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Eighth Ordinary Meeting of the Contracting
Parties to the Convention for the Protection
of the Mediterranean Sea against Pollution
and its related Protocols

Antalya, Turkey, 12-15 October 1993

**REPORT ON THE IMPLEMENTATION OF
THE MEDITERRANEAN ACTION PLAN AND OTHER
RELATED ACTIVITIES**

Table of Contents

	Page
Introduction	1
Summary of the State of the Environment and Development in the Mediterranean	2
Activities carried out under the Mediterranean Action Plan during 1991-1993	4
General Developments and Legal Aspects	4
Coastal Area Management Programme (CAMP)	6
Marine Pollution Monitoring and Research	7
Assessment of Land-based Sources of Pollution	11
Common Measures to Control Pollution	12
Assessment of the Potential Impact of Climatic Changes	12
Training and Fellowships	14
MED POL and the Coastal Areas Management Programme (CAMP)	15
General Remarks on MED POL	15
Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)	16
Blue Plan Regional Activity Centre (BP/RAC)	19
Priority Actions Programme Regional Activity Centre (PAP/RAC)	21
Specially Protected Areas Regional Activity Centre (SPA/RAC)	26
Historical Sites Regional Activity Centre	30

	Page
Activities of the Contracting Parties directly relevant to the Mediterranean Region	33
Cyprus	33
European Community	34
France	35
Greece	36
Israel	37
Italy	39
Malta	40
Spain	41
Tunisia	41
Turkey	43
Activities of other States directly relevant to the Mediterranean region	47
Croatia	47
Activities of UN Specialized Agencies and Intergovernmental Organizations relevant to the Mediterranean Region	48
Food and Agriculture Organization of the United Nations (FAO)	48
International Atomic Energy Agency (IAEA)	50
Intergovernmental Oceanographic Commission (IOC/UNESCO)	55
World Bank (WB)	59
World Health Organization (WHO)	60
World Meteorological Organization (WMO)	63
Council of Europe	65

	Page
Activities of Non-Governmental Bodies relevant to the Mediterranean Action Plan	69
Greenpeace	69
Hellenic Marine Environment Protection Association (HELMEPA)	70
International Commission for the Scientific Exploration of the Mediterranean Sea (ICSEM)	72
Mediterranean Association to Save the Sea Turtles (MEDASSET)	72

INTRODUCTION

This report has been prepared at the request of the Scientific and Technical Committee and the Socio-Economic Committee of the Barcelona Convention at their Joint Meeting in Athens from 3 to 7 May 1993. It follows the format suggested at that meeting by the representative of France.¹

¹ At the Joint Meeting of the Scientific and Technical Committee and the Socio-economic Committee (Athens, 3-7 May 1993), the representative of France "recalled the previous request made to the Seventh Ordinary Meeting of the Contracting Parties to prepare a report on how administrative costs might be reduced and savings effected." He also referred to "the need for improvements in the presentation of progress report on the Mediterranean Action Plan - to be prepared by 15 July 1993, and to be distributed to the Contracting Parties - suggesting that the following points be included: activity of MAP *stricto sensu*; provisional accounts for 1992 of the Mediterranean Trust Fund; efforts of the Co-ordinating Unit to improve the management and reduce administrative expenses; two page summary of the state of the environment and development in the Mediterranean; works undertaken for the environment and sustainable development by other bodies, directly relevant to the Mediterranean region activities undertaken by the Contracting Parties directly relevant to the Mediterranean region."

The Co-ordinator reminded the Joint Meeting that the Co-ordinating Unit does not receive regular reports on the relevant activities of the Contracting Parties. He subsequently decided to present two documents: one dealing with the financial aspects of MAP; another with the activities, covering the other specific points requested. The period covered by the latter document is, in principle, 1991-1993. However, to place certain information in a better perspective, information on earlier relevant activities is occasionally used.

Immediately after the Joint Meeting, the Co-ordinator sent out an urgent request to the Contracting Parties, the MAP Regional Activity Centres, the UN agencies and the intergovernmental and non-governmental organizations concerned. At the time of preparation of the present document, responses had been received only from seven Contracting Parties (Cyprus, France, Greece, Israel, Malta, Tunisia and Turkey); of these, only four (Cyprus, Israel, Malta and Turkey) were drafted specifically for the present purpose (and those from Cyprus and Malta were highly summarized), two (France and Greece) were their national reports to UNCED, and the other (Tunisia) was the national action programme for the environment. National reports on environment and development for Italy and Spain were also available in the Co-ordinating Unit but not covering the reporting period; they have also been used to enhance an otherwise meagre picture of activities.

In the case of Croatia, which is a Mediterranean State but not a Contracting Party, information was obtained in the same way as for Italy and Spain.

Specific reports were received from all the Regional Activity Centres.

Five UN Specialized Agencies and intergovernmental organizations (IAEA, IOC, WHO, WMO and CE) submitted reports on their activities relevant to the Mediterranean, and the European Commission submitted a short statement, pending receipt by the Co-ordinating Unit of an EC summary report. Available information on FAO activities was also available in the Co-ordinating Unit and was used herein.

Three non-governmental organizations (HELMEPA GREENPEACE and MEDASSET) submitted reports, although, because of defective transmission, the Greenpeace report could not be exploited. Information on ICSEM available was also used.

In every case, information is based on reports received or data available up to 4 August 1993.

SUMMARY OF THE STATE OF THE ENVIRONMENT AND DEVELOPMENT IN THE MEDITERRANEAN

The concentration of marine pollutants varies considerably, from one environmental medium (e.g., atmosphere, water, sediments, organisms) to another, from one ecological province (e.g., river, estuary, coastal water, offshore water, deep water) to another, from one faunal group (e.g., phytoplankton, zooplankton, mollusks, crustaceans, fishes, birds, mammals) to another, from one species (e.g., *Mullus barbatus*, *M. surmuletus*) to another, and from place to place (e.g., eastern Mediterranean, western Mediterranean) to another. Even within a given element of the environment, reliable data show appreciable, even considerable, variations, so that the confirmation of a trend is not easy. For the vast majority of pollutants, any trend in concentration tends to be most easily related to human activities, since natural processes have tended to an equilibrium, with variations occurring on a much longer time scale (the ionic composition of sea water, with the exception of two or three key ions, notably calcium, potassium and strontium, has remained virtually unchanged for 200 million years, till the advent of modern man).

