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APPRAISAL AND MANAGEMENT OF FISHERY RESOURCES:
SITUATION IN THE MEDITERRANEAN AND CFM ACTIVITIES IN THIS FIELD

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INTRODUCTION

The management of fishery resources is a difficult task everywhere, and particularly in the Mediterranean where moderate stock productivity has not facilitated the concentration of fishing and, in consequence, its study. As a rule, fishing units are small and scattered along the coast, whence short trips are made. The great variety of species caught (currently, for instance, more than 50 species of invertebrates are consumed) is a reflection of the diversity of the gear used. There are many unloading points, so that the amount of fish they handle is small.

This situation calls for a larger amount of data and complicates its collection. These difficulties explain, in part at least, why studies of stocks and fisheries are lagging; for example, in comparison with marine biology which has traditionally been studied actively in the Mediterranean or with fish biology in other regions of the world with similar resources, only moderate attention has, until recently, been devoted to this research work in the Mediterranean. For the same reasons, in many Mediterranean countries contacts and co-ordination between the profession and support structures, namely, fisheries research and fisheries administration have not been developed to the desired extent. In these circumstances, it is difficult to perceive what sort of management scheme is required, and this has the effect of increasing the risk of making a bad choice or of delaying timely decisions. In many respects, therefore, the sound utilization of the Mediterranean's fishery resources depends on better knowledge of its stocks and fisheries.

This is not the only reason for such research. The Mediterranean is used not only for fishing but also for other purposes, all of which will inevitably come into conflict with one another as activities in each sector are intensified. At present, the potentially most critical conflicts of interest tend to occur in the narrow land-sea interface where competition for the occupation and use of sites is most intense. Lagoons and coastal waters are traditional fishing grounds and are also essential to the reproduction and development of various natural stocks and indispensable for aquaculture, which shows promise of a great future in the Mediterranean. At present, these areas are being gradually reduced in size or impaired by marsh reclamation, reduced inflow of fresh water which is increasingly used upstream by industry and agriculture, bacterial contamination of household origin, the accumulation of toxic industrial products, of pesticides and of fertilizers leached out by rain. Here too, therefore, the approach to coastal management lies in an evaluation of the future use of the ecosystem, including fishing. In this respect, it should be borne in mind that evaluation of the impact of environmental deterioration on the stocks being exploited calls for information on the effects of fishing on such stocks.

IMPORTANCE OF FISHING IN THE MEDITERRANEAN

On the basis of the size of the catch (1.3 million tons in 1974), fishing in the Mediterranean would appear to be of relatively modest importance (2 per cent of world total). However, this figure by itself gives an inaccurate picture of the real importance of this activity. The high human population density - further increased by tourism in summer - that is typical of the coastal areas is responsible for heavy demand which local livestock production (including breeding) is incapable of satisfying. In 1970, for example, coastal countries - excluding the USSR - consumed 3.7 million tons of fish (or 5 per cent of world total), only one-quarter of which had been produced locally (sea and inland waters). Furthermore, as fish -

demersal ^{1/} at least - is traditionally regarded as a choice food in many countries, it is not surprising that it fetches record prices in those countries. In 1974, for example, the average Mediterranean price was several times greater than the world average. The result is that, in terms of the economic value of its fish (\$700 million, or 5 per cent of world total, in 1974), the Mediterranean is among the foremost regions of the world, most of which are better known for the abundance of their fish stocks.

It does not seem that there will be any fundamental change in this state of relative penury. According to available estimates, potential fishery resources of the traditional kind are between 1.5 and 2 million tons. (This estimate may, however, be revised upwards inasmuch as the development of extensive aquacultural techniques will make it possible considerably to increase output from the 1 million hectares of lagoons and brackish water in the Mediterranean). Although the above potential is between 15 and 50 per cent greater than the present catch, it is estimated on the basis of demographic and income growth trends that between now and 1985, demand will tend to grow in the same proportion. The chronic shortfall in livestock production in the areas bordering the Mediterranean serves to emphasize the importance of making full use of fishery resources.

Mediterranean fishing, which is largely artisanal, is a source of livelihood for large numbers of people. This social factor also adds to its importance. It is difficult to estimate the number of fishermen in the Mediterranean. In 1973, 160,000 fishermen were recorded in countries bordering only on the Mediterranean. To this figure must be added a proportion - unknown - of the 760,000 fishermen scattered throughout countries (Egypt, France, Israel, Morocco, Spain, USSR) bordering on another sea as well who work in the Mediterranean.

