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The development of the mediterranean and its impact on the marine environment : mediterranean fisheries

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SUMMARY

1. The Mediterranean fisheries are not large, but they are nevertheless valuable even by world standards, and particularly to those countries having no coasts on the Atlantic or other seas, nor large inland fisheries.

2. The total fish catch from the Mediterranean will not be increased much by more intensive fishing of existing, or by discovery of new stocks. The industry world however benefit from international management of the resources and of their use such as they have not yet had.

3. The catch is very unevenly shared among the coastal countries. The discrepancy between east and west is related essentially to the natural productivity of the resource ; that between north and south to the differences of fishing power among « developed » and « developing » states.

4. Mediterranean countries are big consumers of fish. Their human population is 8 % of the world total ; their catches — from within and outside the Mediterranean — and their net imports account for 10 % of world fish production. Thus these countries have a considerable stake in the growth and maintenance of fisheries in adjacent regions, and in the world as a whole, both, as producers and as consumers of fish products.

5. Not withstanding the existence of a number of regional bodies concerned with fisheries and with marine science, more vigorous efforts are needed to bring about an effective regime of fishery management in the Mediterranean, and an adequate scientific backing for it. Rapid development of sea-bed exploration, pollution problems and of other interacting uses of the Mediterranean and its resources suggest, however, that it is not too early to consider the international arrangements that may be needed to regulate and harmonise these uses, nearly all of which have potential effects on the fisheries.

This paper was prepared as an introduction to the section on fisheries of the Mediterranean Project of the International Ocean Institute, and is published in full with the papers of that project. It was written after the discussion of the projet at the Preparatory Conference in Split, Yugoslavia, May 1972 and at the Third *Pacem in Maribus* Convocation in Malta, June 1972.

Papers, by a number of authors, principally Alferevic, Ben Mustapha and Zei, dealt with particular aspects of the fisheries of the region, Murdock and Onuf, dealt with the general oceanography. I am therefore here summarizing the general text (2).

The countries having coasts on the Mediterranean and on the Black Seas (« Mediterranean and Black Sea Countries » — MBS in the Tables produce annually (16±1 %) of the world cach of marine fish, and they consume about 18 % of it ; those having coasts on the Mediterranean itself (« Mediterranean Countries » — MS) produce (6±1) % and consume 9 % (1969 and 1970 data). Their production as a percentage of their consumption is 89 % and 59 % respectively ; the rest is imported into the region — about 1-2 million tonnes round fresh weight equivalent to the region as a whole, 2,2 million tonnes into Mediterranean countries (The USSR is a major net *exporting* country). Of the total catch by Mediterranean and Black Sea countries only 10 % is taken within the region ; the equivalent figure is 20 % if we consider the catch in the Mediterranean itself by the Mediterranean countries ; the rest is taken by them elsewhere, mainly in the Atlantic Ocean.

The basic setting for the interest of this group of countries, and especially the Mediterranean ones, in fisheries is more closely examined below. It is clear however that collectively that

(2) « *Fish Resources of the Ocean* », prepared for the Indicative World Plan (IWP) of FAO (compiled and edited by J.A. Gulland and published in 1971 in revised version by Fishing News Books, London), brings together the basic information up to 1969 ; the reader is referred to this, while here I add some more recent statistics. I am indebted to colleagues in the FAO Department of Fisheries, and particularly to Messrs. Gertenbach, Robinson and Troadec, for leading me to pertinent statistical information.

TABLE A

Mean annual fish catches and % annual increases, 1964-1971, and fish consumption 1969-1970

