlantic fishery vessels where family ownership prevails. Atlantic fishery vessels usually operate under a S.A. organisation and owners offer their services from the mainland as managers.

Crew members: They are skilled labour (captains-engineers), and the vessel cannot sail off without their presence. They might also be engaged in other types of work within the vessel. In the coastal and medium fisheries this category coincides in most cases with the ship-owners.

Fishing workers: They are permanently employed in the vessels and offer their services during the production process. They are paid a salary on a monthly or daily basis and can be offered a bonus, depending on the size of the catch. These workers are usually in demand during periods with favourable weather conditions, called seasonal workers. In that category, certain sailors or middle-aged retired men, who happen to be out of work during the peak period (summer-autumn), are also included. Crew members are explicitly distinguished from fishing workers in the large vessels (Atlantic and Medium fishery vessels) while the distinction is not very clear in the small vessels of coastal fishery.

Farmers-fishermen: In the context of the above mentioned categories there is another kind of employees. These are involved in the fishery sector (vessel owners or fishing workers) but also earn a supplementary income from farming. This is mainly the case with coastal fishery, where the owners of small vessels have some farm property (vineyards, olive trees etc) which provides them with a small income. This income does not exceed 20-25% of their annual income. These so-called "farmers-fishermen" are met in some Greek islands and coastal areas. Usually, they have acquired their land through inheritance and they represent, on average, about 15% of the total number of coastal fishermen, while in some areas a maximum of 25-30% has been registered. This traditional type of fisherman tends to disappear as income from agriculture is comparatively low due to the high production cost and the low crop yields.

Nomos: Unit of administrative and geographical division at which all official statistical information is provided, in Greece.

Zone: It is a stratified distribution of counties (Nomos) including a coastline, linked together on the basis of certain criteria (factors). These criteria/factors are: (a) number of fishing vessels and their typology, (b)



employment of the sector in the county, (c) fishing production, (d) alternative employment opportunities and (e) common socio-economic characteristics

All the counties included in each zone are identified as a "Travel to Work area", as the maximum distance from the centre of the county to the farthest edge, does not exceed the 100 km.

Fishing ports: These are official ports equipped with the necessary infrastructure for landing, preservation, cold storage and wholesaling of the catches, under the supervision of ETANAL.

Landing places: These are ports located throughout the country where substantial amounts of catches are landed. Part of the catches is carried to the nearest fishing ports.

Fishing Harbours: These are ports built in order to protect fishermen from adverse weather conditions. They can also offer a number of facilities like storage places for fishing gear, refrigerator storage, petrol supplies etc.

#### **1.4 Methodology - Sources of Information**

The methodology adopted in identifying and selecting the five fishing zones is linked to certain criteria (factors) which appear to be of equal importance among different areas of the country. The following criteria have been selected in order to reflect the dependence of particular areas on fisheries and ancillary activities: (a) Number of fishing vessels and their typology, (b) Employment of the sector, (c) Fishing production (volume and value related), (d) Alternative employment opportunities and (e) Common socio-economic characteristics.

All statistical information provided by the official services in Greece is given at nomos level. The whole country is divided into 52 nomos. Zone characterization therefore had to take into account this fact which implies that we could not distinguish between coastal and mainland areas as they both coexist in the official administrative definition of nomos.

More specifically all the counties (nomos) which have access to a coastal line were grouped together taking into consideration two basic parameters as major indicators of their dependence upon fisheries a) Employment: the larger the percentage of fishermen in relation to the total county employment, the more dependent the county is on fisheries. b) Income and Production value: the larger the percentage of Gross Fisheries Product in relation to the Gross Agricultural Product and the Gross Domestic Product of the county the more dependent the county is on fisheries. The fishing fleet was identified as a minor dependence indicator: the higher the number of vessels the more important is the county from the fisheries point of view. Following the above mentioned methodology five fishing zones were identified from the grouping of the respective counties. Their distribution starts from those with the lowest level of dependence (zone A), such as those of the large, developed urban centres and ends with zones which have the highest level of dependence upon fisheries (zone E).

Data collection and processing for the needs of this study presented acute difficulties, due to a number of factors. The inadequate and discontinuous information provided by the Official Statistical Services, the lack of a well organized fisheries statistical system, the scatter of the production and landing places and the large number and small size of operational vessels.

For the purpose of this investigation, information was obtained from secondary data obtained from the following sources:

The National Statistical Service, which, in cooperation with the Ministry of Agriculture (Directorate of Fisheries) keeps records of the fisheries production and the number of fishing vessels participating in each year's fishing. This information is included in annual bulletins issued by the above service from 1964 onwards. The data on vessels is provided by the port authori-

ties and the patrolling services and are arranged in gross-tonnage and horse-power units, by fishing area and by type of gear used. The data on production refer to the annual catch by species and fishing tool, catch by species and month of fishing, and catch by species and fishing area. This information is derived by grouping the replies of statistical questionnaires completed each month by the captains of vessels with engine power higher than 20 HP, unless the ship did not work. Discards and by catches are not monitored. Due to difficulties in obtaining returns from all vessels, the sampling method was adopted for the process of the collected returns, assuming that the later constitute a random sample of the population of vessels. Since the information on the catches is provided exclusively by the fishermen, and the accuracy of their statements cannot be tested, the data available are not considered either reliable, or complete. Another weakness of the method is that by grouping the data of vessels and production, some of the original information were lost, because it is not now possible to recalculate combined parameters, for example catch by fishing area and type of gear used. Since 1976 the data are computerized, but in a form not incorporating the engine power and tonnage of the vessels. Theoretically, it could be possible to add in the computerized data the information on the engine power and the tonnage, which can be obtained from the registers of the fishing boats.

The Agricultural Bank of Greece, which monitors the active fishing vessels and makes assessments of their production from 1970 onwards. The monitoring of fishing vessels and the assessments of production are made by the about 110 Bank Divisions which exist in the coastal areas of the country and are based on various sources of information (local registers of fishing vessels, Ministry of Agriculture divisions, patrol services, fisheries cooperatives, by interviewing the producers, etc.). These data are judged to be of satisfactory accuracy and refer to the number, engine power and tonnage of fishing vessels (by fishing category and type of fishing gear) worked in each district, and to production by species or groups of species by district and fishing category. The selling prices of the products are also provided. Since 1982, the number of people worked and the average number of days spent at sea are given by fishing gear.

The National Company for the Development of Fisheries (the organization managing the eight official fishing ports of the country), which keeps records of the registered landings and the quantities of fisheries products auctioned in these ports. The data available refer to the monthly and annual quantities and selling prices of products transported through the fishing ports, the quantities and value of products exported or imported to Greece through the fishing ports, and some assessments of the number of vessels which landed in some ports during the recent years. The data on production is of satisfactory accuracy, however, only 25-30% of the national fisheries production is distributed through the official fishing ports. In theory, the legislation provides for auctions to be held in landing places where no fishing port exists, but in practice, the products are marketed through parallel pathways.

Additional information was obtained from the results of the Census of the Greek Fishing Fleet performed in September 1988. This census aimed primarily at estimating the number and the technical characteristics of the fishing vessels (engine power, tonnage, age, type of activity, etc.), but also covered demographic aspects of the working population in the fisheries sector, such as the number and age distribution of fishermen, etc. The concentration of statistical data by the marine authorities has proved to be difficult, because data collection is not systematic, and does not cover fishing categories by vessel type. The largest vessels are listed in the same register with the merchant and tourist vessels, while smaller vessels are listed in the same register with cruisers and sport fisheries vessels. Furthermore, the old vessels and boats are kept in the registers independently of the fact if there are still operating or withdrawn. Several vessels listed in the register of a

certain area are permanently engaged elsewhere and this makes impossible checking on their regional distribution.

Despite their limitations, the census data is still valid, due to restrictions posed to the issue of new fishing licences since 1988, and it can be assumed that it provides as average values over the last three year period.

To satisfy the requirements for both the evolution of the parameters and the geographic distribution of parameters we had to rely on two independent sources of information, the Census data and the data by the A.B.G.. For a realistic presentation of the situation in the fisheries sector - the most credible source of data for trends was judged to be the A.B.G. where data collection is based on estimates. That is why data inconsistencies are observed with reference to population vessels, gross product value, (see comments on all Tables of Chapter 2).

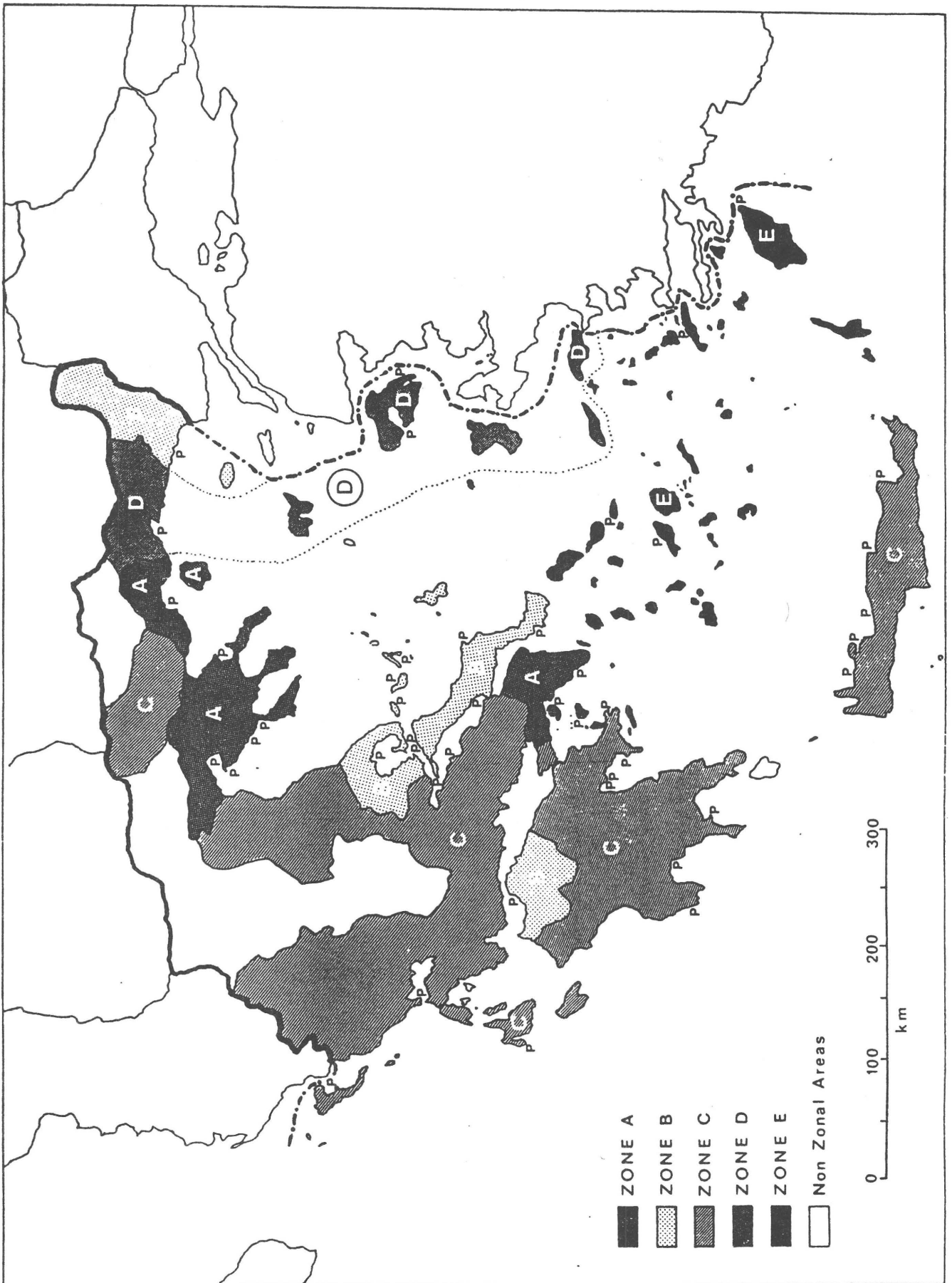


TABLE I

## FISHING ZONE IDENTIFICATION

ZONE	COUNTIES (NOMOS)	MAJOR LANDING PLACES	FISHING PORTS
A	ATTIKI, PIRAEUS, THESSALONIKI, KAVALA, HALKIDIKI	OROPOS, RAFINA, LAVRIO, PALEA FOKEA* (ANAVISSOS), FALIRO, PALOUKIA* SALAMINA, M. PEFKO, THESSALONIKI*, EGIIO, KERAMOTI, KAVALA*, STATONI*, IERISSOS, OURANOUPOLI, N. FOKEA, POTIDEAA*, N. MOYDANIA*, N. MIHANIONA*, EGINA*, POROS*.	PIRAEUS, THESSALONIKI, KAVALA
B	MAGNESIA, EUBOEA, AHAIA, EVROS	VOLOS*, AHILIO, TRIKERI*, SKIATHOS*, SKOPELOS*, ALONISOS*, HALKIDA*, N. ARTAKI, OREI*, KIMI*, PETRIES, KARISTOS, MARMARI*, AMARANTHOS, ERETRIA, KILLII, PATRA,* PSATHOPIRGOS, EGIO, ALEXANDROUPOLI*,	HALKIDA, PATRA, ALEXANDROUPOLI
C	SERRES, EMATHIA, PIERIA, LARISSA, THESPROTIA, PREVEZA, ARTA, ETOLOAKARNANIA, FOKIDA, VIOTIA, FTHIOTIDA, AND THE REGIONS OF PELOPONNISOS (EXCEPT AHAIA), IONIAN ISLANDS, CRETA	PREVEZA*, PARGA, CORFU*, IGOUMENITSA, STILIDA*, AG. KOSTANDINOS, ARKITSA, THEOLOGOS*, KIATO, MESOLOGGI, NAFPAKTOS, GALAXIDI, ITEA, ASTAKOS, VONITSA, AMFILOHIA, KORINTHOS, PAL. EPIDAVROS, ERMIONI, KILADA ERMIONIS, NAFPLIO*, ASTROS, LEONIDIO, NEAPOLI (BION), MOLAI, GITHIO, KARDAMILI, KALAMATA*, KORONI, METHONI*, PILOS, KIPARISSIA, KATAKOLO, ZAKINTHOS, LIXOURI*, HANIA*, SOUDA, RETHIMNO*, IRAKLIO, AG. NIKOLAOS*, SITIA, IERAPETRA, MIRES, KASTEELI, KISAMOU*.	PREVEZA, MESSOLOGHI
D	XANTHI, RODOPI, LESVOS, SAMOS, HIOS	PORTO-LAGO, ABDIRA, THASOS, N. PERAMOS, MITILINI,* POLIHNITOS*, MITHIMNA, HIOS*, PSARA, VATHI SAMOU, KARLOVASI.	CHIOS
E	CYCLADES ISLANDS, DODECANISSA	ANDROS, MIKONOS*, NAXOS-KOUFONISIA, PAROS*, THIRA, MILOS, SERIFOS, SIFNOS, LEROS, PATMOS, KALYMNOS*, KOS, RODOS*, KARPATOS.	KALYMNOS

\* Only the counties (NOMOS) which are included in the Fishery Census



## CHAPTER TWO

### FISHING FLEET AND FISHERMEN

The conditions which characterize the Greek fishery is the great length of the coastline, the narrow continental shelf and slope, the low biological productivity of the waters, the great number of exploitable species, the rocky nature of the bottom and the limited extent of grounds suitable for trawling. The main area of operation of the Greek fisheries is the Aegean Sea, the gulfs of the mainland which are connected to this sea, the northern coasts of the island Crete, and the southern coasts of Peloponnesse. The existence of great depths in the Ionian Sea and the extremely narrow shelf around the islands, do not favour the development of important fishing activities there.

