



MEDWAVES

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THE MEDITERRANEAN COUNTRIES UNITE THEIR EFFORTS TO FACE SEISMIC RISK

A cooperative project for seismic risk reduction has been created. Developed in the framework of the Priority Actions Programme of MAP it is carried out under the auspices of UNDP in collaboration with other UN organizations; it is largely financed by Italy and will be headquartered in Genoa.

A curse which has marked the history of the Mediterranean region

Just like volcanic eruptions, cyclones and tidal waves, earthquakes are geophysical catastrophes which *a priori* escape man's control. However, this is not the case for the consequences of earthquakes: when they are dramatic, they result to a great extent from the absence of a land-use policy and prevention measures, such as strict, obligatory aseismic standards for the construction of housing and public buildings.

It is well known that the Mediterranean is one of the earth's seismically active zones. From the beginning of time, it paid a large tribute to this bane that the Ancient Greeks represented as the Giant Enceladus, son of the God Ouranos and the Goddess Gaia. Just in the last 25 years, Albania, Algeria, Greece, Italy, Morocco, Turkey and Yugoslavia have been periodically hit by earthquakes, some of which have been particularly devastating on a human, material and economic level. The population growth of the Mediterranean region, along with its urbanization and industrialization, has led to an increase in the number of high density concentrations of population which run a higher seismic risk. The need to coordinate research and prevent efforts in order to *attenuate* (the term used is deliberately prudent and modest) the risk was already clearly felt and stated in the 70s. Since that time, it has been concretized in various regional projects carried out under UN auspices. Examples are *inter alia* The Survey of Seismicity in the Balkan Region and the PAMERAR Programme for Assessment and Mitigation of the Earthquake Risk in the Arab Region.



THE MOST CATASTROPHIC EARTHQUAKES IN THE MEDITERRANEAN REGION IN THE LAST 35 YEARS (1)

YEAR	REGION	DEAD	MAGNITUDE (%)
1953	Ionian Islands, Greece	504	7,1
1954	Orléansville, Algeria	1243	6,7
1960	Agadir, Morocco	15000	5,8
1963	Skopje, Yugoslavia	3300	6
1966	Anatolia, Turkey	2394	7
1967	Anatolia, Turkey	4000 (?)	(?)
1968	Sicily, Italy	291	6,2
1970	Gediz, Turkey	1086	7,4
1971	Bingöl, Turkey	995	7
1975	Lice, Turkey	2386	6,8
1976	Friou, Italy	965	6,5
	Van, Turkey	3720	7,3
1978	Montenegro, Yugoslavia	156	7
1980	El-Asman (ex-Orléansville) Algeria	3500	7,3
	Acerno, Laviano, South Italy	2737	6,9
1981	Gulf of Corinth, Greece	16	6,7
1983	Anatolia, Turkey	1300	6,2
1986	Kalamata, Greece	17	6,2

(1) It is estimated that approximately more than one million persons have died because of earthquakes in the Mediterranean since the year 1000 A.D. For the period 1968-1983 alone earthquakes have killed 19,086 persons, have left 4,000 wounded and 1,1 million homeless.

(2) Expressed in points on the Richter scale

The Cetinje thematic framework

In 1979, the Signatories of the Barcelona Convention launch, in the framework of the Mediterranean Action Plan the Priority Actions Programme. What calls for a priority action if not an earthquake? MAP adopts the idea of a regional cooperation in this field. Thus in June 1985, a Seminar is organized in Cetinje, Yugoslavia, to study land-use planning in the earthquake-prone regions of the Mediterranean. The participants focus their attention on the high level of seismic risk to which the region is exposed. They also conclude that each of the Mediterranean countries concerned has valuable experience and knowledge in the field that should be disseminated further throughout the region: the synthesis of the knowledge would be profitable to the whole Mediterranean basin and would lead to global and coordinated action. The main output of the Seminar was an outline for analysis and action known as "Cetinje Thematic Framework". Its main axes are the following:

1. Seismic risk as such: Evaluation, seismic hazard mapping (macro and micro-zoning for land use planning).
2. Vulnerability: evaluation of vulnerability of buildings and infrastructure, aseismic building codes for interdisciplinary use.
3. Risk reduction and management: physical planning, land-use planning and urban design, disaster preparedness and operational capacity at times of catastrophe, protection of historic settlements, public information, adequate legislation.

Obviously, these are but the main axes of a detailed framework. Each one of them sets up a study and a procedural phase, as well as the training of the scientists involved. The synthesis of the results obtained through this framework

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should lead to the formulation of national programmes, to regional cooperation and to political decision making.

Birth of the Mediterranean project

The Cetinje Seminar augured in fact a phase of closer cooperation. In September 1985, at their Meeting in Genoa, the Contracting Parties to the Barcelona Convention approved the preparation of a project known as "Co-operative project for seismic risk reduction in the Mediterranean Region". Meanwhile, the United Nations Development Programme (UNDP) endorsed the project and agreed to allocate \$200,000 to it. UNDP is thus the executive agency of the project. Then, in May 1987, the Italian Government announced its intention to support the project and to allocate \$1,338,000 (or 8% of the total budget) to it. The City of Genoa offered to host it. The preparatory phase was launched through the project's Executive Bureau (OPE) of UNDP for the preparation of the project document; the latter was finalized in PAP/RAC Split in January 1988. The Steering Committee which had been foreseen held its first meeting April 6-8, 1988 in Genoa. In addition to the representatives of the five UN agencies involved in the project, the co-ordinator of MAP and delegates of 15 Mediterranean countries attended the meeting, whereas the competent officials of the Genoa local authorities and of the Italian Ministries of Foreign Affairs and Civil Protection underscored the active engagement of the host country.