	Production tonnes × 10^{-6}		$\frac{m}{m+f}$ (%)	Fraction of World production (%)		Annual rate of increase in production (%)		Consumption / World Prod. (%)	Production / Consumption (%)
$m+f$ = Marine + fresh water. .	$m+f$	m		$m+f$	m	$m+f$	m	$m+f$	$m+f$
World.	61.0	52.9	(87 ± 1)	(100)	(100)	(3.8)	(4.3)	(100)	(100)
World excluding USSR	55.0	47.7	(87)	(90)	(90)	(4.1)	(3.5)		
MBS countries — Total . . .	9.3	8.4	(89 ± 1)	(15.2)	(15.9)		(6.0)	(18)	(90)
— Within MBS	—	1.0		—	(1.9)		(1.4)		
MS countries — Total . . .	3.3	3.1	(96 ± 1)	(5.4)	(5.9)		(2.0)	(9)	(60)
— Within MS	—	0.6		—	(1.1)		(1.7)		
MBS (*) countries — Total . . .		0.72			(1.4)		(5.6)		
— Within MBS		0.58			(1.1)		(1.9)		
MS (*) countries — Total . . .		0.65			(1.2)		(3.5)		
— Within MS		0.44			(0.8)		(1.8)		

MBS (*) countries — having Mediteranean and/or Black Sea Coasts.
MS countries — having Mediteranean Coasts (including Turkey).
MBS (*) countries — having coasts only on Mediteranean and on Black Sea.
MS (*) countries — having coasts only on the Mediteranean (but including Turkey).
Percentages in parenthèsis.
MBS (*) countries take 56 % of the total catch in MBS.
MS (*) countries take 71 % of the total catch in MS.
Total catch by MBS (*) countries/MBS countries = 9 %.
Total catch by MS (*)/MS countries = 21 %.

they have an interest both in the state of the living marine ressources of the region, and in the maintenance of external fishery resources whether or not they themselves exploit them.

The total annual catch of fish and shellfish from the Mediterranean and Black Sea was, from 1938 to 1955, at the level of about 700 000 tonnes. It then grew somewhat, and has stayed since 1965 around one million tonnes (±7 %) (1.05 million tonnes in 1972).

It represents now rather less than 2 % of the world fish catch. This percentage has gradually been declining because catches in most other regions have been increasing steadilly, some of them rapidly (3). (*See Table A*)

Over the 8 year period 1964-71 world marine fishery production increased at an average rate of 4,3 % per year. The Mediterranean and Black Sea countries collectively did considerably better than that — 6 % — but they include the USSR whose fisheries expanded vastly during this period. The Mediterranean countries catches grew more slowly than the world average — little more than 2 % despite the rather considerable growth of the Spanish fisheries which alone account for 46 % of the present (1970) catch by those countries. But the world figure for the period is also much influenced by the USSR catch ; the world growth rate excluding the USSR was only 3.5 %. This is also the rate of growth achieved by those Mediterranean countries having coasts *only* on the Mediterranean or Black Seas (MS) ; even so Table A shows that most of their increase came from *outside* the Mediterranean. The growth rate of catches *within* the basin does not exceed 2 % in any grouping. The global increase in catches is now levelling off. FAO has estimate that the potential yield from the Mediterranean and Black Sea could be about 1.5 million tonnes, and this ultimately would be just over 1 % of the sustainable world ocean yield (excluding whales) (4). Part of the supposed 50 % increase from the Mediterranean would come from stocks presently « underfished », the rest by the more rational exploitation of stocks which are now « overfished ».

The sulk of the Mediterranean catches are of small shoaling pelagic species, particularly anchovy and also sardine. The demersal catches are rather low absolutely, and in comparison with other regions ; « basses etc. » are fairly important, and unsorted and unidentified fishes form a large statistical cate-

(3) 1.8 % of the *marine* fish catch in 1971 ; 1.7 % in 1969 (lowest year) ; 2.2 % in 1964, the first year of published FAO Statistics broken down by marine areas. It may be noted that the surface area of the Mediterranean and Black sea is 0.9 % of the world ocean surface ; and their continental shelves comprise 1.7 % of the world total shelf area (0-200 m) ; 3 % of the area less than 1 000 m. deep.

(4) Since the FAO estimates of global potential were publisted the world catch has levelled off, sooner than anticipated. We are perhaps already peater the maximum than was thought in 1970 ; the mediterranean catch might in future be a relatively more important part — say 2-3 % ?

gory. Bluefin tuna and bonito are relatively important, and also shellfish ; there is a considerable potential for shellfish culture, particularly of molluscs.

