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Expert Consultation on Aquaculture  
Development in the Mediterranean  
Region convened by the Government  
of Greece in cooperation with FAO/GFCM  
and UNEP

Athens, 14 - 18 March 1978

IMPROVED USE OF THE LIVING RESOURCES  
OF THE MEDITERRANEAN

Note prepared by the Food and Agricultural Organization of the United Nations/  
General Fisheries Council for the Mediterranean (FAO/GFCM). This note has been  
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ANNEX II

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ANNEX II

IMPROVED USE OF THE LIVING RESOURCES OF THE MEDITERRANEAN<sup>1/</sup>

STATEMENT OF PROBLEM

1. Prior to 1940 the fishing yield in the Mediterranean and the Black Sea did not exceed 500 000 tons. During the fifties it rose to about 700 000 tons. By 1974 it reached a figure of 1 300 000 tons - of which 750 000 came from the Mediterranean and the rest from the Black Sea. But these catches represent only a very small proportion (little more than 1.5 percent) of the 70 million tons caught all over the world during that year. Their cash value, on the other hand, was proportionately much higher, since in 1974 it reached 700 million US dollars - i.e. about 5 percent of the value of the total world catch. The reason for this is the high price of Mediterranean fish (in all, five times the average world price - and seven times as much, if we exclude other forms than the demersal species, which are the most in demand) and the fact that the demand for bottom fish always exceeds supply.
2. Furthermore fishing in the Mediterranean has never lost its "artisan" character, so that it keeps a considerable amount of man-power employed both at sea and on land, and this gives an idea of the magnitude of this industry for the whole region. The Mediterranean may thus be considered one of the major regions of the world in terms of the social and economic importance of fisheries.
3. The consumption of fish in countries bordering the Mediterranean and the Black Sea rose from 2.7 to 3.7 million tons between 1960 and 1970, whilst the population increased from 265 to 308 million inhabitants. It is estimated that by 1985 the population will have reached 380 million and that the demand for fish will rise to 5.5 million tons.<sup>2/</sup>
4. The region's output of fish is not sufficient to meet the demand. At the present time, two thirds of fish consumed in the Mediterranean region come from other fishing areas, mainly from the Atlantic - partly because some of the countries (France, Morocco and Spain) also border the Atlantic where they yield most of their total catch and partly because a number of Mediterranean countries (Egypt, France, Greece, Israel, Italy and Spain) have ocean-going fleets; and also because imports account for a large proportion (about 15 percent) of the total consumption.

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<sup>1/</sup> This section on the "Improved use of the Living Resources of the Mediterranean" has been prepared by FAO-GFCM. Minor editing and presentation changes were brought in by UNEP Secretariat.

<sup>2/</sup> These figures refer to the total population of the coastal countries and their consumption, including those which also have a coastline on the Atlantic.

5. But these ocean-going fleets are running into even greater difficulties because most of the countries bordering the Atlantic are imposing strict limitations on the operation of foreign fleets fishing off their coasts, because the stocks which are easily exploitable are decreasing every year, and because the cost of operating these fleets is steadily increasing - notably as a consequence of the steep rise in the price of fuel - lessening the profitability of long-distance fishing fleets. Owners are thus led to reconsider the possibilities on concentrating on the Mediterranean itself.

## II. PROSPECTS OF DEVELOPING MEDITERRANEAN FISHERIES

### A. Present state of stocks

6. The General Fisheries Council for the Mediterranean (GFCM)<sup>3/</sup>, an inter-governmental body set up within the framework of FAO, keeps a regular check on stocks of both demersal and pelagic fish. This information provides the basis for the regulations on managing and planning the development of fisheries. Moreover it is the concern of the GFCM to increase fishing yield through conventional fishing as well as through aquaculture.
7. The most recent conclusions of its Working Party on Resource Appraisal and Fishery Statistics may be summarized as follows:
  - (a) Most demersal stocks distributed along the Northern coasts of the Mediterranean are considered as heavily fished. Consequently more benefit is to be expected from the introduction of regulatory measures suitable for maintaining yield and catch rates at high levels than from further intensification of fishing effort.
  - (b) In many places along the Southern coasts of the Mediterranean, particularly along the Western half, a moderate increase in the catch of demersal species seems possible. Still while prospects as to catch are far from being negligible as compared with current yield figures, they are modest in absolute terms.
  - (c) Coastal pelagic stocks can apparently be more intensively fished. They certainly offer the best prospects for fishery development. However, for certain localized fish stocks (particularly in the Northwestern part of the Mediterranean) there is some evidence of moderate, and occasionally intensive, fishing.