At the conclusion of the meeting, the Steering Committee unanimously approved the technical content of the document which it had examined and insisted upon the necessity of its keeping its Mediterranean character. The project has a duration of 2 years from the date it is signed by UNDP and at least 3 governments. In the meantime, it was decided to extend the preparation phase in order that a timetable of activities and the accompanying budget be established.

Many participants, a common effort

In addition to MAP, which intervenes through RAC/PAP, 4 UN bodies are then engaged in this cooperative Mediterranean project. It should be pointed out that seismic risk reduction needs more than anything else a multidisciplinary approach and that each of these organizations can take advantage of experience and know-how in a particular field: UNCHS in the field of human settlements planning and housing; UNIDO in the field of civil engineering and building construction technologies; UNESCO in the field of earth sciences (seismicity, seismo-tectonics and geology) and preservation of historic settlements; UNDRO (Office of the United Nations Disaster Relief Co-ordinator) in disaster mitigation and management; this last UN body is also entrusted with the technical support of the project. As concerns MAP, it is especially oriented toward integrated planning and management of coastal zones which cannot be conceived without pri-



The goddess Athena brandishing her javelin and shield against the Giant Enceladus (Detail from a vase, 420-400 B.C. State Museum, Berlin).

ority consideration of the seismic risk element in many coastal states.

The Steering Committee meeting at Genoa pointed out that the main goal of the

AN UNEQUAL RISK DEPENDING ON THE COUNTRY

Are all countries located in an area of high seismicity equal in the face of the risks from a natural catastrophe? In the light of recent research carried out under the auspices of the UN or by scientific institutes, the gap, that separates developed from developing countries does not exclude the consequences of earthquakes.

In most developing countries, the tenement belt surrounding large cities increases the seismic risk for the people living in it, along an exponential curve. These tenement areas consist of very poor housing offering no resistance to tremors; they often occupy deforested areas on steep inclines, which are subject to land slides after a bad earthquake. It also appears that many deaths after an earthquake are due to the difficulties encountered by rescue teams, because of inadequate transport systems and infrastructure. Finally the reconstruction period is greatly lengthened because of the lack of credits; this is another reason for the disparity. We should also point out however that the rich/poor distinction can affect one and the same country (Northern and Southern Italy for instance).

Generally speaking, seismic risk tends to decrease in the developed countries because of advanced technology; very strict aseismic standards in building construction and adoption of land-use plans and urban plans which take into account the large faults.

On the contrary, in the developing countries, the number of persons exposed to seismic risk continues to increase because of demographic explosion and its corollary, the rural exodus toward the big cities; it is estimated that the latter will double in the next 20 years. The absence of rational planning and the lack of building materials essential for aseismic construction (concrete, steel) aggravate the situation.

A regional project such as that envisaged for the Mediterranean under UNDP direction can therefore also serve to reverse, or at least slow down this trend, by making possible the necessary technology and knowhow transfers from the developed to the developing countries, and an equitable distribution of activities and measures of prevention and assistance.

project is to integrate past experience from the various countries into a coherent whole which can then be made available to the whole region. This is all the more necessary since the region, even though it is one single tectonic unit, comprises 17 countries which are very different from one another by virtue of their level of development, and their political and economic systems; the result is "poor" and "rich" countries as concerns seismic risk.

A permanent project is needed

The media images of an earthquake are all too familiar unfortunately for anyone not to grasp immediately the urgency of a concerted strategy. Organizing help, assessing losses, relocating the homeless, rebuilding according to a more rational urban plan are all operations for which the international community is mobilized in a reflex of mutual help each time a great catastrophe occurs. What is most important today however is to anticipate this solidarity in order to avoid the most dramatic aspects. The emphasis in other words is on prevention; this is now possible given new construction technologies, sensible assessment of seismic risk and its consequences, evaluation of potential damages and loss and a conception of land use planning which integrates all these factors (by dispersing for instance the inhabitants of the most densely populated urban sectors which run the highest risk, by imposing aseismic construction standards etc).

As was underlined last April in Genoa, the project "must be envisaged as an exercise promoting seismic risk reduction and management; its success will depend on the degree in which the participating countries are convinced that the current initiative must be promoted". The countries struck by earthquakes are invited to contribute actively to the project. The reduction of seismic risk implies, at regional level, the setting up of an institutional network of alert and civil defence, the evaluation of methods for the analysis and evaluation of hazard and vulnerability, and the elaboration of complete reduction plans and scenarios. The point is made that the project does not aim at stimulating new research but at "building on the results already obtained and synthesizing them". The first phase will be given over to setting up a network of exchange of information and expertise in all the complex fields related to earthquakes. Beyond the completion of this project, the long-term objective will be to define policy and a strategy common to the Mediterranean countries; this is what the Steering Committee pointed out by "expressing the hope that the impetus of the project would not be lost at the end of the two years but that on the contrary it would be maintained through a permanent programme of Mediterranean co-operation. "The stakes are high if we consider that the Mediterranean does not just have a human and economic capital to preserve but also a prestigious cultural heritage: some of its most important historical sites are located in areas of high seismicity.

ORGANOTIN COMPOUNDS IN THE CENTRE OF ANTIPOLLUTION EFFORTS

By signing the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources, the Contracting Parties to the Barcelona Convention pledged to eliminate pollution caused by a wide series of substances included in a "black list": this is the famous Annex I. Among these substances are the organotin compounds, i.e. those compounds which contain carbon radicals bound with tin. In 1980 when the Protocol was signed, the toxicity of these compounds was sufficiently important to warrant their inclusion in the black list. Since then however the figures of production have considerably increased at world level: from 5,000 tons registered in 1955 to about 35,000 tons today. Thus, in recent years, the warnings of both environmentalists and scientists have also increased; this led several international organizations and many governments to envisage concrete measures for banning or limiting the use of such compounds.