The most comprehensive summary of the best available data is given in MAP Technical Report No. 28 (State of the Marine Environment in the Mediterranean Region; Jeftic *et al.*, 1990). For any given environmental medium, ecological province, species of marine organism, and place, the concentrations of the key pollutants are unlikely to fall outside the ranges given in the above-mentioned Technical Report. Since these values are bound to reflect the corresponding analytical accuracy and precision, quantified by intercalibration exercises but not removed by them, the confirmation of a real trend requires the continuation of all forms of monitoring (even if frequency or spacing of samples can be relaxed in the light of experience) and of the accompanying data quality assurance programmes.

Although currently available data do not allow confirmation or denial of any change in the presently established trends, recent work carried out by the IAEA Marine Environment Laboratory in Monaco has updated our knowledge of radio-active contamination of the Mediterranean Sea, mainly reflecting the Chernobyl "injection" through fall-out. The trend, in the case of radio-active contamination, tends to be stepwise following such specific "injections".

Thus, the inventory of ^{137}Cs is now greater than that found in the western Mediterranean in previous years; the added quantities (about 36%) are derived from fallout debris from the 1986 Chernobyl accident.

Higher concentrations of ^{137}Cs are also noted in the Levantine Intermediate Water mass which originates in the eastern Mediterranean. However, no additional ^{239}Pu is associated with this sub-surface source-term, indicating that very small amounts of the transuranics were deposited with Chernobyl fallout debris.

Relatively higher concentrations of ^{137}Cs and ^{239}Pu are found in the deepest water sampled and, most likely, are transported to depth from near-surface waters by local deep-water formation in the northern part of the western basin. Only 33% of the total ^{239}Pu inventory in the water to a depth of 2000m was found below 1000m in the 1976-1982 period, 46% is now distributed below this depth, mainly as a result of convection and vertical transport in association with particles.

Coastal-zone development continues, though at a slower pace during the current economic recession. Nevertheless, the spread of uncontrolled or poorly managed coastal development, particularly in the form of tourist accommodation and facilities, by creating increasing pressure on dwindling resources in terms of land and drinking water, also creates increasing pressure for some form of longer-term development policy in most coastal countries, such as integrated coastal-zone management, at most (since hardest to achieve) or conscious segregation of antagonistic activities (human habitation/industry; industry/fishery; sport fishing/commercial fishing; artisanal fishing/industrial fishing, for example), at least. Several countries (notably France, Greece, Spain and Italy), as well as the CEC, are now paying considerable attention to improving bathing-water and beach quality and annual reports are published on beaches and bathing waters quality.

With the increasing trends in resident population size and density, and the likelihood of similar trends in the non-resident, tourist population, access to modern sanitation services has also kept pace and, in some cases, even considerably improved. And as the demand for increased quality, particularly in food, has increased in the tourist "exporting" countries, so it has in the tourist "importing" countries.

Under the increasing pressure of public awareness of the need to resist environmental degradation, industries are also increasing their efforts to control or to modify its waste discharges, but assessments of this and other land-based sources and of atmospheric transport have not covered a sufficient number of years, pollutants or areas yet to confirm such a trend definitely.

The Mediterranean continues to be a polluted semi-enclosed sea, quite badly so in certain places at certain times, but quite moderately so in general.

ACTIVITIES CARRIED OUT UNDER THE MEDITERRANEAN ACTION PLAN DURING 1991-1993

GENERAL DEVELOPMENTS AND LEGAL ASPECTS

MAP work has expanded from an initial concern with the pollution of the Mediterranean Sea to include problems of general environmental degradation caused by the uncontrolled development of the coastal area of the Mediterranean region, as well as its management. Mediterranean States now realize that there is a limit to development and that the environmental problem is a development problem.

Most of the Mediterranean coastal States have now created and strengthened institutional environmental structures to meet the new orientation of MAP towards sustainable development.

The great interest shown in the MAP Coastal Areas Management Programme (CAMP) by the Contracting Parties is a clear manifestation of their desire to integrate environmental concerns into development and to enhance their co-operation under the Mediterranean Action Plan (MAP). The EC initiative on Euro-Mediterranean Co-operation (Nicosia Charter) can also be considered an essential instrument to achieve sustainable developments in the Mediterranean Region. Following the adoption of the charter in 1990, a ministerial meeting held in Cairo in 1992 adopted a Declaration in which the short-term and long-term objectives of the Charter were translated to practical actions; among those, the establishment of a follow-up mechanism composed of EC, the World Bank, MAP and UNDP in charge of the co-ordination of the activities, and the identification of four Mediterranean countries on which specific projects would be implemented during an initial period of two years.

In response to this interest, the MAP Co-ordinating Unit has been laying the foundation for a regional effort in sustainable development through the preparation of an Agenda 21 for the Mediterranean region, by way of follow-up of the United Nations Conference on Environment and Development (UNCED).¹

Another positive development, resulting from MAP's work during the last decade, has been the financial and technical support provided by regional and international financial and development institutions to some MAP projects (METAP for MED POL activities, EIB for the Rhodes Island CAMP, and EC(LIFE) for sub-regional systems for combatting major marine pollution accidents).

¹ An Informal Consultation of experts on an "Agenda 21 for the Mediterranean" was organized by MAP in Malta in February 1993 at the request of the Bureau of the Contracting Parties

With a view to completing MAP's institutional and legal structure, intensive consultations with Mediterranean experts during the last three years have aimed at the preparation and subsequent approval of two new legal instruments: one on the Protection of the Mediterranean Sea against Pollution resulting from Exploration and Exploitation of the Continental Shelf and the Sea Bed and its Sub-soil (**Offshore Protocol**); the other on the Prevention of pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (**Hazardous Wastes Protocol**). It is expected that the Offshore Protocol will be adopted by the Conference of Plenipotentiaries of Mediterranean States by the end of 1993.

Preparatory work has started on the drafting of an appropriate procedure for the determination of liability and compensation for damages from pollution of the marine environment in conformity with Article 12 of the Barcelona Convention.