Such geomorphological/productivity characteristics, and also the prevailing socio-economic structures, have favoured the development of the small-scale, multi-gear coastal fisheries, operated by small boats within the 100 meters contour line, which in many areas does not extend beyond the 1 mile zone.

#### 2.1 Methods and Fishing Equipment

##### Fishing Categories

According to the Greek administrative classification criteria, the fishery sector comprises three main categories:

- (a) the Coastal Fisheries, including the fisheries operated in coastal waters by vessels employing set gear (gill nets, trammel nets, surrounding nets, hook lines, long lines, traps, etc.), and also certain types of towed gear, such as dredges and beach seiners.
- (b) the so-called Medium Fisheries, operated by trawlers and purse-seiners.
- (c) the Atlantic fisheries operated by large trawlers fishing for fish and shrimps in the Atlantic Ocean. A number of vessels serve as transporters of the products from the area of fishing.

The "Mediterranean fisheries", operated by moderately large trawlers fishing in the Mediterranean waters outside Greece is nowadays of little importance due to the difficulty in obtaining access to the territorial waters of other countries.

##### Coastal Fisheries.

The coastal fisheries category roughly corresponds to the administrative definition of "artisanal fisheries" of other Mediterranean countries, and fits the characteristics of the small-scale fisheries, as was recently defined in Council Regulation (EEC) 3944/90. The majority of coastal vessels are less than 9 meters in length between perpendiculars, and very rarely exceed 16 meters. The engine power is usually between 2.9 and 110.4 KW, but some vessels specialized in swordfish fishing have engines with a power over 147.2 KW. The vessels are worked by one or two persons, and rarely more, as in the case of beach-seining. The fishing expeditions do not usually last longer than 24 hours, and the vessels operate mostly within the 2 mile zone and in depths not exceeding 80 m. Coastal fisheries is operated along the entire Greek coastline, and particularly in the islands and in gulfs and bays which offer protection against unfavourable weather conditions, and where natural productivity is elevated. The coastal fisheries fleet is administratively separated into several branches, depending on the fishing gear used. The most commonly used gear are gill and trammel nets, bottom and surface long lines, beach-seiners, surrounding nets and dredges fishing for shellfish.

The sponge-fishing fleet which is composed of rather small (10-12 m) and

very old (30-35 year) vessels, equipped with engines between 29.4 and 73.6 KW and an air-supply system to support the divers. Sponge-fishing has a long tradition in the Dodecanese, and especially the island Kalymnos, where about 80 % of this activity was concentrated. Now this activity is declining due to both, market problems and a mass mortality of sponges which occurred in 1986 and affected the majority of sponge-banks in Greek and other Mediterranean waters.

### Medium Fisheries.

Most of the vessels of the medium fishery category could be considered as semi-industrial or industrial vessels, taking into account the international practice. Boat size ranges between 11 and 30 meters. Depending on the type of fishing activity, each vessel may employ from 4 up to 10 persons. The fishing expeditions may be as short as one day, in the case of purse-seiners, but may last up to five days, in the case of trawlers. The two main branches of the medium fisheries category are the trawlers and the purse-seiners. A third branch consists of multi-purpose vessels, which are usually vessels of large average size provided with a license for both trawling and purse-seining.

### Atlantic Fisheries.

The Atlantic fishery category clearly fits the characteristics of industrial fisheries. The vessels are large and well-equipped with fridges and other preservation means. Their main area of operation is the central Atlantic Ocean and the west coasts of Africa.

## 2.2 Species and Stocks

Species of greek fishery are comprised mainly of high commercial value demersal fishes, such as grey mullets, breams, and others (Mullus sp., Mugil sp., Pagellus sp., Merluccius merluccius, Micromesistius poutassou, Polyprion americanus, Lophius sp., Epinephelus sp., Spondyliosoma cantharus, Diplodus sargus, Lithognathus mormyrus, Oblada melanura, Boops boops, Spicara smaris, Solea vulgaris, Nephrops norvegicus, etc) and to a lesser extent of small or large pelagic species, such as sardine, anchovy, horse mackerel, albacore, bluefin tuna, swordfish (Sardina pilchardus, Engraulis encrasicolus, Trachurus sp., Thunnus alalunga, Thynnus thynnus, Xiphias gladius) etc. There are seasonal and geographical variations in the composition of the catch, and also variations relating to the type of gear used. Set nets catch Mullidae, Sparidae, Labridae and Soleidae, while long lines are more efficient in catching Serranidae, Gadidae, Merluccidae and Sparidae. Beach-seiners operate near the coasts and their catches are composed of Centranchidae, Mullidae, Sparidae and Labridae, including a large proportion of juvenile fish, especially during the summer period when such fishes are to be found close to the shore. Trawlers fish Merluccidae, Gadidae, Sparidae, Mullidae, Lophidae, Zeidae, Soleidae, while purse-seiners catch Clupeidae, Engraulidae, Thonnidae, Caragidae etc.

### State of the Stocks

Biological research has been orientated to studies in the offshore zone where the economically more important medium fishery is conducted. There has been only a limited amount of research in the coastal zone, where the coastal fishery is usually practised. Regarding the resources available to the trawling and purse-seining fishery, it appears that the many demersal stocks are fully exploited while, with the exception of anchovy, most pelagic stocks are under-exploited.



## Management and Conservation of the Fisheries Resources

The conservation system is based on technical measures concerning gear and fishing techniques, rather than on catch limits, controls on discards and by-catches and mesh size regulations addressed to target species, upon which the Community fisheries conservation/ management policy mostly relies. As most vessels operate in territorial waters, they are subject only to national regulations. There is a fairly wide range of regulations including closed areas for certain gear and restrictions concerning landing sizes. Mesh size regulations exist for only some gear (e.g. trawls, purse-seines, beach-seines, small surrounding nets).

It is the scope of the long-term management policy to abolish beach seiners, so no new licences for beach-seining have been issued since 1979. The existing vessels are not receiving national or Community financial aid for modernization, while strong incentives are offered for withdrawal or change of fishing activity to use more selective gear.

### 2.3 Current Fleet Structure and Evolution (1983-1990)

#### Fleet Structure

According to the results of the Census of the Greek Fishing Fleet performed in 1988, the fleet is comprised of 19578 vessels of which 18771 belong to the coastal fishery category, 727 to the medium fisheries, and 80 to the Atlantic fisheries. The total engine power of the fleet is 459440 KW and the total tonnage is 111526 GRT. The results are presented below.

#### The Greek fishing fleet in 1988 (census data).

	: Coastal	: Medium	: Atlantic	: Total:
Number of vessels:	18771	727	80	19578:
Engine power (KW):	305357.5	121210.4	32872	459440:
Tonnage (GRT)	49177	36403	25946	111526:

#### Characteristics of some branches of the fleet (Based on a portion of the fleet)

	: Trawlers :(Medium+Atlantic)	: Purse- : seiners:	: Beach- : seiners:	: Net - : long lines	:
Number of vessels:	373	357	561	18321	:
Engine power(KW)	95087.5	46997.3	25034.3	242183.7	:
Tonnage (GRT)	43904	13860	14867	44375	:

Unfortunately the data upon which the information was derived were incomplete, and furthermore it was arranged in groups not allowing to estimate the contribution of individual branches of the fleet.

#### Evolution of the Fleet (1983-1990)

The chronological series of data presenting the evolution of the Greek fishing fleet by major fisheries category and by type of gear used were obtained from the Bank of Agriculture, and normally did not include information on the tonnage of the coastal fisheries vessels.

TABLE II presents information on the number, engine power and tonnage of the vessels of the three categories under the period of investigation. The

TABLE II- Evolution of the Greek fishing fleet (1983 - 1988)

Number of vessels	Year							
	1983	1984	1985	1986	1987	1988	1989	1990
Total fleet	11404	11862	12743	13674	14139	14790	15334	15544
Coastal fisheries	10619	11073	11925	12829	13261	13910	14440	14644
Medium fisheries	743	742	765	789	809	800	811	817
Atlantic fisheries	42	47	53	56	69	80	83	83

Engine power (KW)	1983	1984	1985	1986	1987	1988	1989	1990
Total fleet	359100	371372	409999	447676	502876	540704	579169	596970
Coastal fisheries	193875	214239	238976	268533	287386	323042	350067	362211
Medium fisheries	63523	65794	71109	73468	77625	79980	86782	89589
Atlantic fisheries	29190	30397	32642	34408	45051	52812	55060	55060

Tonnage (GRT)	1983	1984	1985	1986	1987	1988	1989	1990
Total fleet	48928	51666	52552	55914	61892	68462	71020	72043
Coastal fisheries	-	-	-	-	-	-	-	-
Medium fisheries	15176	16250	16719	18362	19484	19978	20568	21049
Atlantic fisheries	16395	17340	17540	18470	20721	23868	24843	24843

general trend is an increase of the number of vessels over the period studied, which is of the order of 5 % per year. This increasing trend is mainly due to the development of the coastal fisheries category because of the addition of new vessels. The high rate of increase of the coastal fisheries vessels during the initial period (1983-1988) can partly be attributed to favourable financing opportunities from national programmes (Law Decree 1262/1982) and partly to stricter regulations applied to sport fisheries with the Presidential Decree 373/85.

The number of the Atlantic fisheries vessels also increased over the same period, and thereafter remained stable. On the contrary, the number of medium fisheries vessels shows only a slight increase over the corresponding period. It is of interest to note the rapid development of the fleet of multi-purpose vessels of the medium fisheries category. More significant than the increase of the number of vessels of the fishing fleet was the increase of their total engine power, corresponding to an increase of about 10.4 % per year, a rate observed in all fisheries categories. While in the case of coastal fisheries the increase of the overall engine power of vessels can be attributed to both the addition of new units and to replacements/modernizations of old vessels, in the case of the medium fisheries category this increase, as well as the increase of tonnage, can be attributed only to modernization and replacement of old vessels by newer and bigger ones taking advantage of Community aid.

Regarding the individual branches of the three fishing categories, the most spectacular trend was the significant expansion of the fleet of net-longliners of the coastal fisheries. The fleet of swordfish longliners also increased, while the number of beach-seiners remained rather stable over the period investigated. The number of not-mechanized vessels progressively declined, as expected.

#### **2.4 Zonal Analysis**

The data of the Bank of Agriculture presents the participation of the Coastal, the Medium and the Atlantic fisheries categories, as well as of the total fisheries fleet, in the five zones. In TABLE III, the Bank data on the number of vessels belonging to the three major categories in 1988 are presented. To a greater or lesser extent, all zones benefited from the increase of the number of vessels over the studied period, but the largest zone, zone C, benefited most. In engine power and tonnage units, however, the highest rate of increase occurred in Zone A, where the largest portion of the Atlantic and medium fisheries vessels are based, and the lowest in Zone E, where the fisheries has a strong coastal character. The heavy concentration of the Atlantic fisheries in Zone A, and especially in Piraeus is remarkable, but reasonably explained by the fact that Piraeus can provide a safe harbour to the Atlantic fisheries vessels, is the administrative centre of the Greek shipping industry, and is the trading centre of frozen products.

The coastal fisheries is largely developed in Zone C, which is the largest of the five zones, followed by Zone A. The apparently low participation of Zone E in the overall coastal fisheries, however, has to be seen in conjunction with the low actual population size and small geographical extent of the zone. The number of net-longliners presented a clearly increasing trend in all zones, both in number of vessels and in engine power units. Swordfish fishing (which is sometimes associated with fishing for albacore and bluefin tuna) using drift long lines is gradually developing as a new activity in all zones. The fleet of trawlers is mainly based in Piraeus, Thessaloniki and other big towns of zones A and B, and in general terms remained stable over the studied period. The same stability is observed in the fleet of purse-seiners in all zones, except in Zone A, where there was a steep increase of the number of vessels comprising this fisheries branch, which seriously affected the general trend of the whole fleet of purse-seiners. The number of

TABLE III Fishing categories by zone (1988)

Zones	BANK DATA		CENSUS DATA	
	Coastal	Medium	Coastal	Medium
A	2795	375	3831	322
B	1877	201	2941	177
C	5656	115	7528	134
D	1715	69	2541	51
E	1807	40	1930	33

multi-purpose vessels of the medium fisheries increased dramatically in all zones, both in numbers and in engine power and tonnage units.

### 2.5 Production

Because of the diversification of the fishing techniques and the numerous landing places, the Greek fisheries statistics system does not monitor the landings, especially those of the coastal fisheries category. However, the Bank of Agriculture has recently established a system which ascribes the fisheries production by geographical area and by gear used, which is based on assessments of the catches of a number of vessels from each fishing category and branch in each administrative geographical division.

Production in tonnes by major fishing category over the period 1988-1990  
: Coastal : Medium : Atlantic : TOTAL :

1988	: 45579	: 86141	: 21200	: 152920	:
1989	: 43928	: 81549	: 19620	: 145097	:
1990	: 45188	: 68202	: 17120	: 130510	:

The results of the analysis, summarized above, show the evolution of the fisheries production by fishing category over the entire country during the period 1988 -1990. There is a strong decreasing trend of the total production over the period studied, due to the decrease of the production of the medium fisheries category, and to a lesser degree to the decrease of the production of the Atlantic fisheries category. The coastal fisheries production maintained a stability over the same period, fluctuating around 45000 tons. The drop of the medium fisheries production was due to a serious decline of the production of all branches which comprise this fisheries sector (trawlers, purse-seiners and multi-purpose vessels), and this decline is particularly evident in Zone A, in which the largest part of the medium fisheries production is landed.



At the same time, changes occurred in the total engine power and tonnage of the medium fisheries category, as well as changes in the navigational systems and the techniques of detecting and catching fish, which probably affected the fishing power of the vessels, but are difficult to be quantified in terms of fishing effort.

The overall production of the Atlantic fisheries sector presented a similar decline which was associated with a parallel decline of the catch per vessel indices, and affected both branches of the sector (fish trawlers and shrimp trawlers). In both cases, the reason of the decline should be sought in the increasing difficulty to get access to the fisheries resources of the Atlantic Ocean.

The stability of the production of the coastal fisheries category over the three year period, coupled with the increase of the total number of vessels comprising this fisheries sector, led to a decrease of the catch per vessel, and also indicates a drop of the catch per effort indices. The decrease of the catch per vessel was observed only in the branch of net-longliners and was most prominent in Zones A and E.

In the following table, the total production by zone was calculated for the year 1990, and the contribution of the catches from each fisheries branch to the total catch of the zone was estimated.

Production in tonnes by zone and gear used in 1990

ZONE:	Net-Long- lines :	Beach-seiners :	Sword : :	Trawl- ers :	Purse- Seiners :	:Atlantic:	Multi :purpose
A	: 10322	: 1964	: 175	: 11368	: 24265	: 15817	: 3275
B	: 4614	: 569	: 150	: 5314	: 5708	: -	: 1493
C	: 10763	: 2360	: 245	: 3482	: 3747	: 1303	: 744
D	: 3632	: 1993	: 25	: 2095	: 2400	: -	: 1700
E	: 6472	: 1588	: 335	: 1145	: 573	: -	: 895

## CHAPTER THREE

### ANCILLARY ACTIVITIES

#### 3.1 Aquaculture

A dramatic increase is expected in the production of aquaculture products. There has already been an increase in mariculture (sea aquaculture) production due to factors such as technological developments, increased consumer demand, relatively high profit margins, substantial amounts of subsidies and other incentives which have been provided from the State and the EEC, but it is difficult to be precise about the rate of increase in mariculture production. Their selling price is relatively high for the average income Greek consumer, while the export price is even higher -which ensures favourable conditions for the producer. The mariculture units generally operate under capacity. On the contrary, trout production which has started as early as 1962 and rose during 1975-85 has reached a maximum of 2000 tonnes (95% of it is domestically sold), because demand is limited, given that the Greek consumer prefers marine species. Mussel-farming has also been developed due to a number of factors such as incentives, provided by the State, low investment cost compared with mariculture, and relatively high product demand.