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<sup>3/</sup> The following Mediterranean coastal States are members of the GFCM : Algeria, Cyprus, Egypt, France, Greece, Israel, Lebanon, Libya, Malta, Monaco, Morocco, Spain, Syria, Tunisia, Turkey, Yugoslavia.

8. Marketing difficulties account to a fairly large extent for the lesser utilization of pelagic species; on one hand they are less popular than demersal fish; on the other hand they are only available seasonally. This therefore results in landing "peaks" and the consequent drop in prices paid to the fishermen. The distribution channels and processing industries have so far not been in a position to spread the landings over a wider period; therefore efforts should be made in this direction to enable both consumers and fishermen to better utilize the stocks of pelagic fish which are estimated at about one million tons.

B. Aquaculture

9. The Mediterranean possesses a considerable potential for developing aquaculture in brackish water; there is a long tradition of breeding fish and shell-fish, large and important tracts of water which could be utilized (as an estimated area of a million hectares), a propitious climate, and a large number of consumers nearby who much enjoy sea-food.
10. Under these conditions, aquaculture could on long terms produce several hundreds of thousands of tons of fish, shell-fish, and molluscs of high market value. There is, however, quite a number of limiting factors (competition for the use of coastal zones, research on intensive fish-culture, production of cheap feed for rearing, water pollution) which still impede the expansion of this operation to the full scale of possibilities offered by the Mediterranean.

PROPOSALS FOR AN IMPROVED USE OF THE LIVING RESOURCES OF THE MEDITERRANEAN

11. The problems involved in developing fisheries and aquaculture in the Mediterranean region are naturally a matter of concern in the first instance for each country, but nevertheless obviously require permanent, concerted action on a regional basis. In fact, stocks of fish do not respect national frontiers, and fishing fleets can move easily from one area to another. At the same time the marketing factors, whose importance for the optimum exploitation of pelagic stocks has already been noted, also have regional implications; and last but not least there are always the problems of marine environment degradation actual or potential. It is therefore imperative that problems of fisheries, which have so much in common between one country and another, should be tackled regionally. The GFCM is the obvious forum for such collaboration; most of the action resulting from this collaboration is decided by the Council and carried out under its auspices.

A. Development and management of resources available for fishery

(a) Introduction

12. To draft a policy for making the optimum use of resources available for fishing the first step is to collect and analyse data to evaluate the present condition of stocks, and then to take whatever steps this analysis may suggest.



13. The GFCM Working Party on Resources Appraisal and Fishery Statistics is devoting itself entirely to the first of these tasks. It submits its conclusions for scrutiny either to the GFCM itself or to its Committee on Resources Management. In this way these bodies can propose management measures, submit them to Member Governments for agreement, and supervise their implementation.
14. In this connexion it should be pointed out that at its Thirteenth Session, held in Rome from 28 June to 2 July 1976, the GFCM assumed new responsibilities, especially with regard to fisheries management. Under these new provisions the GFCM is now responsible for formulating, recommending and implementing appropriate measures for the conservation and rational management of resources (regulating gear and fishery methods, fixing the minimum size of fish caught, fixing periods and areas where fishing is permitted or forbidden, regulating catches and fishing effort, etc).

(b) Demersal resources

15. In February 1976 the GFCM Committee on Resource Management adopted a common text to serve as a general outline for drafting national legislation on the mesh-size and mounting of trawls; at the same time it recommended that trawls with a mesh opening of less than 40 mm be forbidden. This recommendation was sent to Members, who will in due course report to the Council on the steps they have taken to implement it.
16. This is only a first step, however, in limiting mesh-size which will have gradually to be adapted to the particular conditions of fishing in the Mediterranean.