APPRAISAL OF RESOURCES

Appraisals made prior to 1970 were based on a very small number of stocks in a few isolated areas of the Mediterranean (Spanish sardine, for example). It was felt that the majority of stocks must have been intensely fished or even over-exploited, but, for lack of specialists and appropriate data (efforts to collect them regularly were the exception), practically no quantitative appraisal of the principal Mediterranean stocks was available.

The General Fisheries Council for the Mediterranean applied itself to remedying this situation by encouraging and co-ordinating national efforts in three main areas:

- (a) Fishery statistics: preparation and adoption of a regional system laying down standards [species justifying the collection of separate statistics, geographical divisions for the breakdown of data, nature of statistics to be collected (catch, boats and gear, etc.)] for the collection and centralization of fishery statistics and biological data.

This task was carried out by the Working Party on Fishery Statistics and Biological Sampling, which had been established by GFCM at its ninth session in December 1969, until its merger with the Working Party on Resources Appraisal

^{1/} The marketing of pelagic fish still raises problems in several countries, particularly in the north-western part of the Mediterranean.

and Exploitation in accordance with a decision taken by GFCM at its twelfth session in March 1972. One of the most tangible achievements in this sector was the preparation and publication, in 1976, of the first Statistical Bulletin giving the annual national catch (period 1964/74) by principal species and in respect of the eight geographical divisions of the Mediterranean and the Black Sea. This Bulletin represents the first stage in the constitution of the statistical file essential in appraisal work.

- (b) Appraisal of resources: Established in 1969 at the ninth session of GFCM, the Working Party on Resources Appraisal, which is composed of fishery biologists from the majority of Mediterranean countries, first showed that the total catch of most demersal stocks off European coasts had reached or had declined after reaching a maximum, whereas the size of fishing fleets was continuing to grow. Similar appraisals were then made in respect of various areas along the Asian and African coasts of the Mediterranean and, finally, in respect of coastal pelagic stocks (sardine, anchovy, sardinella, mackerel, etc.), although with less precision in this case. With all these appraisals it was possible to obtain, through extrapolation, an estimate of the total potential of demersal resources on the one hand and coastal pelagic resources on the other for the main areas of the Mediterranean and the Black Sea and for both seas as a whole. At the same time, in most countries, the members of the Working Party endeavoured - successfully in most cases - to bring about a strengthening of national programmes for the collection of statistics and assessment of stocks.

In addition to conventional assessment methods, based on the application of theories of population dynamics to the stocks exploited, the FAO (Fishery Resources and Environment Division) and GFCM tried to promote the use of acoustic methods for the direct assessment of biomasses. The UNDP 1/ /FAO fishery development projects in Algeria, Morocco, Tunisia and Turkey made a valuable contribution to these efforts by producing the first assessments of available pelagic resources in corresponding sectors of the Mediterranean. FAO and GFCM have also tried to promote the general adoption of such techniques by distributing specialized bibliographies and documentary material to interested Mediterranean laboratories, by participating in training seminars and by conducting a resource survey in the Adriatic in co-operation with Italy and Yugoslavia.

- (c) Training of stock assessment experts: It has already been noted that the existence of fishery biologists with a clear understanding of all problems connected with the evaluation of stocks and the effects of their exploitation determines the development of knowledge concerning stocks and fisheries. The Council had long drawn attention to a deficiency in this area and endeavoured to encourage the training of such experts. Three Mediterranean research workers participated in an intensive course organized by FAO with the assistance of the Danish Government (DANIDA) in Copenhagen in 1968. Subsequently, thanks to the contribution of the Government of the French Republic, FAO and the Centre national pour l'exploitation des océans (France) jointly organized two intensive courses at Brest (France). The first (summer 1973) was attended by 11 students from seven Mediterranean countries and by trainees from other regions; 12 trainees from six Mediterranean countries attended the second course, which was organized in a similar manner in August 1976. It appears that these courses have already done

much to strengthen national stock appraisal capabilities. In 1974, FAO also organized a course at Kelibia (Tunisia) on fishery biology methods which was attended by 16 Mediterranean research workers. Lastly, some of the region's research workers were able to attend courses organized by FAO in other regions on acoustic detection techniques.