The reduction in the wholesale price of aquaculture products, in 1991, and the search for export channels are indications of the problems faced by the sector, even more so, when the absorption rate by Europe by major EEC markets (Germany, France, Italy, Spain, Denmark, Holland etc) is relatively small. Western European countries as well as Greece under the term sea aquaculture produce the following species: sea bass, mullet, mussels, oysters and eels. There are considerable prospects in aquaculture but careful planning is required for mariculture, mussels and other fish farming types.

In recent years, due to the higher demand in some European countries, eel-farming has started to develop in Greece (on the basis of imported elvers) and the products are mainly directed to exports. This is because domestic consumption of eel is very low. Similarly, in the case of carp-farming, production reached a certain level and then fell while further reduction is expected. It appears that several problems of the subsector have been dealt with and the conditions are suitable for further development of aquaculture as a whole. Mussel-farming and mariculture production are not expected to increase in the absence of professional organizations and a common strategy in view of the sectoral problems. On the other hand, the official services have chosen to stand aside and observe silently while dynamic intervention in cooperation with the producers is required. Production planning and marketing research are necessary prerequisites, but also, technology, equipment and the economic viability of the sector, are all aspects which should be examined.

The Institute of Marine Biology of Crete has taken up some successful research in mariculture and the National Marine Research Centre (N.M.R.C.) should also get dynamically involved. A major problem for the further development of aquaculture is the reaction of the coastal population in fear of environmental pollution and the possible restriction in touristic development of certain coastlines. This is why the specification of some standards is required in order to overcome this social problem.

#### Subsectors-Production Units-Production-Product Value

Trout-farming, carp-farming, eel-farming, mussel-farming and mariculture have been systematically developed. The number of production units, the size of production and production value are presented in TABLE II. In recent years, mariculture products, mussel and eel production have been rapidly developed. Trout production underwent small variations and has been stabi-

lized at an annual amount of 2.000 tonnes approximately, while carp-production after a gradual increase since 1986, fell sharply in 1990. Apart from carp-farming, the production value of aquaculture products has been rising due to the increasing wholesale price. As far as the zonal distribution of production units, their production and production value is concerned. We can say that during 1983-1988, mainland has the largest number of units and the highest production. Since 1989 Zone C comes first in the number of units and since 1990 in the volume of production as well. This is due to the rapid increase of mariculture and mussel-farming which have been developed recently in Zone C. In Zones D and E which are mainly islandic regions, the number of production units has also risen and is expected to rise even further in the years to come.

### Profiles of Undertakers

Generally, the businessmen involved in aquaculture, have been previously engaged in farming, in various non-related professions, in the fishery sector or in urban sector entrepreneurial activities. In trout and carp-farming the firm owners are mainly entrepreneurs, although there is a small percentage of ex-professionals involved. Eel-farming units have been set up, primarily, by coastal fishermen, withdrawn from the profession. Mariculture has attracted entrepreneurs and other professionals who do not live permanently in the region, where the activity is located. Usually, all other firm owners live in the region where their business is established. The following figures present average production per farming unit for 1990.

Trout-farming:	19 tonnes
Carp-farming:	8.5 tonnes
Eel-farming:	4.2 tonnes
Mussel farming:	30.9 tonnes
Mariculture:	15.8 tonnes

The production units in mariculture, under construction, are planned to operate with annual capacity over 25 tonnes, but their average production is expected to be lower initially. It must be pointed out, that the most economically viable units are those involved in mariculture and eel-farming.

### Employment

Between 1984-1990 the number of employees in total and by zone, continuously rises despite the fact that some trout and carp-farming units have ceased to operate. More specifically, in 1983, 403 people were engaged in aquaculture and in 1990 the number rose to 1.198 people (297% increase). Out of this number 5% are scientists specialised in fish-farming or accountants and economists. Productivity per employee is generally low and the highest value registered is 8-12 tonnes/person.

### Technology-Trends-Prospects

Technology in trout-farming, carp-farming and mussel-farming has been developed under the direction of the Ministry of Agriculture, of the National Marine Research Centre and of A.B.G. while technology in eel ELVER-farming and mariculture has been mainly imported from EEC-member States (France, U.K. Italy etc). Several problems have been dealt with but the remaining ones require a specialised Institute on Aquaculture in order to deal with fish diseases.

The production trends observed are: fluctuation around 1900 tonnes for trout, a decrease for carp while eel mussel and mariculture production appear

to have been increased substantially.

Since 1991, a spirit of cooperation prevails among the various interest groups in mariculture and mussel-farming. The absence of marketing and scientific research has been eventually recognised. The prospects are encouraging if the management of production units improves. This will result to lower production cost, healthier fish-farming and monitoring of supply and demand conditions. The expansion of the domestic market and the addition of an international dimension especially in mariculture products will result to the future development of the sector.

Table II presents the total number of units, number of employees and productivity in aquaculture, during 1983-1990, by zone. We observe that the number of units as well as total production have increased while average productivity per person has fallen.

### 3.2 Lagoons

Lagoon farming in Greece is normally extensive without the provision of any supplementary fish-feedings or other artificial improvements of the natural circulation system. Under lagoon farming the following species are cultivated: sea-bream, sea-bass, eel, mullet, goby and common sole. There are instances where special projects have been undertaken in order to increase natural productivity of lagoons similar to those implemented in the Italian lagoons (VALLICULTURA). It should be noted however, that the total lagoon surface has been gradually reduced due to human interventions and natural causes.

Out of 37.709 hectares in 1981 the lagoon surface has been reduced to 33.321 hectares in 1990. The number of small and large lagoons exceeds 70 but only 65 are systematically cultivated. They are mainly owned by the State and are rented out to fishery cooperatives or private enterprises on the conditions of rational exploitation and environmental protection. Lagoons are cultivated by 46 agents out of which: 47.8% are cooperatives in charge of 55.4% of the lagoons, representing 86% of the total surface covered by lagoons. Another 39.2% are private sector owners in charge of 30.8% of the number of lagoons representing 8.3% of the surface covered by lagoons. Also, 6.5% (4.3+2.2) are private sector enterprises in charge of 4.5% of the total number which cover 3% of the total lagoon surface. Finally, 6.5% are local authorities in charge of 9.3% of the number of lagoons covering a surface of 2.1% of the total.

#### Geographical Allocation

Zone C, includes the largest number of lagoons (470 covering a surface of 24.756 hectares or 74.3% of the total lagoon area). It must be pointed out that the total lagoon surface in this zone covers the largest part of central Greece. Zone D follows with 17.9% (8 lagoons) covering 5980 hectares. In the Aegean islands of Zone D there are no lagoons. Zone A and B follow with lagoon surface 4.4% and 3.4% of the total respectively. Zone E, which is purely islandic, has no lagoons as well. In the areas where there is a large number of lagoons such as Zone C, the agricultural sector dominates while industrial development is rather low.

There is an urgent need for lagoon development in those areas through improvements in the conditions of cultivation. The objective is to increase regional income through the creation of new employment. According to studies undertaken by F.A.O., lagoons can be fully utilized combined with semi-intensive and intensive physical and technical aquaculture units. These studies will be useful if adapted to the Greek reality. The OECD and the EEC encourage all studies towards the above mentioned directions, so that the natural environment will be preserved and within it, the lagoons. Table III shows the regional distribution of lagoons by zone.



**TABLE IV**  
**TOTAL NUMBER OF UNITS, PRODUCTION, NUMBER OF EMPLOYEES AND**  
**PRODUCTIVITY IN AQUACULTURE DURING 1983-1990,**  
**BY ZONE**

ZONE	1983	1984	1985	1986	1987	1988	1989	1990
<b>1. TOTAL NUMBER OF UNITS BY ZONE</b>								
A	28	29	29	37	34	38	40	67
B	7	7	7	9	11	12	24	22
C	40	41	42	54	57	65	99	127
D	3	-	-	-	-	3	8	10
E	-	-	1	1	2	2	8	10
Mainland	71	76	78	82	81	81	78	71
TOTAL	149	153	157	183	185	201	257	307
<b>2. TOTAL PRODUCTION BY ZONE (IN TONNES)</b>								
A	305,0	317,0	216,0	321,75	445,7	659,0	680,0	1.290,0
B	49,3	37,0	23,3	34,7	36,5	60,5	138,8	328,3
C	551,0	507,0	756,7	674,6	774,7	1.159,6	1.558,8	2.879,5
D	-	-	-	-	-	-	16,3	132,0
E	-	-	-	17,0	25,0	15,0	30,0	210,0
Mainland	1.349,8	1.092,0	1.192,7	1.221,3	1.403,1	1.882,4	1.749,2	1.472,9
TOTAL	2.255,1	1.953,0	2.198,7	2.279,35	2.685,0	3.776,5	4.173,4	5.312,7
<b>3. TOTAL NUMBER OF EMPLOYEES BY ZONE</b>								
A	69	72	76	134	123	139	151	190
B	15	14	15	17	27	36	61	199
C	111	106	144	184	228	196	382	547
D	-	-	-	-	-	8	33	45
E	-	-	3	3	10	16	30	56
Mainland	201	196	182	184	191	203	178	161
TOTAL	403	388	420	522	579	598	835	1.198
<b>4. AVERAGE PRODUCTION PER EMPLOYEE BY ZONE (IN TONNES)</b>								
A	4,4	4,4	5,5	2,4	3,6	4,6	4,5	6,8
B	3,3	2,6	1,5	2,0	1,4	1,7	2,3	1,6
C	5,0	4,7	5,2	3,7	3,4	5,9	4,1	5,3
D	-	-	-	-	-	-	0,5	2,9
E	-	-	-	5,7	2,5	1,9	1,0	3,75
Mainland	6,7	5,6	6,5	6,6	7,3	9,2	9,8	9,1
Country Average	5,6	5,0	5,2	4,4	4,6	6,3	5,0	4,4

TABLE V

Regional Distribution of Lagoons by Zone: Number, Area, Production, Average Productivity and Average Wholesale Price

Zone	Number	Area		Production		Average	Average	Production	Total	Average	Gross Value
		Hectares	Zonal percentage %	Tonnes	Zonal percentage %	Production					
A	5	1465	4,4	111081	5,8	70,55	762	84588	4,6	3702	2820
B	5	1120	3,4	124100	6,5	110,80	1218	151088	8,3	2640	3215
C	47	24756	74,3	1380586	72,6	55,90	1024	1413227	74,3	2037	2086
D	8	5980	17,9	287103	15,1	48,00	688	197716	10,8	2392	1645
E	-	-	-	-	-	-	-	-	-	-	-
Total	65	33321	100,0	1902870	100,0	57,21	971	1846619	100,0	2174	2111

Source: Agricultural Bank of Greece, 1991

## Production

Fishery production from lagoons in 1974 was 1698 tonnes. During 1980-1984 production amounted to 2800 tonnes and between 1986-1990 production was reduced to 1903 tonnes. Lagoon production by zone is proportional to lagoon surface. More specifically, zone C accounts for 72.6% of fishery production from lagoons, zone D for 15.1%, zone A for 5.8% and zone B for 6.5% of total production. In zone C, which has the largest number of lagoons, production declined between 1985 and 1990, from 2100 tonnes to 1380 tonnes (by 34.3%). In the other zones, small changes have been observed, either because the smaller lagoons are more productive or because improvement works have been undertaken. Apart from the aforementioned causes, it appears that another contributing factor to the fall in production, has been the environmental pollution in some areas of Zone C. Production per unit of surface is low in all zones and ranges among 48-110.8 kg/hectare. Average productivity is 57.1 kg/hectare. The minimum productivity in 1990 was 17 kgr/hectare and the maximum 163 kgr/hectare. It is concluded that methods of cultivation should be improved.

This decline in production affected the structure of catches from lagoons. More specifically, during 1981-1990 sea-bream production fell by 50%, sea-bass production by 10%, eel-production by 18%, and other types of fish by 65%. It was only mullet production that remained approximately constant (from 1102 to 1055 tonnes). The real value of production has also been reduced despite the fact that the average prices have increased from 384 GDR/kg to 971 GDR/kg during 1983-1990.

It appears, that the problems of the subsector are considerable and there is need for research, specialized personnel, improvement works, rational management and environmental protection.

## Employment

Lagoons are farmed by cooperatives, private individuals, development companies and local authorities, while in some areas individual fishermen also engage in lagoon fishing, sometimes illegally. The number of employees in Zone C is naturally larger, since this zone comprises the majority of lagoons. Zones D, B and A follow. The number of cooperative members declined during 1985-1990 while the number of other employees was increased. This decline was due to a number of factors: the reduction in the number of cooperatives, the retirement of traditional lagoon fishermen and the take over of two lagoons, previously owned by cooperatives, by development companies. Overall, the number of employees has been increased (1.6%).

The average productivity per employee by zone, in 1990 is about 2174 kgr being highest in zone A with regard to volume and value respectively.

Zone	Average productivity (kgrs)	Gross value of average productivity (000 GDR)
A	3702	2820
B	2640	3215
C	2037	2086
D	2392	1645
E	-	-
Average	2174	2111

The available data shows that the average productivity is relatively low, especially in zone D, in value terms and in zone C in terms of production. Net wages (approximately 60% of gross income) are low and this is why the cooperative members as well as other employees have to supplement their income through fishery, agriculture or other related activities. Hence, it appears that income improvements are necessary. This can be achieved through modern production methods which will lead to productivity increases.

### 3.3 Processing and Marketing

#### Processing

Market research for processed fish products in the Greek market reveals significant deficit of domestic production. The existing fish processing units are mostly small-scale units, equipped with old technology and producing mainly salted fish products.

In recent years, newly constructed fish processing units have started to appear. They are technologically modernized firms, with production structures directed towards satisfying the changing consumer pattern in fishery products. They produce smoked trout, smoked eel, smoked salmon and generally processed fish in various packaging forms. The major contributing factor to these latest developments has been the domestic boost in aquaculture and especially trout farming. Fresh trout production was not easily absorbed by the market, even more so, when a changing consumer pattern is under way. The domestic market, which since accession into the EEC has acquired an international dimension, welcomed smoked fish and various other forms of processed fish products. Furthermore, market research has shown, that several processed fish products can be produced and marketed in Greece as well as abroad.

The processed fish categories available in Greece are salting, smoking, freezing (distribution, packaging) and canning. The main processed fish types are the anchovy and sardines. To a smaller extent, mackerel and tuna, salted or smoked are also produced domestically. Fish freezing is mainly performed on Atlantic fishery catches and occurs on the catch's arrival on board. Atlantic fishery catches include: codfish, prawns, pike, garnet, squid etc. Smoking is usually performed on trouts produced through trout-farming. Lately, production of smoked eel, mackerel and salmon has also started to appear. Each of the above categories undergoes similar production stages, such as skinning, cutting, filleting etc. Processing firms may engage exclusively into one or more production stages of processing.

The sector of processed fish products may develop further, provided that it improves its technology in order to meet consumer preferences in the domestic and international market. Currently, some improvements have occurred to this effect and many more are still to come such as, newly constructed modernized processing units and extension of the existing ones. Investors' interest is encouraged through national and EEC programmes. A valid indicator of the increasing sectoral activity is rising processed fish production, examined in detail in section 3.3.5 of this chapter.

The number of processing units operating during 1988-1990 fluctuated between 45 and 50. The analysis of the distribution of processing units throughout Greece, has shown that their operation directly depends on local catches production. There is total dependence (100%) of smoked trout and eel processing units on domestic production. Processing units import about 20% of their raw material (frozen fish) while 80% is domestically produced. During 1988-1990, 25% of fresh sardine was absorbed for the production of canned and salted sardine while 75% was marketed fresh. Out of the total amount of processed fish produced in 1988, 68% was salted anchovy, 13.6% was salted and canned sardine products, 8.2% was red caviar, 6.8% mackerel products, 0.7% processed tuna fish and 2.7% various other fish products. During 1990, produc-



tion of processed mussels and especially inland water fishery products (trout and eel, salmon and herring) amounted to 775 tonnes. Distinguishing processed fish production structure by zone, shows that Zone A accounts for 62.2%, zone B for 28.7%, and zone D for 9.1% of total production respectively.