Their toxicity makes them successful

Like the pesticides, insecticides, herbicides and detergents, the organotin compounds are also used on a very large scale specifically for their toxic properties. This was not always the case. In the past they were exclusively used as stabilizers or catalysts in the plastics industry. Since the 50's however they have been used for their toxicity to kill various microorganisms. In agriculture, they protect plants against fungi and mites, in chicken farming to protect poultry against parasitic worms. In the 60's the organotin compounds were introduced in the wood industry and especially in the production of antifouling paints which are used in more and more areas. What do these paints do? They cover the hulls of ships or other surfaces submerged in sea water (drydocks, pipeline walls etc.) in order to prevent fouling, i.e. the accumulation of marine microorganisms which causes various problems, such as the increase of friction along the hull of a ship with the double result of speed reduction and increased fuel consumption. It is true that the organotin compounds replaced products used up to that point in antifouling paints which were even more toxic like arsenic, lead or mercury. Twenty years later however, a series of studies has clearly shown that the product which is most commonly used, tributyltin or TBT represents an important potential pollution load because of its ever increasing use on sea-going vessels and pleasure craft. If TBT cannot be a serious threat at world or regional level, given its negligible rate in the pollution of the world's seas, at the local level it can cause contamination problems in certain areas where there are a lot of painted surfaces under the surface of the sea: marinas, harbours or certain aquaculture installations. TBT escapes from the paints, is slowly and progressively diffused in the shallow waters where the water exchange is limited. In the case of the cages used for salmon growing or of oyster and mussel farms, one can easily see that the risks are more direct, thus dictating strict prohibition measures.

Impact on man

In 1954, in France the "Stalinon" case hit the headlines by dramatically drawing the attention of the public to the toxic effects of an organotin contained in that drug which was responsible for 210 cases of intoxication, of which 98 were fatal. That was a diorganotin and we know that the triorganotins (like TBT) are even more toxic especially for the nervous system. However, luckily enough mass intoxications remain the exception. Most often it is professional exposure through inhalation: in agriculture where the products are pulverized and in naval construction when cleaning the hulls and painting them with anti-fouling products. The most obvious symptoms are headaches, nausea, vomiting, sometimes loss of conscience. On the other hand, the long-term effects on man of small doses of organotins taken in regular fashion are a lot more difficult to evaluate. To get an idea one must rely on animal experiments in laboratories which have shown that the nature and importance of the toxicity vary depending on the compound. Thus it appears that among triorganotins TBT is less noxious for the central nervous system but more for the lymphatic system.

While waiting for the completion of toxicity studies which will also shed light on the embryotoxic and teratogenic potential of the products, it became apparent that control and prevention measures were essential given the impact of organotin compounds especially on marine biota.

"The development of alternative, environmentally acceptable biocides for antifouling paints and coatings should be strongly supported". FAO/UNEP/WHO/IAEA assessment document on organotin compounds, April 1988.

Seafood

Between 1982 and 1986 studies on the effects of TBT on oysters carried out in France, in the U.K. and the U.S.A showed that this product caused a thickening of the shell which meant a serious anomaly in the development of oysters. TBT toxicity studies concerning marine organisms started up again. It became apparent that the young organisms and the larvae are the most vulnerable; the sensitivity of the whole range of mollusks and fishes was studied. Some sensitive organisms are used as pollution indicators in bays and estuaries where large fleets of craft are anchored. In problem sites, the TBT concentrations measured are likely to have acute toxic effects on the most sensitive organisms and exceed the admissible levels according to the FAO/WHO 1971 criteria.

First measures of prevention

Because of strong local contamination, the competent national and international authorities envisaged adequate legislation. The French and British governments were the first to regulate the use of organotin-based antifouling paints by determining the content depending on the type of paint (more or less likely to release the active ingredient into the water). The effectiveness of these measures was evaluated through the monitoring of the critical areas. The results led to the belief that there ought to be a complete ban of triorganotin compounds in antifouling paints. However, for obvious practical reasons, a gradual approach was necessary; the paint industry was encouraged to solve the problem by developing new products that would not harm the environment. In the first phase, it was decided that the use of anti-fouling paints containing triorganotin compounds would be prohibited for boats under 25 m (this is the pleasure craft market which is responsible for the serious pollution of marinas); furthermore, to safeguard marine life and the health of those consuming shellfish, it was decided to ban triorganotin containing products from the installations and equipment (such as cages, nets etc.) in fish farming and shellfish growing areas. Moreover, the European Community is examining similar proposals, whereas Switzerland and Germany have banned the use of TBT in paints for fresh water areas. Italy has prohibited its use in industrial cooling systems.

Permanent evaluation

We may wonder why these measures concern exclusively antifouling paints which represent just one tenth of the world organotin production (about 4,000 tons out of a 35,000 total). In fact, the first assessment studies of other uses (such as in the plastics industry, agriculture, animal farming) and the calculation models seem to indicate that only a very small part of these organotins reaches the sea or the aquatic systems; this is due to their special properties of distribution, the degradation phenomena they undergo, their weak volatility in the air and finally their affinity for soils and sediments which limit their mobility and thus their contamination power. Finally one should add that our knowledge on the distribution, fate and concentration rates of these compounds remain limited and fragmentary, especially in the Mediterranean. This is why a pilot project was launched in 1988; a consultation meeting to be convened 7-9 November at Erdemli, Turkey under the auspices of FAO and IAEA, WHO and UNEP-MEDU cosponsorship will assess the preliminary results of this project. When more data become available, the proposed anti-pollution measures will be updated and if need be revised. This is also the case for other categories of substances included in Annexes I and II of the LBS Protocol which will be evaluated in the future according to a workplan adopted at the 5th Meeting of the Contracting Parties in September 1987.