By contrast with some other important fishery regions, a high proportion of the mediterranean fish catch is for direct human consumption, almost entirely within the region. Only in Morocco does a high proportion of a Mediterranean nation's catch go for reduction, and that is mostly taken in the Atlantic. These facts give the clue to more significant evaluation of the Mediterranean fisheries. On the basis of *value* of landed catch they contribute now (1969 data) not 2 %, but 6 % of the world marine fish supply (5). Among the 15 marine areas by which FAO compiles fishery statistics, the Mediterranean and Black Sea in the period 1968-1970 ranked 12th by weight of catch, but 4th by value. The value exceeded that of the catches from several important fishing regions, among these being the South East Pacific (including the Peruvian anchoveta fishery), the Eastern tropical Pacific (including the important tuna fisheries there) and the North Western Atlantic. When all the world fish stocks are fully exploited the Mediterranean would probably rank 14th by weight of sustainable yield, but 9th by its value, and continue to contribute 6 % or more of the world total potential value of nearly $ 18 000 million (at 1970 prices). In addition, being to a considerable extent artisanal, or small scale industrial, the Mediterranean fisheries employ rather large numbers of people. The tendency to dismiss the Mediterranean as an impoverished, insignificant fishing area in the world context must therefore be challenged. Furthermore, the economic and social significance of the fisheries should not be obscured, within the region, by the newer and profitable interests of tourism and oil. Indeed, the uses, of this part of ocean space are not all in conflict : the futures of both tourism and fisheries depend greatly on the growing state of pollution being brought under control.

Before passing to the matter of international institutions, it is worth looking at the geography of the fisheries, and in particular the location of the fishing countries. First we note that all the catches from the Mediterranean and Black Sea are taken by countries coastal to the region, and that catches are reported to FAO by all those countries except Gibraltar, Monaco and Albania. We next need to break down further the FAO statistics, to distinguish Black Sea (including sea of Azov) catches from those in the Mediterranean proper. With the exception of Turkey, catches in the Mediterranean by countries bordering the Black Sea, and vice versa, are negligible, Turkish national statistics separate Black Sea, Sea of Marmara, Aegean and « Mediterranean » regions. We have made a detailed analysis of these for the years 1967-69 and applied average percentages to the total catches in earlier and later years. Although at the time of writing FAO statistics cover years up to 1971, figures for several important countries (Egypt, Greece, Morocco, Spain) for 1971 and 1970 are only estimates ; 1969 is therefore a convenient recent reference year. In *Table B* the catches in the Sea of Marmara, (which average 24 % of the catch by Turkey and 3 to 4 % of the total harvest by all countries from the region) are shown separately. The Mediterranean catch ranges from 56 to 68 % of the total (Mean = 61 %) with no clear trend over the period 1964-71. The patterns of variation are, however, different in the two basins : the Mediterranean catches have been increasing slowly but rather steadily ; the Black Sea catches have been fluctuating.

Focussing now on the Mediterranean proper, a significant further breakdown is according to the catches by countries on the « European » side and on the « African » side. In 1969, 541 000 tonnes (85 %) were taken by countries on the north shore ; 88 000 tonnes (14 %) by those on the south shore ; 7 000 (10 %) tonnes by the Levant countries of Israel, Lebanon and Syria, and 2 500 tonnes (0.4 %) by the independent islande of Malta and Cyprus. There are no trends in this distribution over the period. In fact whichever way we breakdown the statistics the picture is one of stability of distributions. (*See Table C*). The catches by the north shore countries, led by Italy taking over half of the 541 000 tonnes, and Spain taking another 20 % of it, are not however by any means all taken from the northern side of the Mediterranean. This fact is behind the bilateral negotations and arrangements on fishing between the bigger fishing « powers » of Europe and North African states.

The above geographical breakdown largely corresponds with the distinction between « developed » and « developing » countries, by the standards of the United Nations, which determine whether or not a state is viewed favorably as a recipient of aid through the UN Development Programme. These five more developed countries France, Spain, Italy, Greece and Israel took 79 % of the Mediterranean catch in 1969 ; that is four times as much as the « developing » group. Again there is no trend over the period. There are similar disproportions high catches by EEC countries. Apart from the connection with the Black Sea, the catches in the Mediterranean are significantly affected by two « outside »

(5) Estimated as 8.6 × 10^9 $ US. landed value in 1969.