STATUS OF FISHERIES AND MANAGEMENT PRIORITIES

In the report on its last meeting (November 1975), the Working Party on Resources Appraisal and Fishery Statistics took stock of the information collected on the extent and level of exploitation of the fishery resources of the Mediterranean and the Black Sea.

Most demersal stocks off European coasts - including those of the Black Sea - are regarded as intensively exploited. So far as they are concerned, therefore, better results are to be expected from the application of management measures calculated to maintain catches and yields at high levels rather than from more intensive fishing. A moderate increase in demersal catches should be possible locally in certain areas along the African coast, particularly the western half. Although these prospects are not negligible in comparison with current production figures they are nevertheless modest in absolute terms.

Quantitatively, prospects seem to be best for coastal pelagic stocks as a whole, but the development of their exploitation remains hampered by difficulties in marketing the product. The recent sudden increase in anchovy catches in the Black Sea confirms these general conclusions. Inasmuch as they are still less intensively exploited, their management needs may be said to be less than those of demersal stocks. Nevertheless, the rapid expansion of pelagic fishing in countries where arrangements for compiling, processing and interpreting fishery statistics and, therefore, keeping under review the effect of removals from stocks are clearly inadequate, is a cause for justified concern about the future of such fisheries. Signs of intense exploitation of some pelagic stocks have also been observed in certain areas of the north-western Mediterranean, and the negative effect of reduced fresh water outflow from the Nile, following the closure of the Aswan Dam, on the Egyptian sardinella stock has long been noted.

THE ROLE OF GFCM IN THE MANAGEMENT OF MEDITERRANEAN RESOURCES

The conservation of intensely exploited stocks and optimization of the social and economic benefits of their exploitation can be achieved by the application of two types of complementary measures. As a rule, the first type relates to the size of the fish caught in that fishing is deferred until they are older by, for example, increasing the legal minimum mesh size authorized in the construction of the nets. This type of restriction generally leads to an improvement in total catches and yields but, applied in isolation, it cannot slow down the gradual intensification of fishing normally experienced by fisheries; this type of measure may even have the secondary effect of accelerating investment, attracted by the temporary improvement brought about by better protection of young fish. This means that sooner or later consideration will have to be given to control over the total catch or the total amount of fishing.

Obviously, such measures as limitation of mesh size are more readily accepted, because it is recognized that the loss following the ban on the fishing of young fish will be transformed into a gain later when fish temporarily spared by the change in mesh size will be caught at a larger size.

The second type of restriction, namely the limitation of the overall level of exploitation, is the more difficult to adopt, because usually delay results in the need for a greater reduction in investments and employment.

The delayed introduction of management measures makes the situation particularly difficult in the Mediterranean. In many cases, national regulations are obsolete in that they are cluttered up with a multitude of provisions which are not always warranted for the effective protection of stocks; they are at times inconsistent and very often complicated. Their complexity and relative ineffectiveness can only prejudice the application of the regulations in force.

Having recognized, for the first time in June 1971, the state of apparent over-exploitation of demersal stocks off European coasts, the Working Party on Resources Appraisal recommended the prohibition of trawls with a mesh size of under 40 mm and stressed the importance of ensuring that rates of exploitation are adjusted to stock potentials (estimates were given in the Working Party's report). A mesh size of 40 mm was apparently smaller than the optimum size, but was adopted as a first step because, as it is used in most national legislations and is relatively acceptable to fishermen of various countries, it should result in a speedier revision and more effective application of national regulations, on which any progress in fishery regulation depends.

The Council endorsed this recommendation at its eleventh session in March 1972. In order to promote application of the 40 mm mesh size and to make national administrations aware of urgent management problems in the Mediterranean, the Council expressed the wish that a meeting of senior officers in fishery economics and administration from western Mediterranean countries should be organized. The meeting was held in April 1973. It recommended the establishment, within the framework of GFCM, of a Committee on Resources Management which would be responsible for preparing a list of national legislation and, on the basis of the work of the Working Party on Resources Appraisal, for proposing to the Council recommendations on better resources management. The same meeting expressed the hope that GFCM's statutes would be modified so as to make that body more effective in the preparation and application of recommendations relating to management. To that end, it requested the GFCM secretariat to prepare a study on the legal and administrative stages in which a better application of GFCM recommendations could be achieved.