QUALITY OF BATHING WATERS IN THE MEDITERRANEAN: RECENT DATA SHOW AN IMPROVING TREND

This first encouraging sign should be attributed to the progressive success of the monitoring policy and of antipollution efforts implemented after the adoption by all Mediterranean states of the WHO/UNEP standards and also of the EEC standards by the Mediterranean countries, members of the European Community

One of the main objectives of MAP from the time it was founded has been to draw an accurate picture of the pollution in the Mediterranean Sea. Detailed assessment documents concerning the main marine pollutants have already been published and are periodically updated. They constitute an indispensable prerequisite for taking any prevention or abatement measures. For many years now, the attention of the general public has been drawn on the state of the beaches around the Mediterranean. On the one hand, for financial reasons linked to tourism, those living in coastal regions see to it that their bathing waters remain of a satisfactory quality in order to attract summer tourists. On the other, the tourists want to be informed of the risks to which they may be exposed at a given bathing resort. Is complete and objective information at this point possible? Doubtless, it would be an excessive claim to answer in the affirmative, but one can state that great progress has been accomplished in that direction. National monitoring programmes are nowadays the rule around the Mediterranean basin and all information reaching the MAP Co-ordinating Unit is integrated in the data bank. However, for several of these countries, the implementation of the programmes is still too recent in order to draw a comparison and establish a trend. Let us simply say that the partial data that are available allow us to see a net improvement every time that a local cleaning-up operation has been set up (e.g. construction of an underwater outfall). However, it is still too early to be in a position to give global percentages of the results of monitoring on a country by country basis; furthermore the information submitted to MAP by local authorities cannot be made public, until it is published by the latter in an official form. Be that as it may, MAP has been in a position to register, for some time now, a favourable trend as concerns bathing water quality around the Mediterranean. Other data, from the EEC or private organizations, confirm this hypothesis. From both these elements the following conclusion can be drawn: the disastrous trend of the 70's has been reversed.

The latest EEC Report

The Commission of the European Communities (Directorate-General for Environment, Consumer Protection and Nuclear Safety) has just published its 5th report with the title "Quality of bathing water, 1983-1986". The data contained in it obviously refer only to the EEC countries. The European Community Directive of 8 December 1975 requires that the member countries submit regular reports to the Commission on the state of their bathing waters with the most significant parameters, such as faecal total coliform counts and streptococcus counts; these are indicator organisms for a potential sanitary risk for bathers. Various other physico-chemical parameters (acidity, temperature, presence of nutrients, hydrocarbons etc) are also measured. The Commission report published this year was thus prepared on the basis of the various national reports for the 4 bathing seasons 1983-1986. Spain whose accession to the Community is recent did not submit data. Greece transmitted its data after this report was printed, but from the data at our disposal concerning the Attica region (where 1/3 of the country's population lives and which is the most seriously affected) we

SUMMER SEASON: THE DISCUSSES POLLUTION PROB

Newsweek

The problem of toxic wastes dumped in the third world, the appearance of "red tides" (or abnormal algae blooms) are just two of the topics that the international press discussed this summer while alerting public opinion on the state of the environment. Since the Mediterranean attracts by itself one third of the total world tourism (more than 100 million a year), it is evident why the world press devoted to it large-scale features. The American magazine *Newsweek*, in its August 1st issue, deals with the general topic of marine pollution at world level; the suggestive title of the feature was "Don't go near the water". As concerns the Mediterranean the author writes: "In 1976, seventeen countries surrounding the Mediterranean pledged to fight pollution in what had become one of the filthiest bodies of water in the world. Today those in charge of the programme, which is coordinated by the United Nations, boast that the tide has been turned. "The situation in the Mediterranean is not desperate", says UN official Aldo Manos. "There is hope for the future". Indeed some tangible improvements have been made. Last November the city of Marseille opened its first sewage treatment plant; Barcelona has constructed a similar facility and even Athens plans to build one of its own. And yet the Mediterranean remains shamefully contaminated. If the Mediterranean clean-up campaign demonstrates anything, however, it is that multilateral cooperation is essential".

النسرف الازواسط

Asharq Al-Awsat (Aug. 18), a Saudi daily with a very large circulation throughout the Arab world refers to the "symposium on Energy, Development and Environment in the Mediterranean" held at Naples and deals with the problem of chemical wastes in the Mediterranean. It notes especially the spectacular improvement of the quality of the environment due to the UNEP Programme and estimates that about 80% of the beaches are clean. It concludes on the "sound decision" of the Italian government to allocate \$4 million to clean-up the Po river.

FINANCIAL TIMES

Under the title "Murky treat to Homer's sea", *The Financial Times* (July 22), a British daily of the business world, gives a lengthy description of

see that in 1987 52.9% of the areas monitored (as against 46.6% in 1986) conformed with the standards; there is thus a clear improvement of the order of 6.3%. Also in Attica, the number of beaches monitored increased from 72 in 1986 to 90 in 1987 with a considerable increase in sampling. In the rest of the country, more than 100 beaches were monitored and the trend of improvement is confirmed (beaches meeting the quality standards exceed 85% of the total). Due to its geographical peculiarities (site dispersion and length of coasts the greatest in the EEC because of the high number of islands) Greece will only be able to give precise figures in 1989, when its national monitoring programme will be fully implemented.