TABLE B

Mediterranean and black sea catches Tonnes × 10^{-3}

	1964	1965	1966	1967	1968	1969	1970	1971	Mean 1964-1971 Catches	Mean 1964-1971 %
Catch in MBS	959	991	1 031	1 115.6	1 030.6	944.4	1 068	1 048	1 023.4	(100)
— Black Sea .	328	358	401	455.1	381.0	259.7	385	350	364.6	(36)
— Sea of Marmara	32	31	27	36.6	29.5	46.1	24	26	31.5	(3)
— MS . . .	600	601	603	623.9	621.1	638.6	659	672	627.3	(61)

TABLEAU C

Geography of Mediterranean (MS) catches (Tonnes × 10^{-3}) and (%)

	1969		Mean 1964-1971		Population Early 1970		1969 MS catch per capita (kg)
	Catch in MS	(%)	Catch in MS	(%)	× 10^{-3}	(%)	
Total	638.6	(100)	627.0	(100)	289.0	(100)	2.2
by N-shore counries	540.7	(85)	538.9	(86)	205.6	(71)	2.6
by S-shore countries	88.4	(14)	79.2	(13)	70.6	(24)	1.3
by Levant countries	7.0	(1)	6.5	(1)	11.9	(4)	0.6
by Independent islands . . .	2.5	(0.4)	2.4	(0.4)	0.9	(0.3)	2.8
by « developed » countries .	504.4	(79)	503.0	(80)	149.8	(52)	3.4
by « developing » countries .	134.2	(21)	124.0	(20)	139.2	(48)	1.0
by 2 EEC countries	330.7	(50)	327.8	(52)	104.8	(36)	3.2
in Eastern basin.	91.5	(14)	90.3	(14)	91.2	(32)	1.0
in Western basin	547.1	(86)	537.0	(86)	197.8	(68)	2.8
by 4 «Central Zone» countries	330.0	(52)	319.4	(51)	61.0	(21)	5.4
by Italy	288.0	(45)	286.8	(46)	53.7	(19)	5.4
as % of N-shore	(53)		(53)				
as % of « developed » . . .	(57)		(57)				
as % of W Basin	(53)		(53)				
as % of « Central Zone » .	(87)		(90)				
by Tunisia	29.6	(5)	26.5	(4)	5.1	(1.8)	5.8
as % of S-Shore	(34)	(33)					
as % of « developing » . . .	(22)	(21)					
as % of « Central Zone » . .	(9)	(8)					
by Turkey	166.9 (100)		131.1 (100)		35.6	(12)	
in Black Sea	112.5 (76)		(70)				
in Sea of Marmara	46.1 (20)		(24)				
in MS	8.3 (4)	(1.3)	[8.3] (6)	(1.3)			0.2
by MS (*) countries	459.6	(72)	442.8	(71)	152.2	(53)	3.0

[ ] Estimated.

ocean influences: in the west by the penetration of Atlantic water, in the east by the intrusion of Indo-Pacific species via the Suez Canal. Although the biological productivity of the Mediterranean is still not well measured, it seems agreed that the eastern basin is not so well endowed as the western basin and the Adriatic, and this difference is reflected also in the catches by countries grouped on an eastwest basis. From 82 to 87 % come from the Western sub-area bounded by Albania and Libya, 13 to 18 % from the eastern sub-area bounded by Greece and Egypt. This Eastern area is very roughly equal in surface area to the Black Sea, and half that of the Western sub-area so defined; the catch from it, per square kilometer, is thus one third to one half that from either of the other two sub-areas. A drop in the Eastern sub-area, between 1965 and 1966, is due to a halving of the catches by Egypt, which have not since recovered. Lastly, as noted later, the grouping of the catches from the eastern half of the western sub-area « Central zone », by Italy, Libya, Malta and Tunisia is of some current interest. This grouping includes the leading country in the « developed » and « North shore » group — Italy — ant the leading country in the « developing » and « South shore » groups — Tunisia. The combined catch by the four countries is 52 % of the Mediterranean total, and of this amount Italy takes 90 % and Tunisia 9 %.