MAP has continued to assist the Contracting Parties in the compilation of their environmental legislation. This assistance aims at promoting the management of all legal issues at national, regional and international levels and at helping to raise the level of implementation of the Barcelona Convention. More particularly: it assists the function of the Co-ordinating Unit in advancing the implementation of the Mediterranean Action Plan; it strengthens the role of the Co-ordinating Unit and creates the conditions for further integration and more effective co-operation among the Contracting Parties.

To date, compilation of environmental legislation has been undertaken in Greece, Egypt, Israel, Malta and Tunisia. Two more compilations are intended to be undertaken each year.

Convinced of its important role, particularly in increasing public awareness of the concept of sustainable development, the MAP Co-ordinating Unit has strengthened its co-operation with various relevant international and Mediterranean non-governmental organizations. Assistance was rendered to some NGOs in the Mediterranean, particularly in developing Mediterranean coastal States, to enable them to strengthen their capabilities, to convene meetings on the protection of the Mediterranean environment, and to prepare specific technical reports and studies on the Mediterranean environment.

Improving MAP's public relations and increasing public awareness of its objectives and endeavors, as well as communicating environmental information to governments in order to influence response and follow-up action, was another of the main thrusts of MAP's work during the reporting period.

Issues of the MAP information bulletin (MEDWAVES) were distributed regularly to all Contracting Parties, IGOs and NGOs around the Mediterranean. MAP Technical Report Series, now up to its 75th issue, were received by specialized institutions in the Mediterranean.

Since the training component is an important factor and a prerequisite if the developing Mediterranean States are to be able to benefit fully from the various environmental/development programmes, the MAP Co-ordinating Unit has been developing various general and specialized training programmes for the benefit of nationals from these States.

COASTAL AREA MANAGEMENT PROGRAMME (CAMP)

The inevitable association of levels of pollution and environmental degradation of the environment - marine and terrestrial - with human activities has led to a particular concentration on the coastal areas, the exploitation of which is the main cause of the degradation and the source of many pollutants; the other sources - industry, agriculture, urbanization in the hinterland - also have an impact on the coastal zone, since their pollutants reach the coast mainly via rivers, although the atmosphere is a principal pathway for some of them.

Approaching the dual problems of environmental protection and development, to achieve sustainable development, by more or less disconnected studies of land-based sources, marine dumping, bathing-water quality, for example, while acceptable initially must eventually give way to a much more integrated approach to the use and protection of the coastal zone.

The MAP Coastal Areas Management Programme (CAMP) was therefore conceived to introduce or develop integrated planning and management of the development of the coastal zone. Based on the principles of integrated coastal zone development and, in the longer term, of sustainable development, a CAMP is a form of advanced collaboration between local and national authorities and institutions, based on such principles.

In the MAP context, each CAMP is site-specific, each site being an example of a coastal area threatened or significantly affected by pollution or uncontrolled development, having sufficient local and national capacity to carry out the CAMP, and backed by the express interest of the relevant authorities in its execution. Additionally, the results obtained must be made available for use in at other potential CAMP sites.

Each CAMP is conducted in three phases: I - Preparatory (data collection, upgrading of capacities, knowledge of the environment - assimilative capacity, main problems, potential climatic impacts - and programme formulation); II - Implementation (creation of data base, training, integrated planning studies etc.); and III - Follow-up (preparation of an integrated plan, its execution, associated monitoring, and re-evaluation).

Since each CAMP is site-specific (the sites chosen so far are discussed in the section on the PAP/RAC, later), the main MAP programmes, such as MED POL, the Blue Plan, Specially Protected Areas, may all be associated with, or a part of, a given CAMP.

However, the increasing number of CAMP projects, from the initial four (Kastela Bay, Bay of Izmir, Coast of Syria and Island of Rhodes) to nine (Fuka-Matrouh, Sfax, Albania, Morocco and Algeria) projects today, with another four (Malta, Lebanon, Italy and Israel) expected to be approved by the Eighth Ordinary Meeting, although working towards sustainable development in the region, has placed severe stress and an increased burden on the MAP institutional structure and personnel which, in turn, necessitates a strengthening and upgrading of MAP's institutional, human and financial capacities to handle these new challenges and opportunities

MARINE POLLUTION MONITORING AND RESEARCH PROGRAMME (MED POL)

Introduction

The Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) is the environmental assessment component of MAP and is one of its cornerstones. In Phase I (1975-1980), participating national laboratories were provided with essential equipment and material for monitoring the quality of the water, sediments and marine organisms; scientists and technicians were trained in standardized analytical techniques; and a network of scientists and institutions was created to promote the exchange of results and experience.

MED POL Phase II (1981-1995) has the following components: monitoring; research; data quality assurance; assessment of pollution; common measures for the control of pollution; implementation of the LBS Protocol; training and fellowships.

Monitoring

Four types of monitoring have been undertaken in Phase II: sources of pollution; nearshore areas, including estuaries; offshore (reference) areas; and atmospheric transport of pollutants to the Mediterranean. The National Monitoring Programmes are elaborated with the help of the MAP Co-ordinating Unit; the responsibilities of each of the parties involved are rather precisely defined, covering: location of sampling stations; parameters to be measured; frequency of measurements; methods used; laboratories responsible for sample analysis; data transmission; and the data quality assurance programme. Contamination/pollution is regularly monitored at hundreds of sampling stations.

A draft country profile on the state of, and trends in, pollution of the marine environment has been prepared for Croatia, Cyprus, Egypt, Morocco, Slovenia and Tunisia.

Several countries are continuing to monitor **atmospheric transport of pollutants**, as part of national monitoring agreements. WMO, UNEP and the Euro-Mediterranean Centre on Marine Contamination Hazards ran a Training Course on the Monitoring and Assessment of Airborne Pollution (Malta, 1993).

A EUROMED FAO-UNEP Working Group on Biomonitoring in the Mediterranean and the Black Sea was convened (Malta, 1992). It concluded that biomonitoring could be initiated on a pilot scale and prepared a relevant programme for its implementation; it recommended two general and two specific stress indices to be included in the programme.

Pilot Monitoring Surveys (PMS) are designed to obtain an overall, rapid and reliable picture of the pollution due to specific substances not on the Priority Pollutant Lists I and II of the MED POL Monitoring Programme. If the results of these PMS so indicate, the unlisted pollutants are incorporated into the MED POL Monitoring Programme.