The EEC report contains a rather complete picture of the other two Mediterranean States which are also Community members. For France the following trend is observed: in 1983, 1312 monitoring sites out of a total of 1757 (i.e. 76.4%) met the EEC recommended standards. In 1986, out of a total of 1726, 1465 (or 85.7%) met these standards. The improvement is thus very clear. The data concern monitoring points along all French coasts (Channel, Atlantic, Mediterranean); a breakdown therefore of the percentages by region is not possible, but a comparison of the maps showing water quality for each beach monitored shows that the Mediterranean coast has followed the general favourable trend, registered

INTERNATIONAL PRESS EMS IN THE MEDITERRANEAN

the activities of the Mediterranean Action Plan as part of a full-length feature on Greece, since Athens is the headquarters of the Co-ordinating Unit. It writes that Greece "has pledged to promote the Plan on the level of the European Community in the six months, between now and December, when it will also hold the presidency of the Council". And the author concludes: "The hope is for interest in the cleaning up the Mediterranean to spill over to non-Mediterranean countries in a realisation - supported by tourism figures if nothing else - that environmental protection is a global, not a local concern. "Countries like Britain and Germany should learn to think of the Mediterranean as their own. So far they have been reluctant to accept responsibility", Mr. Manos says".

GYNAIKA

The women's magazine *Gynaika* (Woman) deals in its August 17 issue with the Tributyltin (TBT) problem. This well-documented article reviews all the aspects of pollution caused by this chemical product used in anti-fouling paints used for the protection of the hulls of ships.

CORRIERE DELLA SERA Le Monde

Finally, the Italian daily *Corriere della Sera* (August 17) and the French daily *Le Monde* (August 27) write once more about the threat that pollution represents for the future of the Mediterranean. *Le Monde* notes: "It is only through international action that the situation will be reversed. It is of no use if Nice cleans its wastewaters if the Ligurian current brings to it the untreated wastes of the Italian Riviera. This is the reason why the Mediterranean coastal States meet periodically to discuss the problem. But progress is slow and so far it has not succeeded in compensating for the demographic explosion raging on the whole coastal fringe". His Italian colleague echoes this by quoting a French ecologist to the effect that: "In a certain way, the Mediterranean today is a little cleaner, thanks to the treatment plants operating in several coastal cities".

at national level. For Italy, the EEC report shows a strong increase of points monitored (from 1926 in 1983 to 3525 in 1968) with a corresponding increase in the average sampling frequency at each point monitored from 6.6 to 9.7. In other words, the data are more numerous and for that reason more significant. It should also be noted that the percentage of samples meeting the EEC standards increased from 78.4% in 1985 to 81.5% in 1986. Since the EEC report was published, the Italian Ministry of Health published a supplementary report for 1987; the percentage given there is 86.2%.

Other encouraging studies

For the other Mediterranean countries, as mentioned earlier, the data do not yet allow a numerical assessment of the national trend. The Yugoslav authorities have submitted a report on water quality along the Adriatic coast. For most of the beaches, the data for 1986 show an acceptable level of microbial pollution and no major changes. The main "black spots" are still the harbours of Split, Koper and Rijeka, whereas an improvement is becoming apparent in the areas where new wastewater disposal facilities have been built (as in the Bay of

Piran). This trend should be confirmed in the near future as the programme for cleaning-up the coasts is continued.

For almost 20 years now, the creation of consumer associations has been an important social phenomenon in the developed countries. Such associations are in effect pressure groups with an ever increasing influence; they carry out periodic studies on the bacteriological and chemical quality of bathing waters, in order to inform their members who as potential tourists are concerned about the results. Some of these studies are based on very strict scientific criteria and are carried out in cooperation with international organizations. Of course they cannot claim to have the same value as a monitoring programme carried out by a network of stations and laboratories at national level. Most often, a small scientific team carries out, during a short period of time (one or two weeks) measurements at the most frequented bathing resorts. Such studies give a "snapshot" of the state of water pollution at the time of sampling. It is a fact that these "snapshots" are better in 1987 than they were in previous years, if we go by the results published in the magazines of these associations, at least as concerns microbial pollution. One is not far from the truth assuming that for the whole of the Mediterranean coast, the satisfactory sampling rates range between 70 and 85%. We are far from the alarmist (and hotly contested) rates given to the public several years ago.

A change in attitude and the way of thinking: the consequences

Since the bays and beaches reserved for bathing are (along with guaranteed sunshine) the main drawing card of the Mediterranean region for 100 million tourists every year, one of the main aims of the Mediterranean Action Plan has been since 1975 to ensure the quality of bathing waters. WHO and UNEP carried out jointly a pilot project, through which 14 Mediterranean countries participated in a monitoring programme at approximately 700 sampling stations. When the project was completed in 1980, a first in-depth evaluation led to the elaboration and recommendation of the WHO/UNEP provisional environmental quality criteria for bathing waters and shellfish growing waters, as well as for the mercury content of seafood. These criteria were adopted in Genoa in September 1985 at the Meeting of the Contracting Parties to the Barcelona Convention. At the same time, the Parties in the "Genoa Declaration" took upon themselves to carry out action which is essential for the improvement of bathing water quality within a 10-year period: deballasting stations for tankers and ships, treatment stations for all cities with a population of over 100,000, outfalls for all cities with a population of over 10,000. For its part, the EEC (which is also a party to the Barcelona Convention) has also issued standards and Directives toward the same goal applicable to the 4 Mediterranean countries which are also Community members. Naturally, all these measures have been a decisive factor of progress.