Although ships of European countries fish on the southern side, they do not move far either westwards or eastwards. Apart from Turkey, countries with Black Sea coasts do not fish in the Mediterranean, nor vice versa. Countries that elect to fish far from their own shores do so outside the Mediterranean — Black Sea basin.

Of the twenty countries listed, ten fish only in the Mediterranean and/or the Black Sea; their catches however account for only 29 % of the catches in these basins. Twelve countries (including the 10 above) fish only or mainly there; they account for 67 % of the catch (1969 data). Similarly, of seventeen countries (including Turkey) having Mediterranean coasts, eight fish only in the Mediterranean; they account for 16 % of the Mediterranean catch. Ten of the seventeen fish mainly in the Mediterranean and account for just ower 70 % of the catches ther.

The total marine catch by Mediterranean and Black Sea Countries in 1969 was 9.1 millions tonnes, 17 % of the world total. The Mediterranean countries took 3.2 million tonnes, 6 % of the total. The Mediterranean and Black Sea catch was only 10 % of the total catch by Mediterranean and Black Sea countries; the Mediterranean catch was 20 % of the catch by Mediterranean countries. These percentages are, however, so very low because, in the first case, of the very large USSR catches elsewhere and, in the second case, of the large French, Moroccan and Spanish catches in the Atlantic. In fact *all* the countries having coasts also on other sea areas fish mostly outside the Mediteraanean and Black Sea. Of the others Bulgaria and Romania fish mostly outside, Greece and Italy mostly inside.

The catches per capita vary widely among countries (See Table D). They are not very closely correlated with GNP per capita.

The demand by the Mediterranean countries for fish is not satisfied by their own fishing activity. Of the 18 countries for which FAO publishes data 12 are net importers of fish products, 6 are net exporters (1970 data, fishery products of marine and island origin not distinguished — Table E). The statistics for export and import of products are insufficiently complete to warrant detailed analysis. Destinations of exports are sometimes clear — for example Moroccan exports, both of products for direct human consumption and of meals and oil, are mainly to France and thus are consumed in the Mediterranean region.

Most of the large imports, of both groups of products, are from countries other than Mediterranean and Black Sea countries. Overall, the imports of all products exceed the exports by 425 000 tonnes, but if Black Sea countries (USSR and Bulgaria; No data available for Romania) are excluded the imports exceed exports by 700 000 tonnes.

The IWP estimates of potential fish yield from the Mediterranean and Black Sea are not very soundly based, though we have no reason to suppose they could be wildly wrong. Few, if any, exploited stocks there have been subject to scientific assesment by a variety of techniques, as have stocks in, for example, the North Atlantic, North Pacific and even in parts of the Southern Hemisphere. The statistics of fish catches are weak, and data for fishing report suggests that « given the nature of the fisheries and the magnitude of the potential resource the considerable effort required to bring up the level (in quality) of the statistics would not be worthwhile » (6). If, however, we take account of the rather high value of the catches, and the potential benefits from better management, of heavily exploited stocks we might reach a different conclusion.

(6) The GFCM has never compiled and published fishery, catch and fishing effort statistics in the detail provided by the « independent » marine councils and commissions in other areas such as ICES, ICNAF etc. Yet, while not being so comprehensive as for many of those areas, FAO has extensive files of national statistical publications which contain a wealth of material useful to the fishery analyst and resource investigator, and the whole collection sorted acompiled, world be worth much more than the sum of its parts.