The PMS for **herbicides** has been completed; it covered the Rhône, Pô and Ebro rivers and five Greek rivers (samples were also taken from the Nile). A meeting of the principal investigators (Athens, 1992) was organized by FAO, UNEP and IAEA to prepare a consolidated report containing all the data of the survey.

An FAO-IAEA-UNEP consultation was also convened (Ioannina, 1993) to prepare the programme for a PMS on **fungicides**, to be initiated as soon as funds are made available.

All available data from the MED POL monitoring programme on microbial pollution (in sea water), heavy metals and halogenated hydrocarbons (in biota, plankton, sediment and suspended matter) have been computerized. Phase I data have also been incorporated into the MED POL database, so that some pollution data archives now span over fifteen years.

To assist the Contracting Parties in the computerization and transmission of marine pollution data through magnetic media, two manuals (on Codes and on Data Transfer Formats) were sent to them; these manuals are being regularly updated as necessary.

With the assistance of consultants, the analysis and presentation of MED POL pollution data have continued. Analyses of data on **heavy metals** and **halogenated hydrocarbons** in biota have been completed. A report thereon, including special reference to temporal trends (1974-1991), was distributed to National Co-ordinators for comment. A computer programme and GIS facilities have been acquired by the MAP Co-ordinating Unit and are being used to map bathing-water quality (utilizing data on microbial contamination of sea water).

At present 16 Mediterranean countries have on-going programmes and are submitting data.

Research

As of June 1993, there were 190 ongoing projects under the MED POL research component. However, the Contracting Parties decided that, in the 1992-93 biennium, half of the research funds should be devoted to projects on the specific subject of **eutrophication and plankton blooms**. To this end, a small consultation meeting was held (Athens, 1992) to decide the objectives and the approach and to define a detailed scientific programme. The approach preferred was through comparable case studies. Initially, the suggested study areas are the Emilia-Romagna coast, Alexandria Bay, Thermaïkos Gulf and l'Etang de Prevost; work on the Emilia-Romagna coast and Thermaïkos Gulf started at the end of 1992.

In the **development and testing of methods for the characterization and measurement of specific contaminants**, a number of ongoing projects have addressed: electrochemical methods for the direct measurement of dissolved and dispersed organic matter in marine waters; the applicability of remote sensing to the monitoring of coastal water pollution; the revision of existing recommended microbiological methods and the development of new ones; and determination of the relationships between pathogens and bacterial indicators in seawater and shellfish.

Regarding the **physical, chemical and biological mechanisms of the transport of pollutants, from source to sink**, ongoing projects have addressed: the modelling of atmospheric transport; dispersion and deposition of nutrients and heavy metals in the Mediterranean; coastal water current systems; and the sedimentation and benthic fluxes of heavy metals in shallow coastal waters.

The **fate of contaminants, including micro-organisms, in the marine environment: survival; degradation; transformation; bioaccumulation etc.**, is addressed in several ongoing projects covering: the fate of hydrocarbons in coastal waters; geochemical cycles of heavy metals in estuarine sediments; the role of micro-organisms in chromium accumulation; the transfer of trace metals from water to sediment through green algae; survival of indicator organisms and pathogens in seawater and shellfish under Mediterranean conditions.

A number of the MED POL research projects are directly linked to the implementation of the LBS Protocol.

Those on the effects of selected contaminants on marine organisms, communities and ecosystems or man and human populations include health-related projects dealing with **correlations between recreational water quality and health effects on bathers, biological monitoring of population groups exposed to heavy metals in seafood, and carcinogenicity and mutagenicity of marine pollutants**.

Those on the determination of factors affecting the efficiency of waste treatment and disposal methods and development of environmental quality criteria include one project that was completed in 1992; it covered the study of **coastal pollution due to solid wastes and its control by proper disposal, re-cycling and re-use**. No other such projects are now envisaged.

Data Quality Assurance

The Marine Environmental Studies Laboratory (MESL) of IAEA-MEL, Monaco, continued to assist MEDPOL with the implementation of intercalibration exercises and a comprehensive data quality assurance programme. The work has focussed on the continuing development of an integrated approach to quality assurance, including training, intercalibration, joint monitoring exercises, the preparation and distribution of reference materials and standards and support for instrument installation and servicing.

The work done is reported in some detail in the IAEA section of the present document.

More than 20 MED POL laboratories reported results for the **trace-metal** intercomparison exercise using "polluted" sediment sample IAEA-356. A report will be issued in 1993. Results of a World-wide and Regional Intercomparison for the Determination of Organochlorine Compounds and Petroleum Hydrocarbons in Sediment IAEA-357 have been evaluated and are given in IAEA Report No. 51; twelve MED POL laboratories participated in this intercomparison.

The results of intercomparison exercises on **methyl mercury** and **herbicides** started in 1992 are being analysed.

Through the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials (GESREM), a new bivalve reference material (GESREM I) has been produced and new materials are currently in preparation (GESREM II and III); these reference materials will be made available to the MED POL monitoring laboratories of developing countries. An extensive world-wide catalogue of reference materials for marine environmental applications has also been published.

Several MED POL Reference Methods were revised in 1992 and this work is continuing at IAEA-MEL. The publication of a new series of **Technical Bulletins for Marine Pollution Studies** was also started in 1992.

Instrument maintenance is an essential element of data quality assurance. In 1992-93, besides the regular servicing of instruments through MED POL, several new atomic absorption spectrometers and gas chromatographs were installed in MED POL monitoring laboratories in four countries, through the World Bank's METAP programme. Three more such instruments supplied through METAP will be installed in 1993.

ASSESSMENT OF LAND-BASED SOURCES OF POLLUTANTS AND MARINE DUMPING

Implementation of the Land-based Sources Protocol

MED POL is the main source of data and information on the Priority Pollutants listed in Annexes I and II of the Land-based Sources Protocol (LBS) and of the pollution assessments required for implementation of the Protocol.

A UNEP document outlining a programme of action to reduce the degradation of the marine environment from land-based activities includes a preliminary estimate of the cost/benefits associated with the protection of the Mediterranean Sea against pollution from land-based sources and activities in coastal areas. Taking into account the ongoing integrated coastal-zone management pilot projects under the Mediterranean Action Plan, the Bay of Izmir and the Island of Rhodes were selected as sites for case studies, the results of which were presented to the MAP Co-ordinating Unit's Consultation on Costs and Benefits of Reduction of the Degradation of the Marine Environment from Land-Based Sources of Pollution (Athens, 1992). After review and revision, the two case studies were published as MAP Technical Report Series No. 72.