**TABLE VI**  
**Imports - Exports of Processed Fish Products during 1986-1988**

			1986	1987	1988
Fish Dried Salted Smoked	Imports	Quantity (in tonnes)	7.925	7.456,5	6.473
		Value (mil. dr.)	2.997,022	3.692,655	3.397,114
Fish Dried Salted Smoked	Exports	Quantity (in tonnes)	4.424	8.437,5	4.611
		Value (mil. dr.)	1.116,205	2.801,782	1.995,923
Processed fish products	Imports	Quantity (in tonnes)	4.887	5.270,4	4.785
		Value (mil. dr.)	2.064,640	2.177.143	2.403,898
Processed fish products	Exports	Quantity (in tonnes)	1.013	913	466
		Value (mil. dr.)	648,461	640,716	334,277

Source: National Statistical Service of Greece, (N.S.S.G.), 1991

According to information provided by the N.S.S.G. imports and exports of processed fish products are presented in the above Table, between 1986-1988.

### **Wholesaling**

The wholesale distribution of the fisheries products is almost exclusively in the hands of the private firms. Up to now, very few co-operatives have succeeded in participating "and only up to a certain extent" to the activities of collection and distribution of production. The wholesale firms are unequally distributed in different regions of the country. Approximately 50% of the wholesale outlets are located in the Greater Athens area. In addition the collection and distribution of Atlantic fisheries products and imports of frozen and fresh fisheries products is also highly concentrated in the Greater Athens area. The total view of the wholesale firms appears to be highly differentiated. The wholesale of the local fisheries production includes a large number of small businesses which exceed 250 in total. Furthermore, there is a relatively small number of large firms with considerable financial capacity. These firms deal with wholesale activities in the Atlantic fisheries production and imports of fresh fish.

Usually, a large firm deals with all three of the above mentioned activities or at least two of them. Such firms have in most cases a capital inten-

sive character and many international contacts (with shipowners, wholesale businesses, supermarket chains etc). These relations can reflect competitive conditions in the market but more often are relations of co-operation and coverage. For example, quite often through the retail outlets of the local fisheries wholesalers, other products are also distributed.

In total, the wholesalers participate to the commercial distribution of fisheries products with 50%. Part of this is forwarded to be processed (10%). The wholesalers are supplied mostly through the fishing ports (75%) and the rest directly from the producers. Out of the total quantity distributed, about 40% is forwarded to retailers, fish stores, fish-markets and the rest to other traders.

### The Major Fishing Markets of the Country

The fishing port of Piraeus (Keratsini) is the major fishing market as far as distribution is concerned. On the other hand wholesale trade of the Atlantic fisheries, mainly composed of frozen fisheries and the import wholesale trade are mostly located in the Athens area. For example, from the companies which import salted codfish and herrings, only 6 are located outside Athens. Other wholesale markets relatively important are located in nearby fishing ports. The largest ones are located in Kavala, Thessaloniki, Patras. The zonal distribution of major fishing markets is as follows:

ZONE A : Thessaloniki, N. Moudania, N. Michaniona, Kavala, Athens and Piraeus

ZONE B : Volos, Patras and Chalkis

ZONE C : Preveza, Iraklio, Agios Nikolaos, Nafplio, Gythio

ZONE D : Alexandroupoli, Porto-Lago, Chios, Mytilini, Samos

ZONE E : Kalymnos, Paros

### Retailing

The retail sales of fisheries products are effected through a large number of retail outlets. The most recent Census of the Greek Industry (1988) run by the National Statistical Service of Greece shows a total number of retail outlets 1477 with 2673 people employed. The 1978 Census shows that the total number of fisheries retail outlets was 1227 with 2095 people employed. Hence, an increase of 20.3% is observed with a respective increase of 27.6% in employment. This number of retail outlets, however, should be added to a relatively large number of individual salesmen, the total number of which is very difficult to identify. Retail stores are unequally distributed around the country. That is why in the islandic regions fresh fish is usually consumed which is either an aquaculture product or it is caught by local fishermen from nearby lakes, rivers or streams.

The majority (47.5%) of the retail outlets and employment (45.2%) in the sector, is concentrated in zone A. This is explained by the fact that this zone includes most large urban centres. On the other hand, a very small fraction of the retail outlets (3.8%) are located in zone E, which exclusively consists of islandic areas.

### Supply-Distribution-Preservation of Frozen Fishery Products

Frozen fishery products come exclusively from Atlantic fisheries. The processing and the primary packaging of their total production is completed on board. The product is frozen on the spot and is transported from the point of

fishing to the port with transport refrigerator vessels. The product is packaged in carton packs of 20 kg which mainly include whole-body fish, degutted when their weight is above 1 kg, and beheaded when they weigh more than 2kg. Large fish above 5 kg is cut into pieces. The total production of Atlantic fisheries is landed at Piraeus and it is placed in cold storage capacities located in the Athens/Piraeus region, within refrigerated chambers at  $-22^{\circ}\text{C}$  approximately.

The large cold storage units of the Attica region, where all frozen fisheries are stored upon their arrival from the Ocean (suitable for meat cheese as well as fish) are approximately  $270.000\text{ m}^3$ . Out of these about  $80,000\text{ m}^3$  are used for frozen fish. The fisheries quantities which are stored in cold storage units of other areas (Thessaloniki, Larissa etc.) by the wholesalers of the regions, are negligible.

### **3.4 Shipyards**

#### **Number of Units**

According to the most recent Census of the Greek Industry (1988), run by the National Statistical Service of Greece, there are 335 shipyards in total, located in the zones defined in Table I. Employment is estimated at 9529 (a theoretical estimate, given that 28 people are employed, on average, per shipyard). Depending on the material used for vessel construction, there are 54 shipyards that deal with metal construction, 184 with wood and 97 shipyards that deal with plastic fishing vessel construction.

It must be pointed out that there is no information about the distribution of activity between construction of fishing vessels, construction of cruisers (yachting) and construction of cargo-carriers. It is estimated that less than 20% of the above shipyards deal with fishing vessel construction and repair. For this reason, an extensive fieldwork was undertaken in order to identify the shipyards that construct fishing vessels, at least the medium and large registered units. There is also a number, of small, one-person firms, which can not be easily traced and identified (registered). The majority of the shipyards are located in zone A (188 units representing 56% of the total). About 43% of them or 80 shipyards, work with wood constructions and repairs, 32% with plastic (60 shipyards) and only 26% (48 shipyards) with metal steel vessel constructions and repairs.

To be more specific, and in order to give a more realistic view of the number of units that deal with fishing vessels, the following must be pointed out. In the Census of the Greek Industry (1988) out of the 14 shipyards that are registered in the Cyclades islandic formation (zone E), only 2 deal with construction and maintenance of fishing vessels, one of which is a large shipyard located in Syros and employes 1080 people. Nevertheless, through the fieldwork which was undertaken in order to differentiate the shipyards according to their activity, 60 units were traced all over the country dealing with fishing vessels. About 47% of them (28 units) are located in Zone A. Another 20%, is located in Zone C (12 units), 17% in Zone E (10 units), while Zones B and D follow with 10% and 7% respectively.

#### **Employment**

As previously mentioned, employment in shipyards is estimated at 9529 people, indicating an average employment per shipyard of approximately 28 people. Using employment data from the Census, 83% of total employment is absorbed by Zone A. It needs to be mentioned that 7127 people, representing

90% of the total zonal employment, are employed in shipyards that deal with metallic vessel construction. This figure refers to the large industrialized units of Athens and Thessaloniki which are almost exclusively engaged in repairing, maintenance and construction of commercial vessels (yahts, cruisers and battle ships).

In total, about 87% of the labour force employed in the shipyard sector deal with metallic vessel constructions (8275 people), 6% (550 people) with wooden vessel construction and 7% (704 people) with plastic vessel constructions and repairs.

Employment in Fishing vessel shipyards was estimated indirectly to be 240 people since it has been impossible to approach all fishing vessel shipyard owners for interviews. The fieldwork revealed that the majority of the shipyards that deal with fishing vessels, employ on average 4 people. Hence, employment has been estimated based on average employment per shipyard. Evidently, 47% of the people employed are in Zone A, 20% in Zone C, 17% in Zone E, 10% in Zone B and 7% in Zone D.

### **3.5 Fishing Ports**

#### **Number of Units and Zonal Distribution**

Fishing ports are places where the fisheries production is landed and stored until is sold to wholesalers. Of the total fisheries production, about 25-30% is distributed through the 10 fishing ports of the country. The zonal distribution of these fishing ports is as follows :

ZONE A : Piraeus, (Keratsini), Thessaloniki, Kavala

ZONE B : Patras, Chalkis, Alexandroupoli

ZONE C : Messologgi, Preveza

ZONE D : Chios

ZONE E : Kalymnos

These fishing ports are characterized to be the only authorized and registered points for the landing and distribution of fisheries production.

That is why all other smaller fishing harbours are not sufficiently equipped with installation for storage and handling of fisheries products, making this way impossible the follow up and registration of quantities landed and handled, which in reality are much higher than the respective ones of official fishing ports. There is no statistical information of how much is landed into these smaller fishing harbours.

Piraeus and Thessaloniki are the largest fishing ports among the ones listed above. Their size is identified by the volume of production that passes through as well as by the personnel employed in each fishing port. Most of them with the exception of Kalimnos were established in the late sixties. This has resulted to a growing inadequacy of their storage chambers and refrigerating units by modern standards.

Besides local management that every fishing port employs, the overall operation of fishing ports, as well as repairs, expansions and financing are directed by ETANAL (the National Company for the Development of Fisheries). ETANAL was established in 1969-72 with Agricultural Bank of Greece the basic shareholders. All proposals for Community National programmes for ports are directed through ETANAL.

#### **Zonal Distribution of Production**

Available data for the zonal distribution of production of fishing ports refer to years 1986 up to 1990. Regarding production for the years 1983 up to



1985, the data refers to total annual production of all fishing ports considered together.

Using data of 1990, 82% of the total production of the fishing ports is in Zone A, because the largest fishing ports of the country are included in this zone. Similarly, 16% of the production is in Zone B, while Zone E appears to have the smallest contribution to total annual production as its landing did not exceed 80 tonnes.

This can be attributed to the fact that the vast majority of the vessels fishing in this zone do not land their production in Kalymnos -due to the fact that its complete contribution has not finished yet- but they prefer to go to Piraeus where procedures are faster and prices appear to be higher. In addition coastal fishing vessels directly distribute their production to local retail consumption making impossible the registration and follow up of their production.

### Cold Storage

The actual landings into the main fishing ports in 1990 are presented in TABLE VIIa as well as VIIb total annual production of fishing ports between 1983-1990 in a summarised form.

There are 970 refrigerating units for fresh and frozen products all over the country. Cold storage units have a total capacity of 2,690,000 m<sup>3</sup> for normal freezing and 613,000m<sup>3</sup> for deep freezing. The largest part of this capacity (68%) is utilized for fresh fruits and vegetables(normal freezing). The remaining is utilized for storage of imported meat, fisheries products, cheese, ice cream etc. Capacity utilized for frozen fisheries is approximately 80,000 m<sup>3</sup> of which about 80% is located in Zone A.

### Employment

The total number of people employed by the fishing ports around the country as well as by ETANAL were 179 in 1991 while in 1988 were 215

The zonal distribution of personnel employed in the fishing ports has as follows :

- ZONE A : 104 people in total employed by 3 fishing ports.
- ZONE B : 41 people employed by 3 fishing ports
- ZONE C : 5 people employed by 1 fishing port
- ZONE D : 8 people employed by 1 fishing port
- ZONE E : 4 people employed by 1 fishing port

As shown over 50% of the labour force employed in the fishing ports is in Zone A, due to the location of the largest fishing ports.

TABLE VIIa  
FISHING PORTS PRODUCTION 1990

P R O D U C T S	PIRAEUS	THESSALONIKI	KAVALA	PATRA	CHALKIS	CHIOS	ALEXANDROUPOLI	MESSOLONGHI	KALYMNOS	ANNUAL TOTAL
- A -										
FISH										
QUANTITY ('000 KG)	19520	4472	5603	2238	1682	271	1756	242	42	35781
VALUE ('000 DRS)	6204256	1643220	1974573	1005513	786650	124508	1020658	223999	11650	13005724
CEFALOPODS										
QUANTITY ('000 KG)	593	389	431	201	88	28	460	3	1	2193
VALUE ('000 DRS)	277740	141375	177847	97610	49278	14554	201570	1880	526	962380
MOLLUSCS										
QUANTITY ('000 KG)	439	226	42	65	61	23	69	1	0.05	927
VALUE ('000 DRS)	270231	424874	74577	49154	1076	15072	136828	880	129	1035386
SHELLFISH										
QUANTITY ('000 KG)	25	88	15		1					129
VALUE ('000 DRS)	18977	71000	5307		1076					96362
T O T A L										
QUANTITY ('000 KG)	20577	5175	6091	2504	1832	321	2284	246	43	39030
VALUE ('000 DRS)	6771205	2280471	2232304	1152277	880645	154133	1359055	226758	12305	15099852
- B -										
MEDITERRANEAN FISHERIES PRODUCTS										
IMPORTED FISHERI										
T O T A L										
QUANTITY ('000 KG)		1091	79		19				36	1189
VALUE ('000 DRS)		506716	12685		8333					
GRAND TOTAL										
QUANTITY ('000 KG)	20577	6682	6185	2504	1852	321	2284	246	79	40735
VALUE ('000 DRS)	6771205	2956415	2253439	1152277	888978	154133	1359055	226758	43003	15807620

TABLE VIIb  
TOTAL ANNUAL PRODUCTION OF FISHING PORTS  
1983 - 1990

	QUANTITY(TNS)	COMP.GROWTH RATE* %	VALUE (000 DRS)
1983	29619	-	3932191
1984	30590	3.3	4795950
1985	27797	-9.1	5565336
1986	23790	-14.4	6925855
1987	27261	14.6	7540746
1988	36486	33.8	12293323
1989	44569	22.1	13703249
1990	40730	-8.6	15805263

Source: ETANAL

\* Comp. Growth Rate of quantity =  $r = \left[ \sqrt[N-1]{\frac{Y}{A}} - 1 \right] \times 100$

Y=final value  
A=initial value  
N=number of years

## CHAPTER FOUR

### IDENTIFICATION OF ZONES DEPENDENT ON FISHERIES AND ANCILLARY ACTIVITIES

#### 4.1 Rival and Collaborating Industries with the Fishery and Aquaculture Sector

The competing sectors to fishery production, resource stocks and generally the future of the fishery sector are the following:

Industry: Urbanization and industrial development have had serious environmental side effects, like that of gulf pollution with negative impact on fishery production and stocks. Pollution, is heavily felt in zone A as far as coastal fishery is concerned.

Agriculture: Sea pollution from agricultural waste like fertilizers, pesticides and other chemical substances is quite common in Greece. Waste from the agricultural sector is carried to the sea through rivers and torrents. Especially affected is zone C where agriculture is more intensified. An additional source of pollution has recently appeared by the large livestock units waste and especially waste from pig breeding units which is discarded into rivers and torrents.

However, there is a synergy between brackish water fishery and aquaculture on the one hand and agriculture on the other. This is because infertile or underdeveloped agricultural areas have been turned into prosperous ones through aquaculture and brackish fishery and also because many of fish-feeds types are produced by agriculture.

Tourism: International as well as domestic tourism is assigned a double sided role, that of collaborator and rival. On the one hand tourism provides fishermen with a source of supplementary income especially during the summer months. Furthermore, in some zones (B, D, E) it contributes to the formation of favourable market prices to the producers for fishery and aquaculture products. However, tourism is also considered to be a rival to the fishery sector in the sense that, construction and extension of aquaculture units in coastal areas or islands is resisted by local residents because it is considered as polluting sea waters.