TABLE D

Fish supplies, catches, consumption by Mediterranean and Black Sea Countries

	Catches m / m + f % (1964-71)	10^{-6} tonnes		MS and BS Total % 1964-71	Population early 1970's ($\times 10^{-6}$)	Catches per capita (kg)		GNP		Gross value total catch m + f, 1970 $\$ \times 10^{-6}$	Supply (tonnes $\times 10^{-3}$)		Consumption (Supply per capita) m + f, kg		Import of Export of Products (tonnes $\times 10^{-3}$)
		Total 1970	From MS and BS 1970			Total	From MS and BS	US$ $\times 10^{-9}$	per capita $\$ \times 10^{-2}$		1970 Total	m + f As food	Total	As food	
France	100	764.4	45.6	5	51.1	15	0.8	100	20	287	1 490.4	1 042.4	29.2	20.6	I 306.1
Spain	99	1 483.3	124.3	8	33.2	45	3	23	7	378	1 904.9	1 169.4	51.4	35.1	E 6.6
Morocco	99	255.0	10.5	4	15.7	14	0.6	3	2	18	82.9	52.2	5.3	3.4	E 37.8
Italy	95	368.2	305.3	83	53.7	7	5	60	11	275	1 278.6	710.6	23.8	13.3	I 295.5
Yugoslavia	62	25.6	25.6	100	20.6	1	1	11	5	—	298.8	39.8	14.5	2.0	I 55.3
Albania	100	[4.0]	[4.0]	100	2.2	2	2	1	3	—	—	—	—	—	—
Greece	100	91.3	58.0	67	8.9	10	7	6	7	79	244.1	184.8	27.4	20.6	I 35.8
Algeria	100	25.7	25.7	100	14.0	2	2	4	3	8	23.0	22.5	0.6	1.6	E 1.5
Tunisia	99	24.3	24.3	100	5.1	6	6	1	2	9	24.6	24.6	4.1	4.7	E 2.1
Libya	100	5.5	5.5	100	1.9	6	6	1	7	4	6.9	6.9	3.5	3.5	I 1.0
Egypt	32	[29.8]	14.8	54	33.9	1	0.4	5	2	—	103.9	103.9	3.4	3.1	I 4.3
Israël	48	10.3	3.0	30	2.9	4	1	4	12	15	158.2	36.7	54.1	12.1	I 29.3
Syria	80	1.0	1.0	100	6.2	0.2	0.2	1	2	2	—	—	—	—	I 2.7
Lebanon	100	2.3	2.3	100	2.8	1	1	2	5	4	—	—	—	—	I 5.0
Malta	100	1.2	1.2	100	0.3	4	4	0.2	6	1	8.6	2.6	25.0	8.1	I 1.4
Cyprus	100	1.4	1.4	100	0.6	2	2	0.5	8	1	4.4	4.4	7.0	7.0	I 2.2
Turkey Total	94	103.5	103.5	100	35.6	5	5	10	3	—	171.3	161.3	4.8	4.6	E 9.1
MS	89	7	7	[6]											
BS (incl. Marmara)		96	76	[94]											
Bulgaria	89	84.4	4.4	13	8.5	9	0.7	6	7	—	161.2	59.2	19.0	7.0	E 2.9
Romania	39	25.8	5.1	29	20.3	1	0.1	15	7	—	93.8	93.8	4.6	4.6	?
U.S.S.R.	86	6 398.8	302.5	5	242.6	24	0.6	235	10	—	7 015.0	6 083.0	28.9	24.9	E 270.0
MBS countries	89	9 706	1 068	11	560.4	16	1.7	487	9	?	[13 080]	[9 810]	[23]	[18]	I 304
MS countries	96	3 197	659	21	289.0	11	2.2	232	8	[1 300]	[5 810]	[3 570]	[20]	[12]	I 577
World	87	60 600	1 068	2	3 630	15					69 700	29 800	19	8	

Notes : Supply = catch + Imports + Exports
« As food » is for direct human consumption.
I : Import. E : Export.

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Some demersal stocks off parts of north Africa, and some pelagic stocks, *might* still be rather lightly exploited. However, although scientific proof is lacking, it is virtually certain that many stocks in the Mediterranean are now overfished, and that a few of them have been in such a state for some time. International regulations are almost non-existent, small mesh sizes are used in trawling, illegal ue of explosives and other destructive methods are prevalent, and national regulations are often not enforced. The wide disparity in participation in the fisheries by the more developed northern countries and the less developed southern countries perhaps contributes to continuation of this unsatisfactory state of affairs. Only where national interests are more balanced and participation is by fewer fleets, as in the Adriatic, does it seem that much progress is being made towards more rational fisheries management.