In the implementation of the Land-based Sources Protocol, a number of pilot projects and assessments of the state of pollution of the Mediterranean have been completed or are continuing. For certain types of pollutant, guidelines on their treatment or discharge have also been prepared.

A pilot project on **anionic detergents** was completed and an assessment of this type of pollution is in preparation by the WHO.

A preliminary assessment, prepared by FAO, of the state of pollution of the Mediterranean Sea by **zinc** and **copper**, and another, of the state of pollution of the Mediterranean Sea by **carcinogenic, teratogenic and mutagenic substances**, prepared by WHO and later revised in the light comments and suggestions received subsequently, will be submitted to the Contracting Parties in 1993. An assessment of the problem of **eutrophication and plankton blooms** in the Mediterranean will be ready by the end of 1993. FAO is preparing other assessments of **arsenic, lead, chromium** and **nickel**.

Guidelines on the **treatment and discharge of effluents containing substances listed in Annexes I and II to the LBS Protocol** and on **submarine outfalls in the Mediterranean** have been prepared by WHO and will be published in late 1993.

Implementation of the Dumping Protocol

Regarding the implementation of the Dumping Protocol, nine countries have reported either that no dumping took place or that no dumping permits were issued, and three submitted national reports on dumping (mainly of **dredged materials** and **industrial waste**). A proposal to amend the Dumping Protocol to ban incineration of wastes at sea and dumping of industrial waste has been submitted to the Contracting Parties for their consideration.

The Secretariat was requested to create an *ad hoc* group to review Annex I, section B, of the Dumping Protocol; its main objective is to draw up guidelines for the handling of **sewage sludge** and **dredging spills**.

COMMON MEASURES TO CONTROL POLLUTION

Two consultations were jointly convened by WHO and UNEP. At one, on the microbiological quality of coastal recreational waters (Athens, 1993), guidelines on **epidemiological/microbiological studies correlating recreational water quality with health effects on exposed population groups** were updated and expanded. The other, on health risks from contaminants in Mediterranean seafood (Athens, 1991), concentrated on **viruses and algal biotoxins in shellfish** and identified priority actions required.

ASSESSMENT OF THE POTENTIAL IMPACT OF CLIMATIC CHANGES

Climate changes due principally to the "greenhouse" effect can be expected to have a significant impact on, *inter alia*, the marine environment and the adjacent coastal zone in the coming decades. They are therefore of considerable interest to such MAP activities as MED POL, Blue Plan, PAP and SPA. The possible impact has been assessed by nine regional UNEP Task Teams on the Implications of Climate Change, including one specifically for the Mediterranean region.

The primary "greenhouse" effect is to raise the Earth's mean temperature, particularly that of its atmosphere. The main general consequences are changes in: atmospheric transport patterns (wind field); air-sea interaction (evaporation, precipitation, gas and salt exchange); volume (hence mean sea level) and density distribution (hence circulation patterns) of the sea water. From these, changes in relative humidity, rainfall and wind regimes, for example, will lead to ecosystem changes (in vegetation patterns, soil state, animal distribution etc.).

The Task Teams were asked to examine the possible effects: of sea-level changes on coastal ecosystems (e.g., deltas, estuaries, wetlands, coastal plains, coral reefs, mangroves, lagoons, as appropriate for each region); of temperature increases on terrestrial and aquatic ecosystems, particularly with respect to economically important species; and of climatic, physiographic and ecological changes on socio-economic structures and activities; and to determine areas or systems that appear to be the most vulnerable to such changes.

For the first phase of its work (1987-1989), the Mediterranean Task Team identified eight topics for which regional assessments were considered necessary (climate change; sea-level change; oceanography; hydrology; coastal lowlands; land degradation; vegetation; and socio-economic activities) and six site-specific case studies (the Ebro, Rhône, Po and Nile deltas, Thermaïkos Gulf, and the Bizerta/Ichkeul Lakes). The results were presented at a joint meeting of the Task Team with the Coordinators of the Task Teams for the Caribbean, South-east Pacific, East Asian Seas, and South Asian Seas Regions (Split, 1988), and have been published by Edward Arnold (London) in a book titled **Climatic Change and the Mediterranean**.

For the second phase (1990-1992), besides a continuing regional overview, five new site-specific studies were undertaken: Island of Rhodes, Kastela Bay, Syrian Coast, Malta and Cres/Losinj Islands. In the light of the case studies made in the first phase, the present five studies had the following objectives: identify and assess possible implications of expected climatic change on the terrestrial, aquatic and marine ecosystems, populations, land-use and sea-use practices and other human activities; determine areas or systems that appear to be most vulnerable to the expected climate change; and identify options and make recommendations for planning and design of major infrastructure and other systems. A sea-level rise of 24-52cm and a temperature rise of 1.5-3.0^o C, by the year 2050, were assumed for the purposes of the studies.

The results were reviewed at a Meeting on Implications of Climatic Changes on Mediterranean Coastal Areas (Valletta, 1992). They included the results of an advanced computer analysis, based on four General Circulation Models and the aforementioned assumptions; scenarios for temperature and precipitation perturbations were generated for the five sites selected and for three temporal horizons: 2030, 2050 and 2100AD.² A number of shortcomings in the assessments were also identified at the meeting: oversimplification of the processes (e.g., beach dynamics, ecosystem adaptability) that would mediate or even mitigate a given expected impact; insufficient data or insufficient exploitation of available data to allow a reliable assessment; inadequate attention to extreme events (e.g., storm surges, wave action) through which an impact might be heightened; and recommendations sometimes formulated in language inappropriate for decision-makers.

It should also be borne in mind that these climatic-change impacts will develop over a long period of time and will be of far less immediate significance for the future of the Mediterranean than the majority of current, and still increasing, human activities in the Mediterranean coastal zone and its hinterland.

¹ (Jeftic et al, 1991)

² (Palutkof et al, 1992)

TRAINING AND FELLOWSHIPS

Heavy-metal determinations: In the framework of MED POL-WB(METAP) collaboration, a group training course on the determination of **total and methyl mercury in marine biological and environmental samples** was held at the IAEA's Marine Environment Laboratory (Monaco, 1992). Likewise, a group training course on the determination of **heavy metals** and the use of atomic absorption spectrophotometers was held (IAEA/MEL, Monaco, 1992).