However, as important, if not more, has been the change in mentality which has occurred in the meantime. Pollution for the governments, local authorities and private individuals is no longer a "dirty word" or a "shameful wound" which must be hidden, but a crucial problem to be confronted openly and for which a solution is sought through collective effort. It is a sign of the times that in certain countries, the public can be informed of the pollution at a given resort from the municipality itself which also hoists an alert flag on its beaches when pollution has reached levels higher than the acceptable standards. So, along with awareness campaigns through the mass media and activities like "the blue flag" given to the cleanest resorts, this climate of transparency and truth on environmental matters must become the rule in the future.

Efforts should not be let up

Given these first favourable results, the worst thing that could happen would be to become complacent. If we let up the effort when things are starting to get better, we run the risk of compromising everything that has been accomplished in recent years, especially since the perspectives of a demographic, industrial and tourist expansion in the Mediterranean basin inevitably augur an increase in the sources of pollution; such an increase should be met with even stricter monitoring, measures and legislation. In almost all coastal states the competent authorities are however aware of the problem and plan accordingly. In France, the towns of Nice and Marseille have acquired modern wastewater treatment plants. In Italy, the Po river will be cleaned up. In our last issue we dealt with the two operations which are respectively carried out and in the planning phase in Rijeka and Kastela in Yugoslavia. In Turkey, at Istanbul, work carried out at the Golden Horn will change the area both from a sanitary and an esthetic point of view, whereas in Egypt an exceptionally large-scale programme will be launched in Cairo. For its part, Spain continues cleaning-up operations in the Costa Brava and the Costa del Sol; 60% of the municipalities on its Mediterranean coast will in the very near future have wastewater treatment plants; this form of pollution represents 90% of urban pollutants. The "Genoa Declaration" spoke of "intensifying the vigilance": 3 years later, this watchword has kept all its importance.

MAP ACTIVITIES

MEETINGS AND TRAINING COURSES HELD RECENTLY.

FAO/IOC/UNEP Training Workshop on the statistical treatment and interpretation of marine community data, Piran, Yugoslavia, 14-24 June 1988.

This 10-day training workshop aimed at illustrating by means of lectures and a thorough practical programme some statistical tools which have become available in recent years for analyzing community data (in the form of species abundance and biomass) arising from studies on the biological effects of pollutants.

The IOC Group of Experts on the Effects of Pollutants was responsible for the scientific part, two members of this group being the basic lecturers. The workshop was attended by 26 participants from Algeria, Cyprus, Egypt, Greece, Israel, Italy, Lebanon, Syria, Turkey and Yugoslavia. The workshop was a real success and it was suggested that it be repeated at a future date.

Consultation on carcinogenic and mutagenic marine pollutants in the Mediterranean (WHO/FAO/UNEP joint project, MED POL Phase II), Athens, 23-25 June 1988.

The Consultation was attended by seven temporary advisers from five Mediterranean countries and one non-Mediterranean country, and one representative each of FAO, UNEP, the WHO Regional Office for Europe and IARC (International Agency for Research on Cancer). The objectives of the Consultation were: to consolidate preparations for the pilot monitoring study, to prepare an annotated outline content of the draft document on assessment of the state of pollution of the Mediterranean by carcinogenic, mutagenic and teratogenic substances and proposed control measures and finally to make appropriate recommendations regarding any future reorientation in the appropriate activity within the research component of MED POL Phase II as well as in other ongoing research programmes in the Mediterranean region.

The Consultation agreed to take the lists of substances established by IARC as a basis for the development of a tentative list of actual or potential carcinogenic marine pollutants in the Mediterranean which could be monitored within the framework of the planned 1989 pilot project. For each of these substances, monitoring matrices (marine biota, sediments or seawater) were agreed upon, as well as the relevant analytical methods.

It was also agreed that the specific locations to be eventually monitored should ideally consist of known hot-spots, to be identified by the institution and/or national authorities concerned.

In discussing the draft outline content of the planned assessment of the state of pollution of the Mediterranean Sea by carcinogenic, mutagenic and teratogenic substances, it was noted by the Consultation that this particular assessment would be more complicated than others produced so far within the framework of the MED POL programme.

Among the recommendations adopted by the Consultation there was one to the effect that WHO should initiate the necessary contacts, both with individual laboratories and with the relevant national authorities, with a view to launching the

pilot monitoring exercise early in 1989. The Consultation also recommended that the laboratories carrying out chemical monitoring should collaborate with those involved in the assessment of biological effects in order to obtain a more complete evaluation of the chemical data.

Consultation meeting on Mediterranean health-related environmental quality criteria (WHO/FAO/UNEP joint project, MED POL Phase II) Bled, 12-16 September 1988.

The objectives of the meeting which was being convened jointly by WHO, FAO and UNEP within the framework of the MED POL Phase II programme, in collaboration with the "Josef Stefan" Institute, Ljubljana, Yugoslavia included the following:

- to review the existing situation regarding mercury and other heavy metal marine pollutants in the Mediterranean;

- to review the results of the current phase of the project on "Methylmercury in Mediterranean populations and related health hazards";

- to make a preliminary review of environmental quality and related criteria and standards eventually required for heavy metal marine pollutants in the Mediterranean;

- finally to make appropriate recommendations: 35 persons participated in the meeting: delegates of 9 countries (Spain, Israel, Greece, France, Italy, Tunisia, Syria, Morocco, Yugoslavia), and the EEC; 4 UN agency representatives (UNEP, FAO, WHO, IAEA); two experts, one each from Poland and the U.S.A attended on their own behalf.

MEETINGS SCHEDULED

FAO/UNEP joint consultation meeting on the toxicity of related substances to marine organisms. Villefranche-sur-mer, France, 10-14 October 1988.