All these proposals were adopted by GFCM at its twelfth session in March 1974. The Committee on Resources Management was established and entrusted with two tasks, namely:

To consider a revision of the 1949 Agreement establishing the GFCM and to recommend such amendments as would make the GFCM more adapted to its new tasks, particularly as regards the adoption, implementation and enforcement of measures for the conservation of fishery stocks; and

To consider and adopt an annotated draft on mesh size for trawls; the draft, based on technical principles and prepared by the secretariat, was to be used as a framework for the elaboration of national legislation on methods of measuring mesh size, the rigging devices and enforcement procedures.

Lastly, the Council considered that, in view of the similarities between stocks and of interrelationships between fisheries, the Mediterranean as a whole and the Black Sea had common management requirements, and that consideration should therefore

be given to the adoption of a 40 mm mesh size for all Mediterranean (and Black Sea) countries and to the harmonization of national legislations in this geographical unit.

Accordingly, the Committee on Resources Management, at its first meeting (February 1976), adopted a text which was intended to serve as a basis for the national legislation of all GFCM countries. This text prohibited mesh sizes of under 40 mm in the fitting of trawls, specified the standards to be used for mesh measurement (control), banned rigging devices and outlined derogation procedures. In accordance with the Committee's decision, the Director-General of FAO then sent the text, in the form of a recommendation, to member countries requesting them to provide him with information for subsequent communication to GFCM and all member countries, on measures taken or envisaged with a view to bringing national legislation into line with this common framework.

Finally, the Committee proposed amendments to the 1949 Agreement with a view to increasing GFCM's efficiency as a Mediterranean fisheries management and development body and limiting the Council's responsibilities to living resources and aquaculture in marine and brackish waters.

The Council endorsed all these proposals at its thirteenth session in June-July 1976. It also expressed the hope that each country which had not already done so would as soon as possible make arrangements along the lines of those of the GFCM for the collection of information and its analysis (stock evaluation) and the choice and application of management measures.

It recommended that a second meeting of the Committee on Resources Management should be held in 1978 so that it could review the progress made at the national level in applying the common text on mesh size adopted by GFCM. It should also, on the basis of conclusions reached by its Working Party on Appraisal of Resources and Fishery Statistics, take stock of national experience in the matter of limitations on fishing, assess the advisability of harmonizing, at the regional level, national provisions on the subject and, if necessary, formulate fishery management schemes for possible submission to member States for implementation.

CONCLUSIONS

The procedure adopted by GFCM for examining, adopting and implementing a standard regulation on mesh size for trawls seems well suited to the situation in the Mediterranean. Member countries have been informed, by the secretariat, of its theoretical justification and of the specific needs of Mediterranean stocks in this respect, as well as of the nature of the technical problems raised by the choice and implementation of regulations of this kind. The similarity of their fisheries has led them to adopt a common text designed to serve as a model for national regulations, application of which would be the responsibility of each country. In agreeing to inform each other, through the GFCM, of any action they will have to take in this connexion, the countries concerned recognize that common regulations can be effectively applied only if all parties can be sure that each one will actually comply with the same restrictions.

By requesting its Committee on Resources Management to embark upon studies of problems and requirements in the matter of limitation of fishing and to present it with proposals on action to be taken, the Council has decided to tackle the second major management problem. This is certainly a more difficult problem than that of mesh size control, but the progress made in recent years by the GFCM augurs well for the future.

This is the price that must be paid for the conservation of the living resources of the Mediterranean and for ensuring their continued viability from the economic and social point of view. At present, the main yardstick of the importance of these resources is the level of development of commercial fisheries. This may not always be the case, because ways and means of using living resources are liable to change. For example, the economic and social importance of certain fisheries may decline with the development of technology. In regions where this has occurred, the decline has so far been largely offset by the development of fishing as a sport. The economic importance of this type of fishing, in terms of the expenditure involved, as well as its cultural value to sports fishermen have nearly always been greater than those of the commercial fisheries it has replaced. This factor cannot be underestimated in the Mediterranean where an exceptional increase in tourism has already occurred.