Microbiological methods: WHO and UNEP convened the fourth training course and intercalibration exercise in microbiological methods for marine pollution monitoring (Rabat, 1991); the course was conducted in French. The fifth such training course and intercalibration exercise (Athens, 1992) was conducted in English, with the particular objective of enabling the experienced participants to organize courses in their own countries. A sixth such course and intercalibration exercise, in French, is scheduled for Tunis 1993.

Six recommended methods for pathogen determination were finalized at a WHO-UNEP consultation on the determination of **pathogenic micro-organisms in coastal marine waters** (Chioggia, 1992).

Data processing: The fourth and fifth FAO-IOC-UNEP training workshops on the statistical treatment and interpretation of marine community data were held during the reporting period, in Alexandria (1991) and Tel-Aviv (1992). The fourth workshop was regional and aimed at benefitting scientists from the southern border of the Mediterranean. The fifth workshop was national and covered only multivariate statistics. An evaluation of this series of training workshops appears in MAP Technical Report Series No 68. At the request of Italy, a similar workshop, at the national level was organized (Trieste, 1993).

Biological monitoring: The FAO-IOC-UNEP training workshop on techniques for monitoring biological effects of pollutants in marine organisms (Nice, 1992) was organized by FAO (see section in FAO, below), as was the FAO-UNEP-IAEA training workshop on the design of monitoring programmes and management of data concerning chemical contaminants in marine organisms.

The third EUROMED-FAO-UNEP training course on the application of ecotoxicology to the monitoring, regulation and control of marine pollution was held in Sunderland (1993).

General: A large number of Mediterranean scientists were provided with grants to enable them to undergo individual on-the-job training, or to attend scientific meetings on subjects relevant to MED POL.

MED POL AND THE COASTAL AREAS MANAGEMENT PROGRAMME (CAMP)

The broad outline of CAMP was taken up in an earlier section. However, in the context of MED POL, marine pollution monitoring programmes were proposed for all the designated CAMP sites not already covered by the national MED POL Monitoring Programme, the objective being to obtain pollution data and information needed for proper management of the coastal zone concerned.

Under existing CAMP Agreements, a survey of land-based sources of pollution has started in all CAMP sites. Arrangements have been made to assist the national and local authorities involved in CAMPs in the proper implementation of the LBS and Dumping Protocols as well as the control measures adopted by the Contracting Parties (quality criteria and emission standards).

GENERAL REMARKS ON MED POL

The MED POL monitoring effort has so far been considerable. It must, however, be continued for as long as is necessary to acquire a sufficient amount of reliable data to allow an accurate evaluation of inputs and of the resulting contamination. Monitoring strategies, if they are to achieve precise goals essential to sustainable development, must be regularly revised in the light of the results of the monitoring activities as well as the general knowledge of the marine environment.

This general knowledge, as well as specific scientific knowledge and understanding, is being acquired principally, though not exclusively, through the MED POL research programme.

In the period 1992-93, through the evaluation and application of the results of the analysis of the monitoring data and the increased understanding derived from MED POL research, the specific objectives of national monitoring programmes have been gradually adapted with a view to making them more and more a monitoring tool. This process has, however, been seriously compromised by the shortfall in funding for MED POL monitoring, for research and for other, related purposes (such as data quality assurance, training etc.).

During 1993, an independent evaluation of the entire MED POL programme was carried out by consultants; they examined and critically evaluated the achievements and the results of the Phase I and Phase II of MED POL, identified the weaknesses of the programme and suggested possible improvements for the future. This evaluation has resulted especially useful now that the Phase II of MED POL is at its end and that a new phase with new strategies and new objectives (Phase III) has to be proposed for adoption to the Contracting Parties.

The MED POL programme, and not least its training component, is clearly having a positive effect on the development of the marine pollution and research institutions of the region. It remains to be seen whether such an advance can be sustained by the necessary political will of the Contracting Parties to provide adequate support, whether at the national or the regional level, and to pursue the sustainable development of the region, at the most, or protect its marine and coastal environment from further degradation, at the least.

REGIONAL MARINE POLLUTION EMERGENCY RESPONSE CENTRE FOR THE MEDITERRANEAN SEA (REMPEC)

Implementation of the Emergency Protocol

During the 1991-1993 period, the activities undertaken by the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), were aimed at: improving and strengthening the regional system of co-operation and mutual assistance among the countries in facing incidents causing, or being likely to cause, pollution of the sea, including increasing the Centre's capacity to assist the coastal States to be prepared for, and to respond to, marine pollution emergencies, by further developing the Regional Information System; improving the regional capacity to deal with such emergencies, by the introduction of recommendations, principles and guidelines for enhancing preparedness, response and mutual assistance with respect to accidental marine pollution; increasing the level of preparedness and response of individual coastal States to cope with marine pollution accidents by: assisting individual coastal States in the development of their national preparedness and response systems; and developing sub-regional systems for mutual assistance, including preparation of sub-regional contingency plans.

The activities were balanced between covering accidental pollution by oil and by other harmful substances, although more attention has been paid to developing activities related to the latter, owing to the fact that harmful substances became a subject of the Centre's activities only in 1989.

Information

At the regional level, particular attention has been paid to expanding, improving and completing the Regional Information System (RIS) which is seen as a principal tool for assisting countries in developing their national preparedness and response systems, as well as for assisting them in cases of emergency.

Twelve documents, forming sections of RIS, have been completed and/or updated. These were regularly distributed to all REMPEC Official Focal Points as well as to a number of other interlocutors within the region and outside it. Extension of the distribution network, particularly towards various specialized UN offices and the oil and shipping industries, resulted in improving the level of exchange of information with these sectors, which in turn significantly improved the quality of information that REMPEC has been able to make available to the Contracting Parties. In addition to

the preparation of written documents, REMPEC also developed a relational database in which all suitably formatted information included in RIS has been stored. This database is continuously amended, improved and upgraded.

REMPEC has paid particular attention to the preparation of technical documents on response to spills and release of harmful substances other than oil and, in particular, to the development of a maritime transport-oriented database (TROCS) containing information on physical and chemical properties of approximately 400 selected chemicals, their modes of transportation, marine hazards and behaviour after a spillage or release. Two versions of this database were distributed to the Contracting Parties in the form of PC diskettes, and the third modified and upgraded version has been finalized and will be distributed soon.

