

THE MESSOLONGHI-ETOLICO LAGOON OF GREECE: SOCIO-ECONOMIC AND ECOLOGICAL INTER-
ACTIONS OF COOPERATIVE AND INDEPENDENT FISHERMEN

LA LAGUNE MESSOLONGHI-ETOLICO DE GRECE: INTERACTIONS SOCIOLOGIQUES, ECONOMIQUES ET
ECOLOGIQUES DES COOPERATIVES ET DES PECHEURS INDEPENDANTS

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CONTENTS

	<u>Page</u>
TRACT/RESUME	522
INTRODUCTION	523
1.1 State of Fisheries and Aquaculture in Greece	523
PHYSICO-CHEMICAL CHARACTERISTICS AND FISHERIES	523
2.1 Characteristics of the Lagoon	523
2.2 Exploitation of the Lagoon	523
2.3 Fishery Yields	525
INTERACTIONS OF AQUACULTURE AND CAPTURE FISHERIES	525
3.1 Legal Aspects of the Exploitation	525
3.2 Cooperatives	526
3.3 Independent Fishermen	526
3.4 Sociological and Economic Interactions	526
3.5 Ecological Interactions	527
PROPOSED MANAGEMENT STRATEGIES	527

ABSTRACT

In spite of its long coastline, it is not possible for Greece to increase fish production by a more intensive exploitation of the fishing grounds of the open-sea. In contrast, the development of Greece's inland waters and especially lagoons, could contribute considerably to fish production.

The largest and the most important lagoon in the country is the lagoon of Messolongi-Etolico. However, the competition between the two groups of fishermen involved in the exploitation of the lagoon creates several socio-economic and ecological problems, inhibits development and causes yield to remain at a low level. The interactions and conflicts between the cooperatives and the independent fishermen will not stop until all fishermen become cooperative members. In addition, by taking advantage of the large quantities of fry and fingerlings which could be caught alive in fish traps, the cooperatives could increase the lagoon's production and therefore their incomes by developing intensive fish-rearing units.

RESUME

Malgré la longueur de ses côtes, la Grèce ne peut pas accroître sa production de poisson par une exploitation plus intensive des fonds de pêche au large, par contre, elle pourrait le faire - et ceci, de manière considérable - si elle exploitait ses eaux intérieures et particulièrement ses lagunes.

La lagune la plus vaste et la plus importante du pays est celle de Messolonghi-Etolico mais, la concurrence qui existe entre les deux groupes de pêcheurs qui l'exploitent pose plusieurs problèmes socio-économiques et écologiques, freine le développement et maintient les rendements à un faible niveau. Les interactions et les conflits entre les coopératives et les pêcheurs indépendants ne cesseront que lorsque tous les pêcheurs deviendront membres des coopératives. En outre, grâce aux grandes quantités de frai et de fingerlings qui pourraient être capturés vivants dans des pièges, les coopératives pourraient accroître la production de la lagune et de ce fait leur revenu, en installant des unités d'élevage intensif de poisson.

INTRODUCTION

State of Fisheries and Aquaculture in Greece

Despite the fact that Greece has a long coastline (15 000 km) and excellent climatic conditions, the fishing grounds distributed along its coast are poor and the demersal species are regarded as heavily fished. The total fish production, according to official statistics for 1981, was 115 081 t, and about 45 000 t of fish were imported from abroad.

Per caput consumption of fishery products in Greece is about 18.5 kg/yr with a strong preference for marine species. On the whole, there is a low probability of increased catches of demersal species from wild stocks. Therefore, it is likely that the demand will continue to exceed the supply, resulting in high prices.

Inland waters (lagoons, lakes, rivers, etc.) cover approximately 210 000 ha. There are 11 lagoons with a total area of 55 000 ha producing at least 5-6 000 t/yr of high quality fish.

Intensive fish culture is limited to trout farming. There are 104 trout farms which produce about 2 214 t/yr. During the last 2-3 years work has started on the rearing of sea-bass and sea-bream in cages.

Professional fishermen in Greece number approximately 25 000 and an additional 10 000 in related fields. In inland waters about 2 500 fishermen are employed; one half of them are members of cooperatives.

PHYSICO-CHEMICAL CHARACTERISTICS AND FISHERIES

Characteristics of the Lagoon

The lagoon of Messolonghi-Etolico is situated in the north part of Patraikos Gulf, on the west coast of Central Greece. It is a shallow area of 16 500 ha between the mouths of the Evinos and Acheloos Rivers, the sediments of which have formed the lagoon (Fig. 1). It is considered to be the largest and the most important Greek lagoon.