Against this we have in the Mediterranean an excess of international bodies concerned with the living resources. There are two intergovernmental bodies, apart from the Black Sea Fisheries Commission which despite the non-participation of Turkey, appears to be success both in coordinating research and managing fishing. The General Fisheries Council for the Mediterranean, (GFCM) was set up under the auspice of FAO in 1952. While being a valuable form for scientific, technical and economic discussion, the Council has been extremely slow in coming to grips with resource assessment and management problems (7). FAO's efforts to help the weaker states to « develop » their fisheries have largely by-passed the GFCM. In fact UN aid projets in the area have been very limited, at least partly because of the past attitude of the UNDP, and others as mentioned above, that the Mediterranean fisheries were too small to be worth much assistance. There are signs that the new system of « country programming », under which the countries themselves have a more direct say in what kinds of assistance they receive from the UN System, is correcting this bias.

The International Commission for Scientific Exploration of the Mediterranean Sea (CIESMM) is older than the GFCM. It is modelled on the International Council for Exploration of the Sea (ICES) in Copenhagen, but has been much less significant than ICES in influencing fisheries polices. Like ICES its scope is limited to « Science » and, under the influence of academic groups in the older member states, has given much more attention to biological oceanography and marine biology than to scientific resource studies. Within these limits it has been in recent years an active international body.

(7) A hopeful sign is the study begun by a GFCM waking group, in the fint talf of 1973, of fishing management problem in the Western mediterranean.

The GFCM and CIESMM have nearly, but not quite, the same member states. They include most coastal states, but there is uneven participation in meetings : in particular the participation by the African States in recent CIESMM meetings has been minimal. Neither are affluent organizations. The GFCM receives its very limited funds and its secretariat from the regular programme of FAO : its Members could make special contributions, but have not yet done so. The GFCM in theory covers the Black Sea, but the USSR, not being a member of FAO, is not a Member.

A few years ago the Intergovernmental Oceanographic Commission (IOC), which serves the Agencies of the UN system and is by statute located in Unesco, decided to launch ; as one of its series of « cooperative studies », a Cooperative Investigation of the Mediterranean (CIM). There were a number of reasons why this initiative did not come from one or other of the existing regional bodies. They had no tradition of organizing such joint, multinational expeditions, as had IOC. Their membership did not include non-Mediterranean countries, such as the USA, that were at the time interested in participating in such a study. Unesco, not connected with GFCM or ICSEM, had a useful contribution to make beyond its earlier efforts to bring together the Directors of research stations in the region. And the IOC, then being « broadened and expanded » in accordance with Resolutions of the UN General Assembly, had wider terms of reference, with respect to science, than any other body.
At the time of launching the CIM, Some people thought that the IOC might, in the Mediterranean and elsewhere, somehow supplant or bypass other existing bodies. In this case however, the view prevailed that a Mediterranean study had to be planned and executed jointly by the three bodies IOC, GFCM and CIESMM. The resulting experience of cooperation has probably left its mark on all these bodies, but it has not been easy. Apart from the coordinating arrangements at secretariat level, which are quite cumbersome, and shortage of friends even for planning on the part of at least one of the sponsoring organizations, special arrangements for the scientific planning have been necessitated by the political situation in the eastern, Mediterranean. Support from some countries — notably France and the USSR — as well as by Unesco has resulted in a rather large « operational unit » being set up in Monaco. On the other hand states have been slow and niggardly in pledging their efforts (vessels and support) to CIM. And in 1972 the USA — the main « outsider » — withdrew its tentative vessels contribution..

There being so much ignorance about this sea, the first plan drawn up by scientists nominated by the three sponsoring bodies was comprehensive, but

impracticable. The plan has been progressively sharpened. It now focuses largely on pollution research, and has a better chance of implementation.
The CIM results should thus be revelant to fisheries, but not sufficient in themselves for a leap forward in rational management. The needs remain both for more vigorous fishery research in the area, and for decisive management actions at national and international levels. Perhaps the time is now past when these could be expected from any intergovernmental body concerned only vith fisheries. Such actions vith respect to fisheries now need at least to be related to pollution questions, and very soon may not be possible without reference to oil exploration extraction a transport and other uses of ocean space.