Work on the adaptation to the region of a computerized decision-support system has been initiated.

Assistance in setting up national systems for preparedness and response

Assistance to the Mediterranean coastal States in developing or improving their national systems for preparedness and response to accidental marine pollution has been given particular attention. A group of countries which had not developed their own national systems, has been identified and the Centre's activities have been concentrated primarily on this group of countries. The organizational aspect of the problem was identified as one of major importance, but technical and operational aspects were also given due consideration.

Assistance was also offered to the countries that have already reached a certain level of preparedness; assistance was provided in improving their existing national systems and adoption of sub-regional contingency plans. With the financial assistance provided by the EC, under the EC/REMPEC contract, REMPEC was able to commence work on the development of sub-regional systems for preparedness and response, including, in particular, preparation of sub-regional contingency plans for co-ordinated response to accidental marine pollution by neighbouring countries.

Activities in the same field of assistance were also initiated through ongoing CAMP projects in another group of coastal States and are expected to be completed in the near future.

REMPEC established closer relations with the oil industry, and strengthened co-operation between governments and the oil industry, with a view to improving preparedness and response to oil pollution at national, sub-regional and regional levels.

Facilitation and co-ordination of mutual and international assistance

Assistance in cases of emergency, ranging from alerting national authorities, providing technical information and/or technical advice, identification of resources for response and exchange of situation reports between interested parties, to direct assistance at the spill site, was offered to several coastal States. Countries benefitting from these types of assistance included Egypt, Greece, Israel, Italy and Tunisia.

A communication exercise aimed at testing the capability of the coastal States to communicate in case of emergency was organized in 1992.

A major improvement in REMPEC's capability to offer its assistance in cases of emergency has been made by the installation at the Centre of the INMARSAT communication equipment which is expected to become operational in 1993.

In addition, REMPEC finalized a set of Principles and Guidelines governing co-operation and mutual assistance in dealing with major accidents, which was approved by the Seventh Ordinary Meeting of the Contracting Parties. The Regional System for Preparedness and Response was further improved by the approval, by the Meeting of REMPEC Official Focal Points (September 1992), of a draft Code of Practice for the use of dispersants for combatting oil pollution at sea in the Mediterranean region, and of a proposal for the establishment of a Mediterranean Task Force to provide assistance in combatting accidental marine pollution.

Port reception facilities

REMPEC organized a Meeting of National Experts on Port Reception Facilities in the Mediterranean (Cairo, 1991). Taking into consideration the importance of the problem of disposal of ship-generated oily, chemical and solid wastes, an Action Plan for the Provision of Adequate Port Reception Facilities within the Mediterranean Region was adopted.

Co-operation with IGOs and NGOs

During the reporting period, REMPEC maintained close working ties with six UN bodies (UNEP/IE; UNEP/GRID; UNEP/IRPTC; WHO/IPCS; WMO and IOC), six non-UN IGOs (CEC; OECD; IOPC Fund; Bonn Agreement; Helsinki Commission; and ROPME), and nine NGOs (ITOPF; IPIECA; INTERTANKO; OCIMF; ICS; PAH; GAOCMAO; Greenpeace; and Friends of the Earth).

BLUE PLAN REGIONAL ACTIVITY CENTRE (BP/RAC)

The Blue Plan Regional Activity Centre's main objective is to explore the evolving relationships between populations, natural resources, development and environment, with a view to enlightening decision-making in favour of sustainable development in the Mediterranean region. The programme of work comprises: systemic and prospective studies; participation in the MAP Coastal Areas Management Programme; data base and information; training; communication and publications; co-operation with IGOs and NGOs.

Systemic and prospective studies

This approach is now applied continuously and simultaneously at three levels: overall Mediterranean basin; national; and coastal zone.

At the overall Mediterranean level, prospective studies on tourism, demography and economics have been carried out to update the scenarios presented in the basic Blue Plan document **Futures for the Mediterranean Basin**.

In **tourism**, the analysis and updating were focussed on relations between the European and the Mediterranean countries and on the development of tourism in several countries in the southern and eastern Mediterranean.

In **demography**, the United Nations statistics and projections originally used by BP/RAC were compared to data from some field sources for fertility rates and women's education, for six southern and eastern Mediterranean countries.

In **economics**, the trends forecasted were generally confirmed, the 1988-1992 period appearing to fall within the T1 (reference trend) and T2 (worst trend) scenarios. Other issues (e.g., islands) were studied or updated and improved (e.g., industry, water, energy) and published (see section on publications, below).

At the national level, the country scenarios were updated and published by the authorities concerned.

BP/RAC and the Coastal Areas Management Programme

Systemic and prospective analysis has been applied to the **Kastela Bay CAMP**, in close co-operation with the University of Split (which worked on a simulation model) and the Priority Actions Programme Regional Activity Centre. A team from the University of the Aegean worked on the **Rhodes Island CAMP**, and several scenarios were elaborated. The start-up of the **Syrian Coast CAMP** was lengthy and the continuation has not been as rapid as hoped, additional support from the EC notwithstanding. The study is continuing, however, and completion is expected by the end of 1993.

Data base and information

The BP/RAC data base has been continuously updated, with some refocussing on coastal regions (as redefined by the Focal Points) and environmental data and indicators. To improve analytical capabilities and storage capacity, new equipment was acquired, with the collaboration of the MAP Co-ordinating Unit.

A study is being completed, with the co-operation of an Egyptian consultant, on the delicate subject of pertinent indicators for Mediterranean coastal zones. Several expert working sessions on environmental data and indicators have been convened.

Pursuant to a recommendation of the Contracting Parties, BP/RAC has prepared a project document on the promotion of a **Mediterranean Environmental Observatory Function** (the "Observatory"). The support of the EC has been obtained for this "Observatory" which will strengthen the BP/RAC's, hence MAP's, socio-economic data-base capability and will particularly promote the development of relevant Mediterranean data bases and indicators. Implementation involves close co-operation with the CEC European Agency for Environment and with the Mediterranean National Environment Agencies. Contacts with OECD and IFEN (French Institute for the Environment) have been initiated with a view to ensuring co-operation. Since information is of prime importance for this "Observatory" function, as well as for prospective analysis, the documentation function has also been strengthened.