Amateur fishing: It is mostly undertaken during the summer by locals but by tourists as well. It has as a result the disturbance of the equilibrium of the stocks available, because the sport fishermen are allowed to use professional gear and in many cases they practice illegal methods (dynamite, prohibited scuba diving during the night etc).

#### 4.2 Target Population

In general, the social status of fishermen is low in comparison to workers in other professional fields. The educational level of fishermen is on average low, but no reliable statistics exist. Vocational training in fisheries and management/legislation aspects, is periodically provided in the form of training seminars undertaken by public organizations and to a lesser extent by the National Employment Organization, the Panhellenic Confederation of Agricultural Cooperative Organizations, and other bodies. Fishermen have acquired many years of experience in their profession, especially the older ones, while the younger have already familiarised themselves with the use of electronic equipment. Generally, fishermen engaged in medium fishery are considered to be more qualified in comparison to those engaged in coastal fishery, and this can be attributed to, the need for higher capital investments and operating costs involved in the medium fishery compared with the coastal fishery which can be characterized as a "family" type of business. There is a



lack of effective fishermen professional organization bodies. The prevailing organization scheme is the cooperative one. Most cooperatives remain inactive or present little activity, while only a few fulfil part of the scope for their existence. According to the most recent statistics (1987), there were 138 fisheries cooperatives in Greece out of which, 91 are engaged to a smaller or greater extent in coastal fishery. The number of cooperatives by type of fishing is: 46 which specialize in coastal fisheries, 33 in lagoon farming/coastal fisheries, 6 shellfish dredging/coastal fisheries, 1 in sponge fishing, 5 in coastal and medium fisheries, 10 in medium fisheries, and 17 in inland water fisheries/freshwater farming. Only 17 of these cooperatives are organized in higher order organizations, which include cooperatives of other agricultural products as well.

Sectoral employment amounts to 39.397 individuals, out of which 56.6% are businessmen (shipowners and fishermen) 24.1% are crew members and 19.3% are fishing workers. Also, 9% of the total number employed is below 24 years of age, 42.4% is between 24 and 44 years of age, 40.7% is between 45 and 64 years of age and only 7.9% is over 65 years old. Furthermore 82.8% of the businessmen is over 45 years of age, 15.4% of them is between 25 and 44 years of age and only 1.7% is below 24 years old. In the rest of crew members the following pattern is observed: 75.2% of them is between 25 and 64 years old, 21.2% is between 14-24 years of age and only 3.5% is over 65 years old. As far as the fishing workers are concerned, 84.3% of them is between 25 and 64 years of age while 13.6% is below 24 years of age. It is concluded, that more than the 47% of the people employed in the sector are older than 45 years old.

#### Analysis of Employment by Sex and Nationality

Out of the total labour force employed in fishery, 94.2% are Greeks and 5.8% are foreigners natives. A similar allocation prevails, as far as sex division is concerned between male and female employees. Moreover, it should be pointed out, that wives of fishermen assist their husbands in works of major importance like net repairing and maintenance. The foreigners are usually engaged under the fishing workers category. Furthermore, among the total amount employed, 95.1% is male and only 4.9% is female. In the division by sex the same percentage applies for the Greeks as well as the foreign employees.

TABLE VIII

#### EMPLOYMENT BY SEX AND NATIONALITY, IN 1988

	Total	Male	Female	% Total	Total Country	
					% Male	% Female
Total	39397	37451	1946	100	100	100
%	100	95,1	4,9			
Greeks	37099	35262	1837	94,2	94,2	94,4
%	100	95,0	5,0			
Foreigners	2298	2189	109	5,8	5,8	5,6
%	100	95,3	4,7			

Source: Derived from the Fishery Census, 1988

**Analysis of Employment by Fishery Category**

It appears from TABLE IX that among the different fishery categories, coastal fishery employes 78.4% of the sectoral labour force, the medium fishery employes 15.1%, the Atlantic fishery 3.8% and the inland waters fishery accounts for 2.7% of the total sectoral employment. This can be attributed to the fact that approximately, 80% of the Greek fishing fleet is characterised by coastal fishery vessels, for reasons previously explained.

In coastal fishery, Greeks account for 99.4% of total employment and in Medium fishery for 82.1%. On the contrary, in the Atlantic fishery, foreigners account for 71% and Greeks for 29% of total employment respectively.

The majority of businessmen (91.6%) is engaged in coastal fishery vessels. In the category of crew members, 76% of them are engaged in coastal fishery vessels and 18% in the Medium fishery vessels. The fishing workers are equally shared among the coastal and the medium fishery (43% of them in total) while 14% of the fishing workers are engaged in the Atlantic fishery vessels.

The following observations are made by age group: In the age group 14-24 years, 75.2% of the total number employed in coastal fishery is classified and 19.1% of the total employment in medium fishery. In the age group 25-44 years, 71% of the number of people employed in coastal fishery is listed, 19.7% of employment in the medium fishery and 7.2% of employment in the Atlantic. In the age group 45-64 years, 84% of the people employed, in coastal fishery is listed and 11.7% from medium fishery. Finally, employees over 65 years of age are engaged in coastal fishery by 93%, in medium by 3% and in inland waters fishery by 4%. Within each fishery category the distribution of employees by age group is as follows:

In coastal fishery vessels, 43.7% of the employees fall within the 45-64 age group, 38.3% fall within the 25-44 age group, while 9.4% of coastal fishery employees are over 65 years of age and 8.6% of them fall in the group of 14-24 years of age. In medium fishery vessels, 55.6% of the employees fall within the 25-44 age group, 31.5% fall within 45-65 age group while 11.4% of medium fishery employees are between 14-24 years of age. Only 1.5% of employees is over 65 years old. In Atlantic fishery the majority of employees, or 80.7%, fall within the 25-44 age group, 11% fall within the 45-64 age group and 8.3% are between 14-24 years of age.

Finally, out of the total number employed in inland waters fishery, 61% is over 45 years of age, 32% falls within the group 25-44 years of age and only 7.3% belongs to the 14-24 age group.

**Zonal Analysis**

Distribution of employment by zone is shown below:

<u>ZONAL EMPLOYMENT</u>		
<u>Zone</u>	<u>Number</u>	<u>%</u>
A	11219	28.5
B	5680	14.4
C	12699	32.2
D	4526	11.5
E	4674	11.9

The largest zone, according to the number of employees in the fishery sector, is zone C with 32.2% of the total. It is also the largest zone geographically with an extensive coastal length, as well as with the most significant lagoons of the country. Also the majority of fresh water aquaculture units is concentrated in this zone, having as a result the increase of employment in the sector.

TABLE IX  
EMPLOYMENT BY VESSEL TYPE, NATIONALITY AND SEX, 1988

Total Country										
Vessel type	Grand Total				Greeks			Foreigners		
	Total	%	Male	Female	Total	Male	Female	Total	Male	Female
Total	39397	100	37451	1946	37099	35262	1837	2298	2189	109
%	100		95,1	4,9	100	95,0	5,0	100	95,3	4,7
Atlantic	1496	3,8	1464	32	434	434	-	1062	1030	32
%	100		97,9	2,1	100	100	-	100	97,0	3,0
	100		-	-	29	-	-	71	-	-
Medium	5935	15,1	5856	79	4871	4809	62	1064	1047	17
%	100		98,7	1,3	100	98,7	1,3	100	98,4	1,6
	100		-	-	82,1	-	-	17,9	-	-
Coastal	30892	78,4	29090	1802	30720	28978	1742	172	112	60
%	100		94,2	5,8	100	94,3	5,7	100	65,1	34,9
	100		-	-	99,4	-	-	0,6	-	-
Inland waters	1074	2,7	1041	33	1074	1041	33	-	-	-
%	100		96,9	3,1	100	96,9	3,1	-	-	-
	100		-	-	100	-	-	-	-	-

Source: Derived from the Fishery Census, 1988

TABLE X

## EMPLOYMENT BY VESSEL TYPE, AND AGE GROUP, IN 1988

Vessel type	Age Groups										Skills					Total Country
	Total	14-24	%	25-44	%	45-64	%	over 65	%	Ship owners	%	Crew members	%	Fishing workers	%	
Total	39397	3539	100	16693	100	16059	100	3106	100	22289	100	9510	100	7598	100	
%	100	9,0		42,3		40,8		7,9								
Atlantic	1496	124	3,5	1208	7,2	164	1,0	-		6	0,0	399	4,2	1091	14,4	
%	100	8,3		80,7		11,0		-								
Greeks	434	13		300		121		-		6		381		47		
Foreigners	1062	111		908		43		-		-		18		1044		
Medium	5935	676	19,1	3298	19,7	1874	11,7	91	3,0	1023	4,6	1680	17,7	3232	42,5	
%	100	11,4		55,6		31,5		1,5								
Greeks	4071	608		2460		1717		86		1023		1503		2345		
Foreigners	1064	68		838		153		5		-		177		887		
Coastal	30892	2660	75,2	11844	71,0	13498	84,0	2890	93,0	20409	91,6	7215	75,9	3268	43,0	
%	100	8,6		38,3		43,7		9,4								
Greeks	30720	2624		11736		13480		2880		20409		7130		3181		
Foreigners	172	36		108		18		10		-		85		87		
Inland waters	1074	79	2,2	343	2,1	527	3,3	125	4,0	851	3,8	216	9,2	7	0,1	
%	100	7,3		31,9		49,1		11,7								
Greeks	1074	79		343		527		125		851		216		7		
Foreigners	-	-		-		-		-		-		-		-		

Source: Derived from the Fishery Census, 1988



### 4.3 Employment and Incomes

#### Employment

According to the Fishery Census of 1988, the total number of employees in the vessels, amounts to 39.400 persons, 78.4% of them are involved in coastal fishery, 15.1% in medium fishery, 3.8% in Atlantic fishery and 2.7% in the inland water fishery. While the medium fishery category contributes mostly to production, the coastal fishery category makes a greater contribution to total employment. It provides a high number of low-paid jobs and is socially the most important branch of the Greek fisheries sector.

TABLE XI  
ZONAL EMPLOYMENT BY AGE GROUP, IN 1988

Zones	Total Country									
			Age Groups							
	Total	%	14-24	%	25-44	%	45-64	%	over 65	%
A	11219 100	28,5	1061 9,4	30,0	5287 47,1	31,7	4258 38,0	26,5	613 5,5	19,7
B	5680 100	14,4	519 9,2	14,7	2142 37,7	12,8	2552 44,9	15,9	467 8,2	15,0
C	12699 100	32,2	1013 8,0	28,6	5383 42,4	32,3	5289 41,6	32,9	1014 8,0	32,7
D	4526 100	11,5	344 7,6	9,7	1693 37,4	10,1	1992 44,0	12,4	497 11,0	16,0
E	4674 100	11,9	565 12,1	16,0	2020 43,2	12,1	1669 35,7	10,4	420 9,0	13,5
Inland waters	599	1,5	37	1,0	168	1,0	229	1,9	95	3,1
Total	39397 100	100	3539 9,0	100	16693 42,3	100	16059 40,8	100	3106 7,9	100

Source: Derived from the Fishery Census, 1988

Concerning division by age group Table X shows that, 9% of the total number of employees are under the age of 24, 42.3% are between 25 and 44 years old, 40.8% between 45 and 64 years old and only 7.9% are over 65 years old. Concerning the regional distribution of workers among the different fishery categories, over 90% of the total are involved in coastal fishery in the zones C, D and E, while in zones A and B 27% and 21%, respectively, are involved in medium fishery. This is attributed to the fact, that zones A and B are characterized by large urban centres with industrial expansion and fishery processing units. The zones which account for the highest level of employment in coastal fishery (C, D, E) happen to be the poorest in terms of industrial

infrastructure and trade activities, so that the alternative employment in the secondary sector becomes more difficult. The coastal population in the areas of Aegean islands (zones D and E) is heavily dependent on fisheries and ancillary activities. Fishery constitutes, often, the only viable economic activity since alternative employment opportunities are absent or strictly seasonal.

Social aspects: Depending on the socio-economic structures, coastal fisheries may be overlapping with lagoon aquaculture and sport fisheries. The income of coastal fishermen is generally low, in comparison to the income from other professional activities. There is lack of harmonization at a national level of medical care, pensioning and insurance systems. Fishermen are covered under three different social regimes, with regard to medical care, accidents and pensioning, depending on previous or other associated occupations, and on working status (employer or employee). Only few fishermen are covered by a collective agreement concerning salaries, working days at sea and health care. Pensions are generally low and are granted at an age over 60, depending on the insurance agent and other parameters.

### Income

The coastal fisheries, account for the highest product value, although the volume of production of the medium fisheries is greater. This is due to the fact that the prices of fish from coastal fisheries are much higher than those from the medium fisheries. That way, the gross product of the coastal fisheries amounts to 53,8% of the total for both categories. The product of the medium fisheries is 46,2% of the two categories and 41,5% of the total number of the sea fisheries categories (coastal, medium, Atlantic). Both the coastal and the medium fisheries account for 87,7% of the G.F.P., the Atlantic fisheries for 10% and the rest (inland water, lakes, lagoons, aquaculture) contribute 2.3% of the G.F.P.

Zone C accounts for 37.4% of the coastal fisheries product. Zones A and E follow, with 22.2% and 16% respectively. In the middle fisheries, Zone A prevails with 53.1%. It is followed by Zone B (22%), while the last place is occupied by Zone E (3.4%). Regarding the total of the coastal and middle fisheries product, by zone, Zone A prevails with 36.4% while Zones C (26.2%), B (17%) D (10.2%) and E (10.2%) follow. The majority of Atlantic fisheries product is registered in Piraeus of Zone A (95%), where, as it has been mentioned, the Atlantic fisheries firms are established. The remaining 5% is registered in zone C (Chania-Crete) where three ships are listed.

### 4.4 Framework of Analysis and Indicators

The contribution of the fishery sector into total country employment is 1.15% and when combined with related activities is 1.2%.

The contribution of gross fishery product into the country GDP is 0.87% and when combined with related activities is 0.95%. Zonal employment in the fisheries and related activities and GFP contribution to GDP is distributed as follows:

ZONE	A	B	C	D	E	Mainland
Employment in Fisheries (%)	0.82	2.2	1.2	3.4	5.8	2.1
GFP contribution to GDP (%)	0.85	1.9	0.82	3.1	3.01	-

It is clearly shown that zones D and E are highly dependent on fishery activities because the highest percentages are noticed, regarding the contribution of fisheries to the zonal employment and the contribution of Gross Fishery output to the zonal GDP.

#### 4.5 Alternative Employment Opportunities

Fishing may be a full-time occupation or may be developed in parallel to other professional activities. The degree of involvement to fisheries depends on the existence of alternative employment opportunities, and therefore differs among regions or among seasons. Fishing, may be the exclusive or main activity of fishermen in the poorest areas (Aegean and Ionian Islands, Peloponnese, Western Greece), because alternative activities in agriculture or other professional fields are limited or highly seasonal. Fishing is usually activated during the summer period, due to favourable weather conditions which permit longer stay at sea, and also because of the higher prices that products enjoy in the local markets.

#### 4.6 Zone Characterization - Integration with other Economic Activities

A summary characterization by zone is given in Tables XII and XIII.