The Etolico lagoon is about 1 750 ha and has a maximum depth of 30 m. The Messolonghi lagoon covers an area of 14 750 ha with an average depth of 0.45 m and a maximum depth of 55 m. The seaward side of the lagoon is formed by a chain of small islands.

An important section of the Messolonghi Lagoon is the Klissova Lagoon (2 650 ha) which was separated from the main lagoon by the construction of a road in 1885. Up to 1950 there was no other significant physical change in the lagoon. However, from 1950 up to 1980 many changes occurred in most instances resulting in great damage to the lagoon's ecosystem.

Reclaiming the lagoon for agriculture has been seriously considered, and a pilot project of drying 242 ha was carried out by a Dutch company in 1952. Subsequently, these areas were abandoned, but a number of unscheduled modifications to benefit agriculture, irrigation and salt production were carried out. After the above-mentioned changes were completed, the fishing grounds of the lagoon were limited to an area of 10 500 ha.

With reference to the main physico-chemical parameters of the lagoon, the average annual air temperature is 18-19°C (maximum 40.5°C, minimum -5.2°C). The temperature of the lagoon water is 12-28°C, the rainfall is 737 mm/yr, pH is about 8.0, dissolved oxygen is 7.8-11.0 mg/l, and salinity 2.7-88.5‰.

Exploitation of the Lagoon

The lagoon is the property of the Greek State. The area across the lagoon mouth is divided out to 11 fishermen's cooperatives. The members of the cooperatives close off the mouth of the lagoon with fences and set fish traps there. The unleased area of the