The consultation meeting will review the results of the inter-laboratory toxicity testing exercise with marine organisms; review, and if necessary amend the reference methods on acute toxicity; furthermore review the research work already carried out within the framework of research activity G and relevant to toxicity, persistence and bioaccumulation

and will formulate the framework for future work in these areas.

ECHOES OF MEDITERRANEAN ORGANIZATIONS AND COUNTRIES

The Aspen Institute Italia organizes, this coming November in Cairo, a seminar on the Mediterranean Sea

The Mediterranean region is undergoing enormous growth and with it, heightened threats of environmental dislocation and social, political and economic instability. In the next generation, the region's population will jump from 350 million to over half a billion people, while demand for energy, food and fresh water will grow even more quickly, especially on the Southern shore of the Mediterranean where the demographic explosion will take place. As part of an annual series of seminars on the Mediterranean, Aspen Institute Italia will convene a meeting in Cairo November 21-23 1988 to examine the state of environmental science with relation to the Mediterranean and the Mediterranean Action Plan carried out under the auspices of UNEP.

In the past, the Aspen Institute Italia seminars have examined the possibility of establishing cooperation mechanisms to deal with certain regional issues. The broad outlines for such a mechanism were agreed upon at the 1987 Barcelona Seminar and a "Mediterranean Manifesto" was subsequently agreed upon by the seminar participants as a guide in the establishment of several regional institutions such as a Mediterranean Assembly, a Mediterranean Centre to promote economic and trade development, a Forum to encourage cultural exchanges and a Support Group to sustain the Euroarab dialogue.

This coming seminar will be attended by personalities such as the Vice President of the Italian Council, the Egyptian Minister for the Environment, the Algerian Deputy Minister of Fisheries. UNEP will be represented by the Director of the International Environmental Monitoring system, the Co-ordinator of MAP and the Director of RAC/Blue Plan.

The holding of this seminar in Cairo, comes at a time when the Egyptian capital is setting up a vast cleaning-up project and is also hosting the MAP travelling exhibit.

The Environment: an original way to promote it A record for the Mediterranean

The COREVEN Association (Comité de recherche d'éducation à la vie, l'environnement, la nature) based in Marseille, France, has come up with an innovative idea for the protection of the environment. It taped a 45 r.p.m record with two songs, one of which is on the Mediterranean. The Association called upon a professional musician who composed the music and loaned his studio and equipment for the taping. A children's chorus made up of Association members accompanies the singer Lisa. The profits from the sale of the record go to COREVEN which has created "nature centres" promoting contact with the rural world, garbage collection and reforestation activities.

The Association is headed by Antoinette Guillen, Council member for the Environment of the City of Marseille. In the contest organized by the French Ministry of the Environment for the Best French language song on the environment, the COREVEN record was rewarded.



The record on the Mediterranean

In the framework of refocusing PAP on integrated planning and management of the coastal areas of the Mediterranean Sea

A PILOT PROJECT IS BEING DEVELOPED FOR THE ISLAND OF RHODES

The island of Rhodes has inherited from its past sites and monuments, which along with its natural beauty and mild climate make it a great pole of summer and winter tourism in the Eastern Mediterranean. This phenomenon in fact preceded the appearance of mass tourism in the 60's. Rhodes shares with Athens, Corfu and Delphi a long past of "elite" (high-class) tourism in Greece, favoured by infrastructure set up in the period between the two World Wars. This development generates income, jobs and more generally gives rise to a higher living standard; at the same time however, if development is not adequately controlled, it can have negative repercussions on the environment, the quality of life, land-use and the use of natural resources. There is then the risk of imbalance and the creation of new problems which lead to a vicious circle. In this connection, Rhodes was recently at the centre of attention of both the Greek authorities and MAP officials. The Priority Actions Programme of Split in its refocusing on integrated planning and management of the Mediterranean coastal regions will tackle concrete problems in sites under ecological threat. In response to the invitation extended to the Contracting Parties to submit appropriate proposals, the Greek Government singled out Rhodes for a pilot project. A consultation meeting was held in Athens in March 1988; a UNEP/MAP mission visited Rhodes in June 1988 to hold in-depth discussions with local officials and experts. A preliminary report was submitted by the Greek authorities in September 1988 outlining the main axes of the project. In addition to the active engagement of RAC/PAP, Split, RAC/SPA, Salambo, is also studying the possibility of creating in Rhodes a Specially Protected Area. This process did not aim at replacing by a new project the projects already launched by the Greek State (especially those within the framework of the 5-year plan), but to make Rhodes benefit from the experience gained through the various MAP components to find practical solutions to its environmental problems. The EEC has also shown an interest: the process has already started for the inclusion of Rhodes in an Integrated Mediterranean Programme; in addition, a favourable decision has already been taken as regards waste disposal.

The main problems

The project has already made possible the identification of the main problems facing the island; the local and national authorities welcome the prospect of cooperation, technical assistance and financing.

Water supply: this is a problem of most Greek islands, because of the small amount of rain they receive and the lack of fresh water springs. In Rhodes, the problem becomes very acute in the tourist season, when the population almost doubles, especially in the Northern part of the island in which most of the tourist sites are located. Two solutions are possible: either to build a retaining dam on the Gadoura or desalinate sea water.

Forest protection: in August 1987, an especially destructive fire annihilated 16,000 acres of forest in the heart of the island and caused grave upsets in the ecosystem and the environment of the island. Expert cooperation will be very useful for the study of the impact and reafforestation activities.