TABLE XII  
CONTRIBUTION OF ZONES TO TOTAL SEA FISHERIES (%), 1988

	Total	A	B	C	D	E
<b>1. Fishing fleet</b>						
Coastal	95.9	90.4	94.3	96.0	97.9	98.3
Medium	3.7	7.8	5.7	1.8	1.9	1.7
Atlantic	0.4	1.8	-	0.1	-	-
Total	100	100	100	100	100	100
	100	21.5	15.8	39.7	13.1	9.9
<b>2. Employment</b>						
Coastal	80.6	59.6	78.6	92.5	89.5	92.5
Medium	15.5	27.3	21.4	7.2	10.5	7.5
Atlantic	3.9	13.1	-	0.3	-	-
Total	100	100	100	100	100	100
	100	28.9	14.5	32.5	11.8	12.2
<b>3. Gross product</b>						
Coastal	48.3	25.1	40.5	75.2	61.7	84.6
Medium	41.5	51.9	59.5	22.9	38.3	15.4
Atlantic	10.2	23.0	-	1.9	-	-
Total	100	100	100	100	100	100
	100	42.5	15.3	24.0	9.1	9.1

Source: Derived from Chapter 2, Table 4 and Chapter 4, Tables 11 & 12.

Table XIII  
Fisheries and Ancillary Activities Indicators - Year 1988

ZONE	General feature of the zone				Number of jobs in fisheries and related activities			Value Added of fisheries and related activities			Relative dependence			
	Total population	Total number of workers	G.D.P.*		Fishermen only	Other jobs	Total	Landings & first handling	Other activities	Total	In terms of jobs %		In economic terms %	
			Total	per capita							e/b	g/b	h/c	j/c
a	b	c	d=c/a	e	f	g=e+f	h	i	j=h+i	e/b	g/b	h/c	j/c	
A1 THESS/NIKIS	91,6	30,2	4.134,5	45,1	2,21	0,28	2,49	41,6	5,9	47,5	7,0	8,0	1,0	1,0
A1 CHALKIDIKIS	977,5	322,6	466,4	0,5	1,65	0,01	1,66	13,4	0,4	13,8	0,5	0,5	3,0	3,0
TOTAL A1	1.069,1	352,8	4.600,9	45,6	3,86	0,29	4,15	55,0	6,3	61,3	1,0	1,0	1,0	1,0
A2 KAVALAS	135,7	44,8	763,6	5,6	1,43	0,18	1,61	14,2	3,5	17,7	3,0	3,0	2,0	2,0
TOTAL A2	135,7	44,8	763,6	5,6	1,43	0,18	1,61	14,2	3,5	17,7	3,0	3,0	2,0	2,0
A3 ATTIKIS					5,81	0,09	5,9	12,9	2,5	15,4				
A3 PIREOS					0,0	0,08	0,08	63,1	1,0	64,1				
TOTAL A3	3.522,8	1.162,6	13.374,6	3,8	5,81	0,17	5,98	76,0	3,6	79,6	0,5	0,5	0,6	0,6
<b>TOTAL ZONE A</b>	<b>4.727,6</b>	<b>1.560,2</b>	<b>18.739,1</b>	<b>4,0</b>	<b>11,10</b>	<b>0,85</b>	<b>11,95</b>	<b>145,2</b>	<b>13,4</b>	<b>158,6</b>	<b>0,7</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>
B1 MAGNISIAS	197,6	67,2	713,5	3,6	1,96	0,16	2,12	15,0	1,6	16,6	3,0	3,0	2,0	2,0
TOTAL B1	197,6	67,2	713,5	3,6	1,96	0,16	2,12	15,0	1,6	16,6	3,0	3,0	2,0	2,0
B2 EVIAS	209,1	71,1	859,7	4,1	2,26	0,147	2,407	26,3	2,9	29,2	3,0	3,0	3,0	3,0
TOTAL B2	209,1	71,1	859,7	4,1	2,26	0,147	2,407	26,3	2,9	29,2	3,0	3,0	3,0	3,0
B3 AXAIAS	297,3	101,1	991,1	3,3	0,63	0,059	0,689	6,7	0,4	7,1	0,6	0,7	0,7	0,7
TOTAL B3	297,3	101,1	991,1	3,3	0,63	0,059	0,689	6,7	0,4	7,1	0,6	0,7	0,7	0,7
B4 EVROS	143,8	48,9	508,0	3,5	0,70	0,015	0,715	4,7	0,2	4,9	1,0	1,0	0,9	0,9
TOTAL B4	143,8	48,9	508,0	3,5	0,70	0,015	0,715	4,7	0,2	4,9	1,0	1,0	0,9	0,9
<b>TOTAL ZONE B</b>	<b>847,8</b>	<b>288,3</b>	<b>3.072,3</b>	<b>3,6</b>	<b>5,55</b>	<b>0,41</b>	<b>5,96</b>	<b>52,7</b>	<b>5,1</b>	<b>57,8</b>	<b>2,0</b>	<b>2,0</b>	<b>0,2</b>	<b>1,9</b>
C1 SERRON	191,9	71,9	523,6	2,7	0,04	0,01	0,05	0,4	0,0	0,4	0,1	0,07	0,08	0,07
TOTAL C1	191,9	71,9	523,6	2,7	0,04	0,01	0,05	0,4	0,0	0,4	0,1	0,07	0,08	0,07
C2 PIERIAS	116,8	43,7	372,0	3,2	0,63	0,01	0,64	3,2	0,0	3,2	1,0	1,0	0,9	0,9
C2 LARISSAS	269,3	100,9	835,0	3,1	0,16	0,007	0,167	0,3	0,0	0,3	0,2	0,1	0,03	0,03
C2 IMATHIAS	138,1	51,7	597,0	4,3	0,04	0,008	0,048	0,2	0,2	0,4	0,1	0,09	0,03	0,07
TOTAL C2	524,2	196,3	1.804,0	3,4	0,83	0,025	0,855	3,7	0,2	3,9	0,4	0,4	0,2	0,2
C3 BIOTIAS	134,0	50,2	1.323,8	9,9	0,23	1,029	1,259	0,5	0,3	0,8	0,5	2,0	0,04	0,06
C3 AITOL/NIAS	230,7	86,4	533,7	2,3	1,05	0,152	1,202	7,6	0,2	7,8	1,0	1,0	1,0	1,0
C3 FTHIOTIDAS	168,3	63,0	650,0	3,9	0,90	0,01	0,91	3,7	0,5	4,2	1,0	1,0	0,6	0,6

(continued)



Table XIII - continued

C3 FOKIDAS	43,9	16,4	1.015,2	23,1	0,37	0,00	0,37	0,7	0,0	0,7	2,0	2,0	0,07	0,07
TOTAL C3	576,9	216,0	3.522,7	6,1	2,55	1,191	3,741	12,5	1,0	13,5	1,0	2,0	0,3	0,4
C4 ARTAS	78,9	29,5	212,5	2,7	0,42	0,131	0,551	2,0	0,1	2,1	1,0	2,0	0,9	1,0
C4 THESPROTIAS	44,2	16,6	107,0	2,4	0,12	0,012	0,132	0,9	0,1	1,0	0,7	0,8	0,8	0,9
C4 PREVEZAS	58,9	22,1	159,8	2,7	0,38	0,022	0,402	1,6	0,9	2,5	2,0	2,0	1,0	1,0
TOTAL C4	182,0	68,2	479,3	2,6	0,92	0,185	1,105	4,5	1,1	5,6	1,0	2,8	0,9	1,0
C5 ARKADIAS	103,8	38,9	283,0	2,7	0,18	0,002	0,182	1,3	0,0	1,3	0,5	0,5	0,4	0,4
C5 LAKONIAS	94,9	35,5	265,1	2,8	0,80	0,008	0,808	2,7	0,0	2,7	2,0	2,0	1,0	1,0
C5 MESSINIAS	167,3	62,7	504,6	3,0	0,75	0,01	0,76	2,6	0,1	2,7	1,0	1,0	0,5	0,5
C5 KORINTHIAS	142,4	53,3	545,8	3,8	0,36	0,021	0,381	2,1	0,4	2,5	0,7	0,7	0,4	0,4
C5 ILIAS	174,0	65,2	476,5	2,7	0,33	0,01	0,34	2,2	0,1	2,3	0,5	0,5	0,5	0,5
C5 ARGOLIDAS	97,3	36,4	326,8	3,3	1,00	0,00	1,00	8,7	0,1	8,8	3,0	3,0	3,0	3,0
TOTAL C5	779,7	292,0	2.401,8	3,1	3,42	0,051	3,471	19,6	0,7	20,3	1,0	1,0	0,8	0,8
C6 LEYKADAS	20,9	7,8	70,2	3,3	0,56	0,007	0,567	3,3	0,1	3,4	7,0	7,0	5,0	5,0
C6 KEFALONIAS	32,3	12,1	93,8	2,9	0,44	0,055	0,495	1,8	0,8	2,6	4,0	4,0	2,0	3,0
C6 KERKYRAS	105,0	39,3	298,3	2,8	1,02	0,018	1,038	13,2	0,1	13,3	2,0	3,0	4,0	4,0
C6 ZAKYNTHOU	32,7	12,2	88,6	2,7	0,38	0,002	0,382	1,7	0,0	1,7	3,0	3,0	2,0	2,0
TOTAL C6	190,9	71,4	550,9	2,9	2,40	0,082	2,482	20,0	1,0	21,0	3,0	3,0	4,0	4,0
C7 CHANION	133,1	49,8	324,8	2,4	1,08	0,0	1,08	11,3	0,1	11,4	2,0	2,0	3,0	3,0
C7 LASITHIOU	70,8	26,5	208,6	2,9	0,62	0,001	0,621	5,2	0,0	5,2	2,0	2,0	2,0	2,0
C7 RETHYMNOU	69,3	25,9	153,6	2,2	0,14	0,005	0,145	2,1	0,0	2,1	0,5	0,5	1,0	1,0
C7 IRAKLIOU	263,9	98,8	660,5	2,5	0,47	0,00	0,47	3,4	0,2	3,6	0,5	0,5	0,5	0,5
TOTAL C7	537,1	201,0	1.347,5	2,5	2,31	0,006	2,316	22,0	0,3	22,3	1,0	1,0	2,0	2,0
TOTAL ZONE C	2.982,7	1.116,8	10.629,8	3,6	12,47	0,616	13,086	82,7	4,4	87,1	1,0	1,0	0,8	0,8
D1 RODOPIS	103,3	36,9	299,1	2,9	0,27	0,007	0,277	1,4	0,3	1,7	0,7	0,7	0,5	0,5
TOTAL D1	103,3	36,9	299,1	2,9	0,27	0,007	0,277	1,4	0,3	1,7	0,7	0,7	0,5	0,5
D2 XANTHIS	90,4	32,3	287,8	3,2	0,25	0,061	0,311	0,9	0,8	1,7	0,8	1,0	0,3	0,6
TOTAL D2	90,4	32,3	287,8	3,2	0,25	0,061	0,311	0,9	0,8	1,7	0,8	1,0	0,3	0,6
D3 LESVOS	103,7	37,0	242,0	2,3	2,08	0,03	2,11	9,5	0,8	10,3	6,0	6,0	4,0	4,0
TOTAL D3	103,7	37,0	242,0	2,3	2,08	0,03	2,11	9,5	0,8	10,3	6,0	6,0	4,0	4,0
D4 CHIOS	52,7	18,8	122,4	2,3	0,87	0,023	0,893	4,5	0,2	4,7	5,0	5,0	4,0	4,0
TOTAL D4	52,7	18,8	122,4	2,3	0,87	0,023	0,893	4,5	0,2	4,7	5,0	5,0	4,0	4,0
D5 SAMOS	41,8	14,9	113,4	2,7	1,05	0,0	1,05	13,9	0,1	14,0	7,0	7,0	10,0	10,0
TOTAL D5	41,8	14,9	113,4	2,7	1,05	0,0	1,05	13,9	0,1	14,0	7,0	7,0	10,0	10,0
TOTAL ZONE D	391,9	139,9	1.064,7	2,7	4,52	0,149	4,669	30,2	2,2	32,4	3,0	3,0	3,0	3,0
E1 CYCLADES	95,1	30,7	463,4	4,9	2,65	0,014	2,664	20,1	0,8	20,9	9,0	9,0	4,0	4,0
TOTAL E1	95,1	30,7	463,4	4,9	2,65	0,014	2,664	20,1	0,8	20,9	9,0	9,0	4,0	4,0
E2 DODEKANISOS	162,4	52,4	601,8	3,7	2,02	0,028	2,048	10,9	0,4	11,3	4,0	4,0	2,0	2,0
TOTAL E2	162,4	52,4	601,8	3,7	2,02	0,028	2,048	10,9	0,4	11,3	4,0	4,0	2,0	2,0
TOTAL ZONE E	257,5	83,1	1.065,2	4,1	4,70	0,058	4,758	31,0	1,2	32,2	6,0	6,0	3,0	3,0
Rest of Greece	1.054,9	386,1	4.682,7	4,4	1,44	0,194	1,634	-	3,6	3,6	0,4	0,4	-	0,1
TOTAL	10.262,4	3.574,4	39.253,8	3,8	39,78	2,277	42,057	341,8	29,9	371,7	1,0	1,0	0,9	1,0

- NOTES:
1. Population and job figures are expressed in ',000.
  2. Economic figures expressed in million ECU.
  3. Column (d) expressed in th. ECU.
  4. In Column (e) an additional number of 1440 people are included (see Chapter 4.3.1.1).
  5. "Other Jobs": Refer to aquaculture, processing, Fishing ports, wholesalers and Shipyards.
  6. Columns a and b refer to year 1991.
  7. Column f includes the number of wholesalers (see Table 14, Chapter 4, Main Report) in the zone totals.

Certain characteristics emerge with reference to each zone, which are listed below:

#### Zone A

- Major fishing harbours: Piraeus, Paloukia, Egina, Poros, Thessaloniki, Mihionia, N. Moudania, Potidea, Kavala.
- Major fishing ports: Piraeus, Thessaloniki, Kavala.
- This zone employs 29% of the total fisheries employment. The majority (59,6%) of the people employed is absorbed by the coastal fisheries, while 90% of vessels are classified under coastal fisheries. Also 27,3% of workers are employed in Medium fisheries and 13,1% in Atlantic.

The percentage of the total zonal fisheries employment in relation to the total employment is low (0,82%). Despite the fact that 29% of the total fisheries employment comes from zone A, only 0,77% of the total zonal labour force are classified as fishermen. The percentage of the zone gross product value of fisheries in relation to the total zone G.D.P. is 0,85%, the lowest among all zones (as that of the Zone C). The gross fisheries product of the zone coming from the medium fishery is 51,9% and the total gross fisheries product of the zone is the 42,5% of the country total. The people employed in this zone are relatively young in age since 47.1% of the total number employed belongs to the age group 25-44 years of age.

The main characteristic of this zone is its large urban centres which include large fishing harbours. There is developed industrial and commercial infrastructure and expanded ancillary activities which provide several options for alternative employment, in comparison to other zones. Aquaculture activities in this zone cannot be easily developed for geographical and environmental reasons.

#### Zone B

- Major fishing harbours: Volos, Skiathos, Skopelos, Alonissos, Chalkis, Kymi, Patra, Alexandroupoli
- Major fishing ports: Patra, Chalkis, Alexandroupoli

It should be pointed out, that 78,6% of the population employed in fisheries is absorbed by coastal fisheries, with a respective percentage in the fishing fleet (94,3%). Concerning the fishermen age, the group of 45 years and over prevails. The two Zones, A and B, account for the highest proportion of the total vessels and employment in medium fisheries. The characteristic of this zone is the existence of urban centres, surrounded by semi-urban or agricultural areas. This way, socio-economic activities are concentrated around these urban centres while the rest of the zone, in most cases, lacks infrastructure for fisheries or ancillary activities. Despite the above, the zone accounts for 14,5% of the total fisheries employment, while the percentage of the fishermen in relation to the total zone employment is 2.1%.

Furthermore, the gross fishery product of the zone is 15,3% of the country total, and the percentage of the G.F.P. in relation to the GDP of the zone is 1,9%. It appears that this zone depends upon fisheries more than Zones A and C.

It must also be pointed out, that in certain islands of this zone (i.e Sporades) the percentage of fishermen to total workers reaches 30% (Alonissos island). This zone has a low development level of aquaculture.