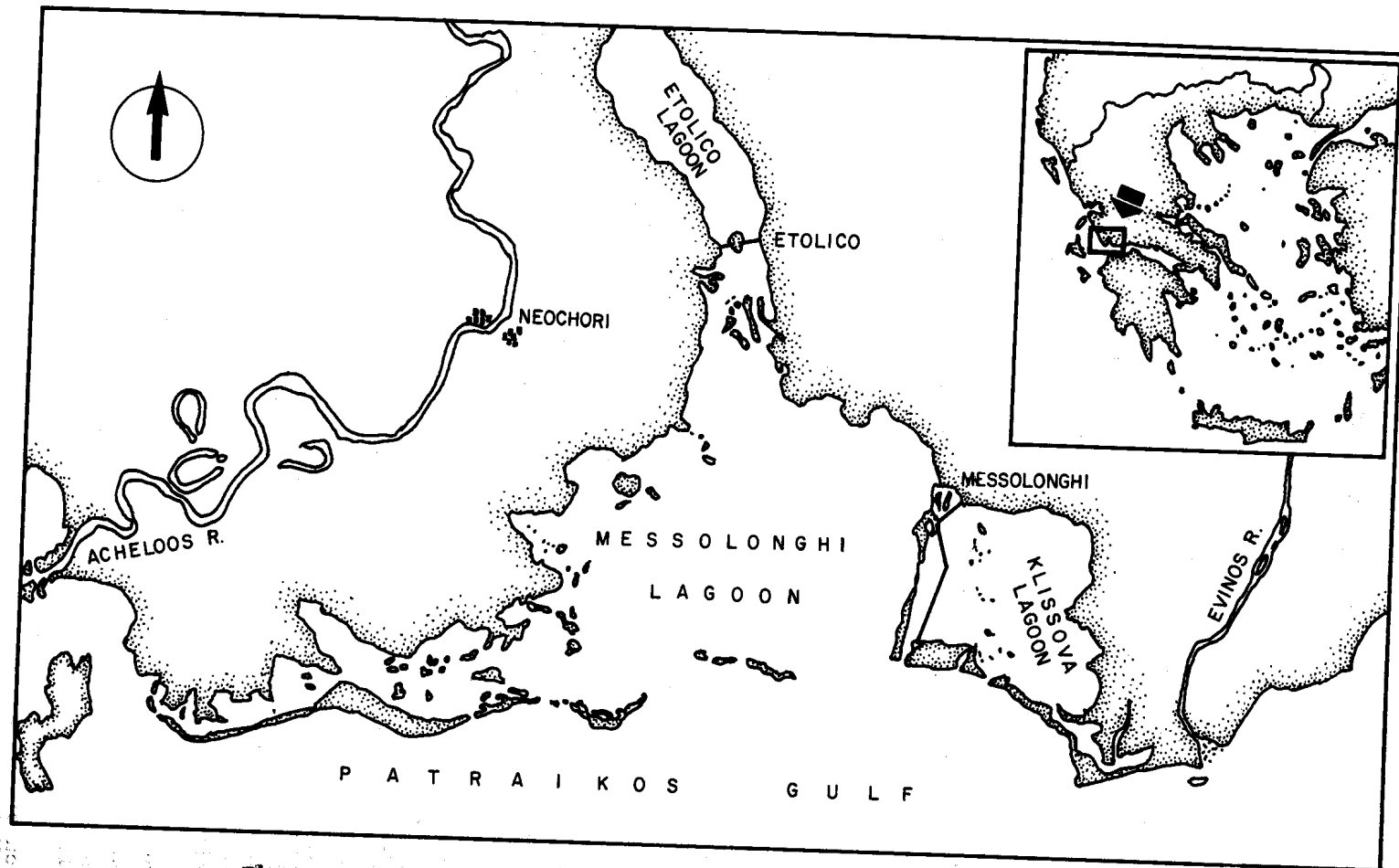


Figure 1 The lagoon of Messolonghi-Etolico. Scale 1:200 000

lagoon is used by the so-called "independent fishermen" who fish mainly with spears and lights.

The traditional form of fishing known as "lagoon culture" is practised. Fish enter the lagoon in the spring, grow during the summer on natural feeds and are trapped when they attempt to return to the sea in autumn. All are sold regardless of size.

3 Fishery Yields

There are no reliable data regarding the fish yield of the lagoon. A tax of 25 percent is imposed on the gross value of the catch which encourages the cooperatives to declare a much less than actual catch. The independent fishermen, although they are not taxed, are widely dispersed, and this makes the collection of statistical data difficult. It is estimated that the total production before 1960 varied from 1 500 to 2 000 t/yr. The present production is estimated to be in the region of 1 300-1 500 t/yr with the following proportions of the different species in the total catch:

	<u>%</u>
Mulletts	45
Sea-bream	25
Sea-bass	8
Eel	15
Other species	7

Approximately, 70 percent of these fish are caught by the cooperatives and the remainder is caught by the independent fishermen.

INTERACTIONS AMONG THE FISHERIES

1 Legal Aspects of Exploitation and Regulations

In general, the legal aspects governing the exploitation of the lagoon are as follows:

- a) The governor of the province has the right to lease out part or the whole of the lagoon to cooperatives or businessmen for a maximum period of 10 years.
- b) The lagoon is under the supervision of the Ministry of Agriculture.
- c) The cooperatives have to pay 25 percent of the gross value of the catch. The businessmen pay a fixed amount of money per year.
- d) The local councils of Messolonghi, Etolico and Neochori get most of the income.
- e) For leased areas the fishing gears are defined in the written contracts.
- f) Fishing rights on the unleased fishing grounds of the lagoon, on a no-fee basis, are for fishermen residents of Messolonghi, Etolico and Neochori, the so-called independent fishermen. This right does not extend to members of cooperatives who are lease holders.
- g) The independent fishermen can use only non-motor-powered boats and they can fish with long-lines and spears without lights throughout the year. Fishing with spears and lights is restricted to the period from the beginning of November to the end of March.
- h) Fishing of any kind is not permitted within a zone of 500-1 000 m from the mouth of the lagoon toward Patraikos Gulf. For trawlers this zone is wider.

3.2 Cooperatives

As indicated above, the exploitation of the lagoon is carried out by the cooperative. This fishery is limited to the 12.5 km-wide mouth of the lagoon, with the area leased out to the cooperatives thus 12.5 km in length and 350 m in width. Until 1959 most of this area was leased out to businessmen who employed fishermen from Messolonghi and Etolico as workers.

In 1960, with the assistance of the government, the exploitation of the whole lagoon was undertaken by a single, large cooperative made up of 600 members which included all the fishermen of the area. This original idea faced many difficulties due to the fact that the local fishermen were unused to the idea of collective work. As a consequence, the cooperative was terminated in 1966 leaving behind a large debt. Immediately after 1966 many small cooperatives were established having from 8 to 60 members each, and today 11 of them are involved in the exploitation of the lagoon. The leases issued for lagoon exploitation up until 1980 were for a 5-year period, but since 1981 the period of the lease has been extended to 10 years. According to the membership lists of these 11 cooperatives there are 215 members in total, but actually there are not more than 170.

3.3 Independent Fishermen

The independent fishermen of the Messolonghi-Etolico lagoon are well-known in Greece as well as outside the country as very skilful spear fishermen. There is a long tradition of spear fishing in this area, and in 1915 there were about one thousand independent fishermen. This number gradually decreased and today there are not more than 200 fishermen. As they do not belong to cooperatives, everyone is competing with everyone else. It is estimated that 30 percent of the total fish production of the lagoon is handled by these fishermen. About half of them want to become members of the cooperatives exploiting the mouth of the lagoon, but the rest of them are unwilling to do so.