Several studies have been published recently on the state of marine pollution in the Mediterranean. Among these is the book edited by Ritchie-Calder containing some of the contributions to the second Pacem in Maribors. Convocation, and the GFCM *Studies and Reviews* No. 51 (1972).
One might have expected the latter, particularly, coming from a fishery organization, to deal fully with the impact of pollution on the fisheries of the region. In fact the only references to effects on fisheries are to the bad taste of fish from Waters polluted by oil, and the consequent effects on marketing — but even for that no quantitative date are given. The other effects of various kinds of pollution on the fish stocks (and on consumers of fish) are either not known, or not documented — but this does not mean they do not exist or are not important.

There have been a number of bilateral and multilateral inter-governmental actions at the sub-regional level — for example between Italy and Yugoslavia with respect to the Adriatic.
In the « central zone » negotiations have started since the third P.I.M. Convocation and the meeting of Mediterranean states members of the UN Sea-Bed Committee, which followed it, in Malta, in July 1972. For example, during 1972, Malta and Libya began a joint resource survey, with Japanese assistance. Then in November, at a meeting of the Prime Miniter of Malta with the Foreign Ministers of Italy Libya and Tunisia, a seven item agenda was agreed for later discussions at Ambassatorial level of which three items related directly to the sea — marine pollution, seabed problems and fisheries. The importance of this central zone in the Mediterranean fisheries picture has already been stressed.
The participating countries' interest in fisheries is in three cases exclusively, and in one case mainly, within the Mediterranean, and within the sub-area in question. A proposal that they should jointly and continuously operate a vessel for monitoring pollution on a real-time basis could be combined, if they so wish, with continuous monitoring of fish stocks PTO and of related environmental parameters. If such an operation could be success mounted, the idea of such cooperation might spread elsewhere in the Mediterranean. Perhaps the most difficult question to avise would be the conditions of access to data. Detarted seal-time information about the distribution of fish in the sea can be used more effectively by some fishermen than others. Equity in such Situations is not achived simply by making all data freely available, or even by ensuiting participation by scientists of all concerned nationalities in the data collection. The problem is much the same as in the debate about « freedom of scientific research » in the ocean.

Another sub-regional initiative is that of the International Biological Programme (IBP), with respect to the problems of the Eastern Mediterranean.

Of major interest there are the effects of man's activities, expecially by dam and canal construction. The most notable environmental effects of these activities are on the living resources, and a review of them will be attempted at a scientific symposium to be organised by IBP at the International Ocean Institute in Malta in September 1973.

In the Mediterranean, even more perhaps than elsewhere, many active scientists became, in earlier years, discouraged by the difficulties of getting prompt and effective cooperation through governmental channels. Much of their work is financed only indirectlly, where at all, by governments. Thus some years ago a non-governmental body was formed in the region — the Mediterranean Association for Marine Biology and Oceansology (MAMBO). In its unique way this remarkably fluid — some might say disorganized-organization has done a lot to promote marine science in the region and, most important, to arouse interest among young people in the « developing » countries. Most recently MAMBO has sponsored regular annual trainning courses in ecology and pollution research at the Portoroz laboratory of the University of Ljubljana and studies of marine parks within the region ; all these activities have a bearing on the fishery problems. There are a number of other less broad, but significant, cooperative activities in the Mediterranean concerning the living resources and their environment. Among these are the Mediterranean Marine Sorting Center in Tunisia (a joint continuing project of the Smithsonian Institution — USA, and the Government of Tunisia) ; the Laboratory of Marine Radioactivity at Monaco (a joint project of the IAEA, the French Institute Oceanographique and the Government of Monaco, and now also of Unesco). There is at least one marine laboratory in most Mediterranean countries. FAO headquarters are located on the Mediterranean, and nearly all UN Agencies with ocean interests are based within easy access to the region. So there should be no dearth of international interest in the fisheries. There is still lacking a vigorous regional development and management body to marshall both the authority of all concerned governments and the enthusiasm of scientists, and which is able to deal with the fisheries themselves in their own right and with the increasing interaction of fishing with other ocean uses.