(c) Pelagic resources

17. Two courses have here to be pursued simultaneously: to continue stocks assessment by analyzing statistical data (as indicated in (a) above) and by acoustic methods (which was the subject of a seminar organized in connexion with the Council's Thirteenth Session); to promote research on the use and marketing of pelagic species (which is being undertaken by a specialized working party of the GFCM).

(d) Effects of pollution on living resources and on fishery

18. We have as yet no formal proof that pollution has directly affected the size of stocks in the open sea. But it is impossible to deny the potential danger which threatens these resources as a consequence of the continuous and steadily growing inflow of toxic effluents into the Mediterranean, even if it is not yet possible to determine the exact point at which this will reach a seriously prejudicial, if not intolerable, degree. It is therefore advisable to keep a sharp eye on certain phenomena which are symptomatic of a deterioration of the environment at least momentary - for example, fish or shell-fish unfit for consumption due to cointing, spawning grounds abandoned by the fish, etc.

The four pilot projects on the monitoring of metals and pesticides in marine organisms and the effect of pollutants on marine populations and ecosystems, which FAO(GFCM) is carrying out within the framework of the UNEP Action Plan for the Mediterranean, will no doubt yield more precise and valuable information on this subject and provide bases for a more detailed survey of the effects of pollutants on stocks.<sup>4/</sup>

B. Development of aquaculture and Management of the coastal zones<sup>5/</sup>

19. The Mediterranean coastal zones are today subjected to numerous demands: urbanization, industrialization, tourism, agriculture, aquaculture are all competing for space on the land-sea interface and its utilization.
20. The management of these zones should be inter-disciplinary to facilitate the evaluation of advantages and drawbacks which may be expected to result from different ways of using this environment and thus to work out general plans and directives. The economic advantages which may accrue from each discipline must obviously be taken into account; but we do not as yet have all the economic social and ecological data to enable us to make a fair and correct evaluation of aquaculture against other activities whose profitability is better known. It would be helpful if this could be studied in some depth.

C. Technical and scientific aspects

21. Whereas most of the aquaculture techniques in the Mediterranean are of an extensive type, the development programmes of this industry are as usually based on methods of intensive culture. Although this latter option seems to yield a higher profit, it is nevertheless beset by complex problems: controlled breeding, critical phases in larvae rearing, suitable feed at low cost, epizootic diseases, etc. It is precisely the task of the Cooperative Programme of Research on Aquaculture, which was launched in 1970 within the framework of GFCM, to study these technical and scientific questions, and to spread this work among the thirty-odd Mediterranean institutes and laboratories participating in this programme.
22. However, this research implies lengthy, costly and highly complex experiments. They therefore lie outside the scope of some of the laboratories concerned - especially those in developing countries, although paradoxically the

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<sup>4/</sup>The four joint FAO(GFCM)/UNEP pilot projects referred to are:  
(a) Pilot Project on Baseline Studies and Monitoring of Metals particularly Mercury and Cadmium, in Marine Organisms; (b) Pilot Project on Baseline Studies and Monitoring of DDT, PCBs and other Chlorinated Hydrocarbons in Marine Organisms; (c) Pilot Project on Research on the Effects of Pollutants on Marine Organisms and their Populations, and (d) Pilot Project on Research on the Effects of Pollutants on Marine Communities and Ecosystems. The findings of two other UNEP projects namely a project on Land-based Sources of Pollution in the Mediterranean and a project on Marine Parks and Wetlands in the Mediterranean have direct relevance for fisheries resources management in the Mediterranean.

<sup>5/</sup>A separate paper on aquaculture is presented

economy of these very countries would reap the largest profit from an expansion of fishculture. This means that there is a very considerable problem of financial and technical support, for which some solution must be found, or otherwise long delays in the further progress of coordinated research on aquaculture will be encountered.