### Zone C

- Major fishing harbours: Preveza, Corfou, Lixouri, Ermioni, Tolo, Nafplio, Gythion, Kalamata, Methoni, Stilida, Chania, Rethymno, Iraclio, Ag. Nicolas.
- Major fishing ports: Messologhi, Preveza.

The characteristic of this zone is its large size, as it covers more than one third of the country.

The reason for grouping the different areas together and classifying them to this zone are: the absence of large organised urban centres, the absence of large industrial units, the existence of big islands where tourism flourishes and the dominant agricultural profile of the area. In this zone there are also certain districts (e.g. Serres, Imathia, Larissa, Arkadia) a small part of which, is attached with a coastline to the sea. It should be mentioned that this zone accounts for 37% of the total country fishing fleet, a fact which can be attributed to reasons previously explained, such as the relative large size of the zone and the existence of big islands.

This zone employs 32,5% of the total number of fishermen employed in the sector while the percentage of the fishermen employed in relation to the total employment of the zone is 1,2%. The 92,5% of the fishermen employed are absorbed by the coastal fisheries, while 96% of the vessels belong to the coastal fisheries. There is a ratio of around 2 people employed per vessel, which actually indicates the small scale of this coastal fishery as well as the family type of business. The gross product comes by 75,2% from coastal fishery and the total gross product of the zone is 24% of the country total. The percentage of the zone gross product of fisheries in relation to the total zone G.D.P. is 0,82%, the lowest among all zones. Agricultural and seasonal tourism are the two major types of alternative employment in this zone. The absence of industrial units, as well as of infrastructure and fisheries ancillary activities, reduces the possibilities of employment to the two types mentioned above.

However, this is the zone which offers opportunities for alternative employment in aquaculture as well. The geomorphological characteristics of this area create ideal conditions for trout farming, which actually represents 96% of the total country trout production, the most of which comes from Epirus region. So, the implementation of CFP in this zone should be directed to coastal fleet reduction.

### Zone D

This zone occupies the rest of Thrace and the North-Eastern Aegean islands.

- Major fishing harbours: Porto Lago, N. Peramos, Mytilini, Chios, Karlovassi.
- Fishing port: Chios

About 98% of its vessels belong to the coastal category, while 89,5% of the fishermen employed are absorbed by the coastal fisheries. This zone employs in total 11,8% of the total fishing population and accounts for 13% of the total fishing fleet. The percentage of total zone fisheries employment to the total zone employment is relative high (3,4%). In this zone advanced ages of fishermen are met, a fact that keeps pace with the age structure of total population. Also the percentage of the gross fisheries product of the zone in relation to the G.D.P. is 3,1%, which is rather high if we take into consideration, that in all previously mentioned zones this percentage was not higher than 1,9%.

Apart from certain areas of Thrace and a few islands like Mytilini and Samos which have some agricultural activities, the rest of the zone depends



almost exclusively on fishing. This zone is characterized by the absence of urban centres, it is a rather isolated area located at the eastern part of the country towards the border with Turkey and also includes a number of isolated islands of the eastern Aegean sea. The absence of organised infrastructure and fisheries ancillary activities, forces people to engage either with fishing and/or with agriculture whenever the physical conditions allow it. Seasonal employment in tourism occurs only in a few of the East Aegean islands and this mostly happens during July and August.

It therefore appears that alternative employment opportunities do not exist in the zone except very rare occasions.

### Zone E

This zone is comprised of about 30 islands scattered in the central and southern Aegean sea, known as the Cycladic and Dodekanissian islandic complex.

- Major fishing harbours of the zone are: Paros, Myconos, Kalymnos, Kos, Rhodes.

- There is only one fishing port, that of Kalimnos. Kalimnos island is also the main sponge fisheries centre. The fishing fleet of the zone is almost exclusively composed of coastal vessels (98,3%). The coastal fisheries employment as a result, absorbs 92,5% of the total fisheries employment in the zone. The zone employes 12,2% of the total fisheries labour force and accounts for 9.9% of the total fishing fleet. This percentage is quite high, taking into consideration the small size of the land area and population in comparison to the total of Greece. The age group 25-45 prevails among fishery sector employees in this zone, which has the highest percentage of young fishermen among all zones.

It appears that Zone E is highly dependent upon fisheries and more specifically upon coastal fisheries. The contribution of fishermen in relation to the total zone employment is 5,8%, the highest percentage among all zones. But the number of people actually involved in fishing, without any legal licence is much higher in practice. Alternatively, the zone gross product from fisheries in relation to the G.D.P. of the zone is almost 3%, again the highest contribution, among all zones. The major characteristic of this zone is the small isolated islands where there are no options for any industrial or other tertiary activity except seasonal tourism, and the opportunities for alternative employment are very low. Most of the registered population move towards the capital during winter and they return to their homeland after May, mostly to engage in tourism activities. In certain areas, total population during winter does not exceed a couple of hundred people who deal almost exclusively with fishing. There is a lack of infrastructure as well as of fisheries ancillary activities during winter and in the case of adverse weather conditions, many of those islands become isolated by sea for over a week. The expansion of aquaculture in this zone, faces a number of difficulties. In an effort to upgrade the socioeconomic environment of the region, there have been recently established a few fish farms which deal with sea bream/bass farming. They have shown some encouraging results up to now.

## 4.7 Trends

### Employment

From the following TABLE XIV one can observe the evolution of employment, by fisheries category, for the whole country. From this table, it is deduced that the number of those employed at sea fisheries and aquaculture is con-

tinuously increasing. In 1983, 26.756 persons were employed in fisheries and in 1990 their number increased to 37.336, (i.e. a rise of the order of 39.5%).

TABLE XIV  
EVOLUTION OF EMPLOYMENT BETWEEN 1983 AND 1990

Fisheries Categories	Year								Change 1990/1983 %
	1983	1984	1985	1986	1987	1988	1989	1990	
Coastal	20632	21477	22863	24465	25586	27615	28646	29097	41,0
Medium	5264	5410	5594	5846	6225	6549	6737	6657	26,5
Atlantic	860	936	1046	1058	1313	1516	1582	1582	84,0
Total sea fisheries	26756	27823	29503	31369	33124	35680	36965	37336	39,5
Aquaculture	202	192	238	338	388	395	657	1037	413

Source: Derived from A.B.G. data

### Income

TABLE XV presents the evolution of Gross Product Value of the fisheries, by zone, through the period 1983-90. These data are obtained from the A.B.G. and were the only available and most credible, even though inconsistencies might appear, for monitoring trends of fisheries gross income.

TABLES XV and XVI were derived from Table 21 in the Main Report and they present the evolution of gross product value by fishing category, by zone and for the whole country, in absolute and relative numbers.

In total, the compound growth rate of gross product value (in nominal values) during the seven year period, was 23.8% for coastal and medium fisheries together and 22.9% for the Atlantic fishery.

By zones, the gross product value increase was considerable in all fisheries categories.

The aforementioned significant increase of the gross product value in nominal terms is not due to the increase in fishing effort and amount of production but it is mostly due to the great increase of prices in all kinds of fish.

Table XV

Evolution of Gross Product Value between 1983 and 1990 (In mil dr)

Total country									
Fishery Categories	1983	1984	1985	1986	1987	1988	1989	1990	Compound growth rate* 1990/83
Coastal and Medium	21108,1	27033,9	36666,3	44617,6	53912,1	62934,8	69599,7	75857,3	23,8%
Atlantic	2690,0	3745,0	5800,0	6860,0	9320,0	10215,5	10379,4	9290,4	22,9%
Total sea fisberies	23798,1	30778,9	42466,3	51477,6	63232,1	73150,3	79979,1	85147,7	23,7%

Source: Table 21 of the Main Report

$$* r = \left[ \sqrt[N-1]{\frac{Y}{A}} - 1 \right] \times 100$$

where n = number of years  
 Y = 1990 value  
 A = 1983 value

Table XVI

Changes of Gross Product Value 1983-90, by Zone

Zones	Compound growth rate (%)		
	Coastal and Medium	Atlantic	Total
A	24,3	20,8	23,3
B	28,7	--	28,7
C	22,9	...	...
D	20,4	--	
E	21,4	--	23,6
TOTAL	23,8	22,9	23,7

Source: Derived from Table 21 of the Main Report.



## CHAPTER FIVE

### THE INSTITUTIONAL FRAMEWORK OF THE FISHERY SECTOR AT NATIONAL AND COMMUNITY LEVELS

#### 5.1 Policies in the Fisheries Sector

##### Aspects of the CFP

The Common Fisheries Policy came into being as a result of the transfer of power from the Member States to the Community for matters relating to fisheries. The policy is founded on Article 39 of the Treaty and came into effect since January the 25<sup>th</sup>, 1983. The Community has exercised its powers in the following areas: conservation and management of resources Council (Regulation EEC No 170/83), structural policy, market organization, research activities and fishing agreements with non-Community countries and among Member-States for fishery resource use.

The general directions of CFP in the next few years will be the following:

- (a) Close monitoring of access to resources by all member states. Adjustment of TACs to current biological requirements;
- (b) to reduce fishing capacity, by a more binding policy of structural planning, taking account of the different segments of the fleet;
- (c) to offset adverse socioeconomic effects by appropriate accompanying measures and to reorientate fishing activities while an attempt will also be made to promote a responsible attitude in all the parties concerned, at all levels;
- (d) monitor fishing more closely by introducing a licensing system, strengthening control mechanisms and deterrent penalties;
- (e) improve the synergy between the management of internal and external resources, market management and other supply sources;
- (f) improve the system of data collection and continue to encourage research into technical and market aspects of the sector, promote aquaculture further and
- (g) finally producer organization will be strengthened through various support measures in order to take up conservation/management of resources apart from the marketing of their products.

##### The New Multiannual Guidance Programme of the Greek Fishery, Sector 1992-1996

Since Greece's accession into the EEC three MGPs on the fishery sector have been prepared by the Ministry of Agriculture, concerning the periods 1983-86, 1987-91 and 1992-96. These programmes are supported by financial aid for the restructuring of the fishery sector (vessel construction, existing vessels modernization, experimental fishery explorations, joint ventures, temporary or permanent vessel withdrawal etc). Financial aid covers 50% of the investment cost in Greece, 10-30% is covered by the Greek state and the rest is the vessel owners' contribution (own capital or a bank loan through the A.B.G.). Greece's current structural policy, through the MGPs 1987-1991, followed the lines of the general EEC principle for the reduction of the fishing effort, 3% reduction in G.R.T. and a 2% fall in engine power. The discrepancy in the Greek MGP targets regarding fleet capacity and engine power appearing in this study and in OJ LGG of 14.3.90 is due to the fact that the first reflects the Greek administrative proposal and the second reflects the final

approval of EEC.

The difference lies in the different basis of calculations. The Greek Ministry of Agriculture submitted a MGP for the period 1987-91 in which a reduction of tonnage by about 3% over this period was envisaged, based on an initial assessment of 134.569 tons. However, EEC defined 137.761 tons as the initial tonnage of the period, while maintaining the same final target (130.946 tons), which led to the obligation for an overall reduction of capacity by 5% instead of 3%.

On similar grounds, Greece defined 502.467 KW as the initial engine power of the fleet, while EEC defined 568.823, which led to the obligation for an overall reduction of engine power by 13.2% instead of 2%.

The structural policy implemented in the EEC - member States, gradually allowed for the monitoring of the fishing effort without succeeding to balance out the existing resource stocks and the fishing effort. With the aim to achieve this balance, the Commission, by firm implementation of the MGPs conditions, refused its financial contribution to the fishery fleets renewal plans, to these countries which had not achieved the specified objectives. Greece was one of those countries, since its MGP of 1987-1991 was based on statistical estimates for the number of vessels, given that an official fishery fleet census was non-existent. This way, it was not possible to achieve the objective of the 1987-1991 MGP, as far as the reduction in total engine power of the vessels was concerned. At the same time, the Commission during the MGPs implementation has decided to establish a navigational register of all vessels, for all EEC member-states. No other corrective intervention actions were made, at the initiation of the structural Council regulation 4028/86 whose measures were extended to include small scale fishery too.

On the basis of the gained experience from the CFP implementation, essentially since 1971 and typically since 1983, the Commission prepared, in the context of the new MGPs, a complete structural approach aiming at the distinction of fishery fleets according to new parameters (fishing time, gear, electronic equipment etc) as well as old ones. It must be pointed out, that a team of experts, claimed that the total EEC fleet capacity should be reduced by 40% on average and this should be the objective of the new multiannual 1992-96. All member states as expected, reacted strongly to such a proposal which was never officially adopted. All the EEC member states had submitted their new MGPs by April 1991. The objectives of the new Greek MGP 1992-96 are: (a) reduction in the Atlantic fishery capacity (G.R.T) by 21.6% and in the coastal fishery by 6.3%, and (b) reduction in the engine power (K.W) of the Atlantic fishery fleet by 3.3% and of the coastal fishery fleet by 5.3% This is because the existing Atlantic fleet is underpowered and has uneconomic capacity. The MGPs provide reasons for a lower capacity fleet with the appropriate engine capacity per vessel. These are the official Administrative proposals.

The Ministry of Agriculture prepared a special programme which includes specific measures concerning coastal fishery vessels. The main objective of this programme is the reduction of the vessel numbers by 2500 within the next two years, the reduction of fishing effort by 8500 GRT and total engine power by 33894.7 KW. However, a large part of the lost capacity will be regained through the construction of larger, safer, modernized and more efficient vessels, which will allow healthy competitive market conditions to develop.

As far as medium fishery is concerned, no reduction is proposed under the new MGP and it is estimated that the following objectives will be achieved:

- More rational exploitation of fishery resources in Greek waters
- Energy saving and expansion of the fishery resource areas
- Diversification of part of the fleet into new types of fishing and underutilized fishery resource areas.

- Improvement of working conditions and the standard of living of fishermen.
- Improvements in the safety standards.
- Improvements in the quality of fish-products.
- Support measures for regional employment and development.

## 5.2 National Fisheries Policy

### Directions

Since Greece's accession into the EEC the national policy on the fisheries sector -conducted by the Ministry of Agriculture- is directed towards the achievement of unification and harmonization under the Community's C.F.P. This policy includes a number of concessional measures directed towards:

- (a) rational conservation/management of the available fishery resources provided that the financial viability of the sector's businesses is maintained intact;
- (b) structural improvement of the fishery sector aiming at the balanced exploitation of the country's fishery resources, the expansion of fishery resources and the increase in fishery capabilities and aquaculture;
- (c) the maintenance of a fair standard of living for the Greek producers through market stabilization and safeguarded supply of the raw material
- (d) the development and improvement of commercial networks as well as the fish processing methods of fishery and aquaculture products;
- (e) the preservation and development of fishery capabilities through third countries resource exploitation (bilateral agreements on EEC level or between Greece and other countries) in order to cover part of the deficiency of the Greek market in fish-products;
- (f) legislation for the maintenance of a healthy and rational competitive environment in the sector.

### Management

All professional fishery vessels, should have on the basis of current legislation fishing licences for the gear which they will be using, issued by the port authorities.

For the larger vessels (medium and Atlantic fishery) licences are issued by the Fishery Department of the Ministry of Agriculture. The port authorities keep two registers of the fishery fleet; one for the fisheries vessels whose capacity exceeds 10 GRT and another for smaller vessels. Some fishery ports, have a register where all vessels below 10 GRT are listed.

The conservation system is based on technical measures, concerning gear and fishing techniques, rather than on catch limits, control on discards and by-catches and mesh size regulations addressed to target species, upon which the Community fisheries conservation/management policy mostly relies. Direct techniques of stock assessment, such as the Virtual Population Analysis, and single-species management approaches, often do not find applicability, especially in the case of the numerous short-living species.