Solid and liquid waste: despite the work carried out (construction of a central collection facility which is 70% completed), the disposal of solid and liquid waste remains a major urgent problem: completion of a wastewater treatment facility, construction of an underwater outfall, construction of a recycling plant for solid waste. Even though 69% of the island beaches are still clean, the pollution of bathing waters has affected the vicinity of Rhodes harbour near the evacuation pipes.

Historical sites: the old town of Rhodes has two aspects: a very lively commercial centre, whose expansion must be controlled and abandoned living quarters which cause numerous social problems. Since 1985, the Greek Ministry of Culture and the Municipality of Rhodes have launched restoration activities. More in-depth studies and technological assistance are both needed. In the other settlement areas of the island, the construction of new buildings and tourist complexes which mar the existing architectural context should be avoided.

Seismic risk mitigation: Rhodes is located in a zone of high seismicity and the island has

THE MAP CALENDAR OF MEETINGS

October-December 1988

Meeting of the Task Team on the implications of climatic changes in the Mediterranean	3-7 October Split, Yugoslavia
Consultation Meeting on the acute toxicity of certain substances on marine organisms	10-14 October Villefranche, France
Meeting on oceanic processes	14-18 October Zagreb, Yugoslavia
IX ICSEM/IOC/UNEP Workshop on pollution of the Mediterranean Sea	17-19 October Athens, Greece
Meeting of officials responsible for the 100 coastal historic sites	20-22 October Marseille, France
Meeting of the Bureau of the Contracting Parties to the Barcelona Convention (BUR 32)	31 October
Meeting of the expanded Bureau open to all Contracting Parties (BUR 33)	1-2 November Athens
Consultation meeting on organotin substances	7-9 November Erdemli, Turkey
Training course on renewable sources of energy in the Mediterranean region	7-18 November Almeria, Spain
Workshop on data collection and treatment for integrated planning in the Mediterranean coastal areas	14-18 November Camargue, France
Consultation meeting on organophosphorous substances	21-23 Nov. Barcelona, Spain
Workshop on soil protection	23-25 November, Valencia, Spain
Meeting of scientists responsible for national monitoring programmes	12-16 December Athens, Greece

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A PILOT PROJECT IS BEING DEVELOPED FOR THE ISLAND OF RHODES

often been destroyed by catastrophic earthquakes (an 8 on the Richter scale in 1926, a 7.2 in 1957). The construction boom of the last decades has often been to the detriment of the most elementary aseismic construction standards. Emergency planning should be improved.

The above mentioned fields of priority action are precisely those where the experience gained by the various MPA components can prove very useful. However in Rhodes, as in other places, in addition to solving the concrete problems (workplan for project

implementation, financing), one also needs a new conception of development which is in harmony with the environment; up till now, the economic well-being of the island has been based almost exclusively on tourism and hardly on the primary and secondary sectors. This one-sided development, which brings about economic and social imbalance (the

Southern part of the island has remained in the margin) must be corrected by either launching new activities ("clean" industry) or by reactivating traditional activities to which tourism gives an outlet: fishing, agriculture, animal farming, quality handicrafts. In December, Rhodes will host the European Summit which will mark the end of Greece's chairmanship in the EEC: it will be an excellent occasion for the heads of State and Government to have an in-the-field review of the problems facing the outlying regions of the Community.



RHODES *Summary information*

Rhodes, the most important of the Dodecanese islands is located in the S.E. section of the Aegean Sea, near Asia Minor (Marmaris)	
Surface:	1,398 km ²
Length of coasts:	220 km
Population:	88,000, of which 41,425 live in the town of Rhodes (according to the 1981 census). 47% of the population is urban, 52% employed in the tertiary sector.
Climate:	Temperate Mediterranean - mean annual temperature 19° C. Abundant vegetation due to the prevailing humidity.
Morphology:	In the centre, semi-mountainous to mountainous relief: 3 mountain ranges, highest peak Atabyros (1215 m). The coastal plains give the coasts a regular contour.
Administration:	Rhodes is part of the S. Aegean island district whose headquarters are in Hermoupolis, Syros; the prefecture of the Dodecanese islands is located in the town of Rhodes. The island is subdivided into 5 geographic regions.
History:	Like most of the Aegean Islands, Rhodes has a three thousand-year history, the civilizations succeeding one another, each leaving its traces. About 1100 BC, the Dorians settle the island and found Ialysos, Lindos and Camiros, 3 cities with links to other cities in Asia Minor. The town of Rhodes is founded in 408 BC in the N.E. of the island; it becomes a centre of Aegean civilization, an ally of Sparta and then of Athens. Its commercial links with Rome will make it a centre of maritime trade at the crossroads of Europe, Asia and Africa. In 395 A.D. Rhodes follows the fate of the Eastern Roman Empire. During the 4th Crusade, the knights of St. John of Jerusalem begin to settle in the island. They stay for 200 years building the mediaeval town, the quarter of the Palace and the Inns - the "Collachium" - the fortifications which are examples of Western Art with some Byzantine elements. Rhodes was conquered by the Turks in 1522 and remained a part of the Ottoman Empire until 1912 when the Italians occupied it. Between the two World Wars, Italy develops the modern city outside the walls, creates a hotel infrastructure and restores or rebuilds most of the Frankish monuments. Like all the other Dodecanese islands, Rhodes is restored to Greece in 1948. The fact of its late integration to Greece and its distance from Athens, explains its special customs status and its direct trade exchanges with other countries.
Tourism:	In 1987 (according to the statistics of the Greek National Tourist Office) 777,488 persons visited Rhodes and spent 7,380,878 nights there. The island has a total bed capacity of 41,673, 16,130 of which are in the town of Rhodes. The latter, along with Lindos, was officially given the status of an area "with saturated tourist development".