3.4 Sociological and Economic Interactions

There is strong competition between the independent fishermen and the members of the cooperatives due to contrasting interests. This competition started in former times as a conflict between the "wealthy landlords" who leased out the mouth of the lagoon and the "poor fishermen". It has ended up today as a conflict between the two groups of fishermen.

In an effort to provide employment to all fishermen of the area and a better allocation of the income of the lagoon in 1960 the government established the single, large cooperative mentioned above. Unfortunately, this effort was a complete failure and any similar efforts in future do not appear promising.

After 1966 the government tried to keep the two groups of fishermen in balance through regulations concerning the exploitation of the lagoon. The success of this legal arrangement was limited.

The fishermen members of the cooperatives have to work hard for months every year to install the fences and the fish traps along the mouth of the lagoon. They have to live in small huts on the islands with low standards of living. They visit their families for only two or three days once every two weeks. In addition, they have large capital investments and running costs (fences, traps, petrol, etc.). For this reason they borrow money from the banks by mortgaging their property (e.g., houses). Apart from that, 25 percent of their gross income goes to the government as a lease fee.

Therefore, members of the cooperatives feel that the independent fishermen are only using the lagoon resources without making similar capital investments or efforts to develop the lagoon for fisheries. They also believe that their income is reduced by the competition from the independent fishermen in a rather unfair way. The conflict between these two groups often includes violence.

The cooperatives, on the other hand, are run in such a way that there are many points from the side of the independent fishermen. The most important argument is that most of the cooperatives are rather more like "closed clubs" than real cooperatives. Independent fishermen who tried to become cooperative members failed in their efforts though their qualifications were in accordance with the constitutions and regulations of the cooperatives. A possible explanation is that the fewer the members of a cooperative the higher the income for every member. The government tried to rectify this weakness and a minimum number of members for a cooperative was given by law. However, this has been overcome by the cooperatives by having their relatives and friends registered as members though they do not really work for the cooperatives. In this way the legality of the cooperatives is maintained and at the same time the number of the real members is kept to a minimum. As a consequence, some cooperative members became prosperous within a short period of time, and they used to have the power to influence decisions in favour of their interests. They also object to any changes of the "status quo" in the lagoon as they believe it will be against their interests and special privileges.

The independent fishermen have not established any cooperative and this is why they lack power. This is obvious from the fact that the spear is still their main fishing gear, they are not allowed to use motor-powered boats, although most of them have installed engines illegally. In general, they have low incomes which are rather unlikely to increase in the future from fishing. Many of them are now working in factories whereas others have a second job for additional income. It is estimated that half of them would like to be members of the cooperatives, but the rest do not like any organized form of employment. A minority over the last few years has started using nets as well as other forbidden fishing gears. Efforts of the authorities to restrict these activities have not been successful so far.

Ecological Interactions

The fact that the two groups of fishermen share the same stock of fish results in activities such as fishing close to the mouth of the lagoon, and the use of fences of very fine mesh, practices which have a rather serious ecological impact on the lagoon's resources.

The cooperatives use fences and fish traps of very fine mesh so as to make sure that no fish escape. This practice affects the speed of tidal currents as well as the circulation pattern of the area, and in turn, results in a slow renewal of the water of the lagoon. During the spring-time, in order to reduce the required expenses to a minimum, the cooperatives do not completely remove the fences from the mouth of the lagoon. These fences therefore considerably inhibit the lagoonward migration of the fish. In addition, by maintaining the fish traps beginning in May, along with the larger fish they catch considerable quantities of fry and fingerlings which die in the traps during summer time.

The independent fishermen fish legally or illegally during the spring-time close to the mouth of the lagoon and also inhibit the lagoonward migration of the fish.

PROPOSED MANAGEMENT STRATEGY

It is not the purpose of this report to give detailed management solutions for the interactions and conflicts between the two groups of fishermen. However, a few general points are mentioned below, expressing the author's personal opinion.

As long as the two groups of fishermen exist, they will continue to compete with negative impacts on both groups as mentioned above. Therefore, one of the two groups has to be absorbed by the other. Since the great bulk of the lagoon fishery is based on the activities of the cooperatives, it is obvious that all fishermen have to become cooperative members. Fishing rights should not be given to individuals.

It is estimated that 50 to 70 percent of the trapped fish are less than one year old and less than 100 g in weight. By using a double-trapping method of harvesting to separate large and small fish, and by carefully handling, most of the undersized fish could be

caught alive and returned to the lagoon, or better, grown to an adequate size by culture methods and sold when the demand is high. In the first case deep channels must be dug in the lagoon where the fish can over-winter. In the second case, the fishermen will have to gradually start intensive culture by growing fish to marketable size with different kinds of appropriate culture systems such as floating cages, fenced enclosures and earth ponds.