As most vessels operate in territorial waters, they are subject only to national regulations. There is a fairly wide range of regulations including closed areas for certain gear and restrictions concerning landing sizes. Mesh size regulations, exist for only some gear (e.g. trawls, purse-seines, beach-seines, small surrounding nets). Basic legislation is given by Law Decrees 420/70, 1740/87 and Presidential Decree 261/91.



There are several seasonal and geographical bans for the medium fisheries vessels. Demersal trawling is prohibited during the summer period (between 1 June and 30 September) throughout Greece. In some regions, the aforementioned ban can reach up to six or nine months. Trawling is also prohibited within the 1 mile zone from the coast, and in some regions the prohibitions extend to three miles. Some gulfs are permanently closed to the trawl fishery. Purse-seining is also subjected to seasonal and geographical restrictions resulting to underutilization of the vessels potential capacity. Pelagic trawling is not allowed at all. Sport-fishermen are subject to restrictions concerning the size of nets and number of hooks in the longlines they use.

It is the scope of the long-term management policy to abolish beach seiners, so no new licences for beach-seining have been issued since 1979. The existing vessels are not receiving national or Community financial aid for modernization, while strong incentives are offered for withdrawal or change of fishing activity to use more selective gear.

As regards the international legislative framework, Greece has not defined an Exclusive Economic Zone, and the conservation measures are applicable for fishing activities conducted in the territorial waters (6 miles). This prevents an effective management of shared resources. The problem is particularly acute in the case of fisheries of big pelagic species (swordfish and tunas), especially in view of the fact that vessels from countries not based in the Mediterranean are fishing there. Since there are no international agreements regulating catches and landing sizes, the stocks of these species do not receive adequate protection.

### **5.3 Relevant Programmes**

#### **Socioeconomic Pilot Programme of Pieria County**

In order to mitigate the adverse effects from the implementation of the "coastal fishery development by zone" a pilot scheme of social and economic measures was implemented in Pieria county. Under this plan, coastal fishermen, have been redeployed in other activities such as aquaculture, tourism etc. and compensated. The compensation consists of direct payment, if the fisherman withdraws from his profession, which is in addition to the payment that the fisherman will receive if he permanently withdraws his vessel. The amount of payment for vessel withdrawal depends on the vessel's age, capacity, etc. but in all cases exceeds 1.5 million dr.

#### **Fishery Harbour Ancillary Services**

As already mentioned 95% of the fishery fleet is made up of coastal fishery vessels which according to recent census information (30.9.91) numbers 18,770 vessels. Their length does not exceed 13m between the perpendiculars, but the majority is below 9m in length (in most cases between 3-5). It is also estimated that 13,000-14,000 coastal vessels do not have deck and have not measured their capacity. During winter they are pulled out of the sea in the absence of adequate harbours especially in the Aegean islands. In view of this situation, the ministry of Agriculture with EEC financial support, prepared a programme study, on a preliminary level, for fishery harbour construction, in a number of suitable regions throughout the country.

Each county submitted the results of the preliminary studies to the respective administrative authorities where the construction plans will be prepared and submitted for financing into the EEC or the Ministry of National Economy. The following table shows the number of fishing harbours and the



amounts approved for their construction, by administrative region.

Attica	4	budgeted for	147 million GDR		
N. Greece	7	budgeted for	593	"	"
W. Greece	18	budgeted for	1083	"	"
Crete	10	budgeted for	965	"	"
Aegean	10	budgeted for	452	"	"
	-----		-----		
	49		3240	"	"

Even though a few more fishing harbours will be constructed, apart from those shown above (through local authorities finance), the numbers will still be totally inadequate for the purpose of covering the basic needs of the majority of fishing vessels. In the absence of basic infrastructure, for vessel safety or ancillary services like ice, cold storage, etc a significant reduction in the duration of employment of coastal fishermen results.

The Ministry of Agriculture, attempting to reduce the deficit in fish-products in the domestic markets and to contribute to the development of the sector, has already submitted proposals to the Ministry of National Economy. The development plan of the Aegean islands into context of, for the construction of fishery harbours based on existing studies. In addition, the Ministry of Agriculture has submitted to the EEC, in the context of the special sectoral programme, a "Programme for fishing harbour ancillary services". In this programme, aid is provided to private investors who will take up the construction and operation of ancillary services throughout the country's harbours. These ancillary services include: auction rooms, cooling cabins, ice-factories etc. The significance of such services is obvious and it is believed that their contribution to production increases and coastal fishermen income will be considerable.

## CHAPTER SIX

### ALTERNATIVE EMPLOYMENT AND SUPPORT MEASURES FOR TARGET POPULATIONS

#### 6.1 Identification of Opportunities for Alternative Employment in Affected Zones

As it has already been mentioned and shown in Chapter 4 the following points must be noted on alternative employment opportunities.

According to the view of the Ministry of Agriculture (Directorate for Fisheries) there should not be any reduction in medium fishery employment, because full time workers involved in it, depend exclusively on the income they earn from fishery and also because it is considered that the fleet capacity is in balance with available resources. However, the data presented in Chapter 2 show a considerable drop in production, over the period 1988-1990 by 20,000 tonnes. Nevertheless, employees are not willing or able to withdraw from the profession and engage in alternative employment. Their withdrawal from the profession could only come about, through natural retirement.

Alternative employment opportunities concerning coastal fishermen exist only in certain zones while in certain other zones fishermen dealing exclusively with fishing are faced with limited opportunities for alternative employment (Zone E).

By order of employment, zones C, A and B engage on average, 75% of the fishery labour force. From these zones, there is direct commuting to the main-

land where there are several alternative employment opportunities in industry, agriculture and commerce. Especially in zone C, where lagoons are located, employment opportunities related to fishery can be created. On the contrary, in zones D and E alternative employment opportunities are negligible and mainly seasonal (like tourism). Furthermore, zone D is isolated, without any infrastructure and the State takes actions to maintain population at its present level. In addition, zone E has the largest proportion of young fishermen (12.5% of fishermen falls within the 14-24 age group) of all zones. It appears, that the issue of alternative employment has immensely important social dimensions. Zones D and E are highly dependent on fisheries and its ancillary activities, since they register the highest percentage of employment in the fishery sector and the highest proportion of total income coming from fishery. Furthermore, a large part of the population are sailors by tradition.

## **CHAPTER SEVEN**

### **CONCLUSIONS AND RECOMMENDATIONS**

On the basis of the aforementioned, our preliminary proposals aim at increasing Greek fishery production while rationally conserving and managing fisheries resources. Furthermore, the objective is to investigate the opportunities for training and reconversion operations.

Better utilization of current fishery production. The discarded amount of catches which occurs because they are of low commercial value should be considerably reduced. It can be limited through the development of processing, fish-meal production and the change in Greek consumer preferences. For the effective implementation of the proposal, a number of prerequisites are necessary such as: formation of producer organisations, improvements in marketing conditions, subsidies on the discarded catches and the establishment of more cold storage units in fishery harbours or medium fishery vessels. In order for this objective to be achieved, fishermen should be organized in producer groups which will take up, concentration and the marketing of these products (fresh and processed).

Increase in fishery production. It can be obtained through developing new fishery activities. Though the in-depth extension of trawler fishery resources or the use of other gear such as net long liners etc. mainly in very deep waters. This is due to the absence of experience on the part of Greek fishermen or know how. The continuous increase in the fishery of migratory pelagic and demersal species, during the last decade, has significantly contributed to the exploitation of a new fishery resource and an increase in the income of Greek fishermen. This type of fishing should be encouraged by the State to the extent that no permanent damage will be caused to the fishery resources. Through the extension of fishery resources (Zones C,D,E) we can also achieve fishery production increases. Favourable fishing opportunities for tuna and swordfish exist, which can be further exploited in the frame of re-orientation operations.

Reduction of production cost. This can be achieved through more efficient production, either through the development of fishery vessels equipped with different fishery gear, which will allow them to work all year round, or through the encouragement of professional organizations.

Improvements in the statistical fishery data collection system. A necessary prerequisite in the context of the common Mediterranean fishery policy is the development of an adequate statistical system. The sound statistical system is prerequisite for evaluation of the impact of policy options that lead to informed decisions.

Development of fishery research. Greece's accession into the EEC contributed to the development of fishery research within the context of Community needs and priorities which financed various projects. However, it is necessary to develop research at the national level based on the following: (a) development of new methodologies to study the dynamics of fish-populations. (b) development of a flexible system of fishery data collection. (c) development of new fishery gear or adapting the existing one to modern technological demands.

Compensation. It appears that the reduction in the number of vessels will lead to substantial reductions in the number of employees. Measures therefore are required, so that fishermen will get sufficient compensation for their withdrawal from fisheries. In order for the measures to be effective and attract the interest of the redundant fishermen two lines of action should be followed. One concerns financial provisions in the form of compensation paid to vessel owners on withdrawal and the other reconversion measures.

Redeployment. As far as reconversion measures are concerned, unskilled labour should be at the centre of any relevant programme because they cannot be easily engaged elsewhere. On the contrary, skilled personnel (captains, engineers) can more easily be absorbed by related sectors, such as merchant navy for instance. Regional studies should be undertaken, where reconversion opportunities for unskilled labour will be investigated, so that professional training is of immediate effect. Relevant programmes are financed by the State and the EEC such as the Mediterranean Integrated Programmes (MIPs). Redeployment opportunities exist in agriculture and animal-breeding, tourism, merchant navy, industry, the tertiary sector as well as mariculture and lagoon cultivation. The Labour Exchange Organisation of Greece subsidises professional training in all the above mentioned sectors. Furthermore, the Greek Productivity Centre (EL.KE.P.A.), the A.B.G. and the regional fishery authorities as well as some local authorities, also contribute. A greater need for reconversion measures exists in Zones C, D and E which do not include large urban centres where alternative employment opportunities can be easily found. More specifically, with reference to aquaculture and lagoons the following must be noted. Employment opportunities exist in aquaculture (especially mariculture) and lagoon cultivation. Fishing, by nature, is closely connected to aquaculture and lagoons that is why professional training of fishermen absorbed by the two subsectors should receive special attention.

Training for lagoon cultivation would only be effective when undertaken in areas covered by lagoons and should involve rational lagoon cultivation within short time period, management of capital intensive units of VALLICULTURA type, or combination of lagoons with semi-intensive and intensive to a small extent aquaculture units. Professional training of young people should include a special course lasting between 6 months to 2 years. At least four months, out of this period, should be spent on practical training. Zones C and D are the most suitable for the relevant training which can be taken up by the Institute of Marine Biology of Crete (I.M.B.C.) as well as the training centre of the Agricultural Bank of Greece (A.B.G.).

Aquaculture of water organisms offer great employment opportunities in all zones. Depending on the physicochemical, hydrobiological and morphological conditions of coastal areas, various aspects of aquaculture can be developed by region. Employment opportunities in shellfish farming are rather restricted to areas where environmental conditions allow it. Technical training for mussel farming, which enjoy high market prices and are mainly exported should also be undertaken. The relevant zones by order of suitability are: Zone C, D, B and A. Fishermen of all ages, withdrawn from fishery could engage in shellfish farming. In the development of mariculture, which has recently appeared

there are great employment opportunities for withdrawn fishermen from their profession. This subsector, is expected to grow even further in the years to come and also include other water fish farming, apart from sea-bass/bream, when new technologies create favourable conditions.

Fish farming units involve high construction cost. So professional training should be accompanied with financial provisions in order for the desirable results to be achieved. It is well known, that these units require high investment expenditure but offer considerably high profit margins and that is why -as already mentioned-businessmen are mainly involved. By order of significance, zones C, D, E and B can all develop healthy and viable aquaculture units. Professional training could be taken up by the Institute of Marine Biology of Crete, the Agricultural Bank of Greece and the National Marine Research Centre. With reference to employment opportunities of fishermen in the island of kalymnos, the most important sponge fishery centre, which has already developed mariculture, employes fishermen specialised in scuba diving. Professional training and reconversion should be based on careful planning and specific age prerequisites. Inland water employment opportunities are limited. It must be pointed out that over 45% of the labour force engaged in the fishery sector is over 45 years of age and within the next 15 years are expected to enter retirement.



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ANNEX 1

COLD STORAGE CAPACITY BY FISHING PORT

a) <u>Piraeus fishing port- Zone A.</u>	
-35 chambers for preservation of frozen fisheries products	: 17,975m <sup>3</sup>
-2 chambers for fresh fisheries	: 308m <sup>3</sup>
-1 deep freeze tunnel	: 392m <sup>3</sup>
-1 ice preservation chamber	: 88m <sup>3</sup>
-total volume of antechambers	: 3,416m <sup>3</sup>
Total cold storage capacity	: 22,179m <sup>3</sup>
b) <u>Thessaloniki fishing port -ZONE A</u>	
-8 chambers for preservation of frozen fisheries products	: 4,468m <sup>3</sup>
-2 chambers for fresh fisheries products	: 396m <sup>3</sup>
-1 ice preservation chamber	: 323m <sup>3</sup>
-1 deep freeze tunnel	: 250m <sup>3</sup>
- total volume of antechambers	: 857m <sup>3</sup>
Total cold storage capacity	: 6,294m <sup>3</sup>
c) <u>Kavala fishing port -ZONE A</u>	
-9 chambers for preservation of frozen fisheries products	: 2,188m <sup>3</sup>
-2 chambers for fresh fisheries products	: 575m <sup>3</sup>
-1 deep freeze tunnel	: 316m <sup>3</sup>
-total volume of antechambers	: 382m <sup>3</sup>
Total cold storage capacity	: 3.411m <sup>3</sup>
d) <u>Patras fishing port - ZONE B</u>	
-4 chambers for the preservation of frozen fisheries products	: 1,519m <sup>3</sup>
-2 chambers for fresh fisheries products	: 365m <sup>3</sup>
-1 deep freeze tunnel	: 197m <sup>3</sup>
-Total volume of antechambers	: 140m <sup>3</sup>
Total cold storage capacity	: 2,221m <sup>3</sup>
e) <u>Chalkis fishing port - ZONE B</u>	
-2 chambers for preservation of frozen fisheries products	: 542m <sup>3</sup>
-2 chambers for fresh fisheries products	: 450m <sup>3</sup>
Total cold storage capacity	: 992m <sup>3</sup>
f) <u>Alexandroupoli fishing port - ZONE B</u>	
- 1 chamber for fresh fisheries products	: 80m <sup>3</sup>
- 1 chamber for ice preservation	: 72m <sup>3</sup>
Total cold storage	: 152m <sup>3</sup>
g) <u>Messologhi fishing port -ZONE C</u>	
2 chambers for preservation of fresh fisheries products and 1 chamber for frozen fisheries products, the total cold storage capacity of which reaches the 300m <sup>3</sup> . It is approximately 100m <sup>3</sup> each section.	
h) <u>Preveza fishing port - ZONE C</u>	
2 chambers for fresh fisheries products	: 53.5m <sup>3</sup>
- 1 chamber for ice preservation	: 31.7m <sup>3</sup>
Total cold storage capacity	: 85.2m <sup>3</sup>

i) Chios fishing port - ZONE D

-1 chamber for preservation of fresh fisheries products	:	80m <sup>3</sup>
-1 ice preservation chamber	:	87m <sup>3</sup>
Total cold storage capacity	:	167m <sup>3</sup>

j) Kalymnos fishing port - ZONE E

This is a quite new fishing port which actually started operating in April 1989.

- 1 chamber for preservation of frozen fisheries products	:	40m <sup>3</sup>
- 1 chamber for fresh fisheries products	:	100m <sup>3</sup>
- 1 chamber for ice preservation	:	30m <sup>3</sup>
Total cold storage capacity	:	170m <sup>3</sup>

Apart from the above mentioned, regarding the cold storage units of the fishing ports, it should be added that all the fishing ports except the Peraeus one in Zone A, have their own ice production units (ice towers) with an average daily capacity 17.5 tonnes of ice each.