Training

Some of the weaknesses in the BP/RAC working programme can be partially explained by the difficulty of systemic and prospective analysis, by the delicate problem of selection of suitable trainees, and by the degree of willingness, or otherwise, to make appropriate use of the relevant tools. Nevertheless, the awareness of decision-makers of the usefulness of prospective analysis is increasing, and BP/RAC has improved its training capacity in this field through the development of additional and new applications. For example, twenty-five decision-makers and experts from ten countries attended a three-day seminar on Mediterranean Prospects, in 1992.

A joint BP/RAC-CEC Seminar on the Role of Information on Land Cover for the Protection of the Environment and the Management of Space in the Mediterranean, was held in 1993.

A Summer School on Biochemical Processes and the Mediterranean Environment will be organized at the University of Nice (28 August - 17 September 1993). A workshop on regionally applied prospective analysis will be organized in Turkey in 1993, with participants from five countries of the region.

With the assistance of international consultants, BP/RAC experts are preparing a practical manual on prospective analysis tools for Mediterranean decision-makers, and it is expected to be ready by the end of 1993.

Communication and Publications

The basic BP/RAC document **Futures for the Mediterranean Basin** has been translated into Arabic and Spanish. The following Blue Plan booklets have been published: No. 1 - Pêche et Aquaculture en Méditerranée; No. 2 - Les Forêts Méditerranéennes; No. 3 - Conservation des Ecosystèmes Méditerranéens; No. 4 - Industrie et Environnement; No. 5 - Les Iles en Méditerranée; No. 6 - L'Eau dans le Bassin Méditerranéen; No. 7 - Energie et Environnement en Méditerranée.

A new brochure entitled **A Blue Plan for the Mediterranean People: from Thought to Action** was prepared and widely distributed throughout the Mediterranean region and at UNCED (Rio de Janeiro, 1992); reprinting is under consideration.

Co-operation with IGOs and NGOs

To strengthen and improve its activities, BP/RAC has developed co-operation with, and gained support from, the Commission of the European Communities (for the "Observatory", studies of tourism, demography and desertification, for the Syrian Coast CAMP, and training), and from the World Bank (management of the coastal environment). Co-operation was also developed with NGOs, such as CCFD, and with national NGOs, on the use of the systemic and prospective approach (Turkey).

PRIORITY ACTIONS PROGRAMME REGIONAL ACTIVITY CENTRE (PAP/RAC)

PAP activities have been aimed at creating an effective basis for integrated coastal and marine areas management (ICAM), based on the principles of sustainable development. These activities during the reporting period were as follows:

ICAM and PAP activities in the context of the MAP Coastal Area Management Programme

These activities were carried out in the framework of the CAMP projects for Kastela Bay, the Bay of Izmir, the Island of Rhodes and the Syrian Coastal region. Activities have also been carried out in preparation for the CAMP projects for the Albanian coast, Fuka-Matrouh and Sfax: The main thrust of all these activities has been the development of tools and techniques for integrated coastal management: Environmental Impact Assessment (EIA), Geographic Information System (GIS); carrying-capacity assessment for tourism; application of economic criteria; preparation of training documents and guidelines.

Implementation of co-operative projects

These have covered: seismic risk mitigation; protection of soil against erosion; environmental aspects of aquaculture.

Implementation of selected priority actions

These have covered: water-resource management; protection and conservation of historic settlements; tourism and environment; solid-and liquid-waste management; the application of renewable sources of energy.

The principal documentation prepared within the PAP activities in the MAP CAMP context has covered the following sites and subjects:

Kastela Bay: optimum level of treatment of urban waste water prior to discharge into the Bay; study of water-resource management of the western part of the area and two adjacent islands; EIA of the Brac channel submarine outfall; study of the Pantan area.

Izmir Bay: EIA of the urban liquid waste treatment plant; Integrated Planning Study for the area; a synthesis of studies related to the state of pollution of the Bay.

Island of Rhodes: Integrated Planning Study for the island; carrying-capacity assessment for tourism; EIA of the waste-water treatment plant.

Syrian Coastal Region: Integrated Planning Study; Coastal Resources Management Plan; EIA of the Amrit tourist complex.

Furthermore, in all the four CAMPs mentioned above, with the assistance of GRID-UNEP and UNITAR, Geneva, training was organized on GIS at PC level, using the ARC/INFO software; assistance was given for the purchase of equipment, and software was provided on a non-commercial basis. Practical applications of GIS to management were performed in all four CAMPs. Training on integrated planning and management, as well as on the application of EIA, was also organized for local and national experts.

Under the guidance of the MAP Co-ordinating Unit, preparatory activities relevant to MAP CAMPs were undertaken covering the Albanian coast, Fuka-Matrouh (Egypt) and Sfax (Tunisia).

At the present stage, PAP has concluded its activities in Kastela Bay and on the Syrian coast, and those in Izmir will be completed by the end of 1993, and in Rhodes, by the end of 1994.

The activities in Kastela Bay were supported by the World Bank, and in Rhodes, by the European Investment Bank.

The principal results of the above-mentioned activities are:

Kastela Bay: complementary knowledge on the state of pollution and on the Bay ecosystem was acquired; GIS teams and activities were set up; results were applied to some development decisions, and others were used in the design of the urban waste-water collection, treatment and disposal system.

Izmir Bay: the design of the liquid-waste treatment plant was partly modified; previous results were applied to urban and regional planning practice; a GIS team was established; and the planning department strengthened.

Island of Rhodes: the documents prepared were used for planning and management purposes; a GIS team was established.

Syrian Coast: the Government and the local authorities accepted the prepared document as the basis for immediate action; several recommendations were made on the institutional, legal and land-use aspects of management and protection of coastal resources.

National training courses on the application of EIA were organized in Malta, Turkey (2 courses) and Syria. In Morocco, PAP participated in a training course organized by the World Bank. Assistance in the preparation of the relevant national legislation and the implementation of EIA was provided to national authorities in three countries.

An expert meeting reviewed several documents prepared by PAP on the application of economic instruments to coastal management. On the recommendations of that meeting, all the documents were disseminated and a specific action on the subject launched in 1993.

Jointly with UNEP OCA/PAC and FAO, the second draft of **Guidelines for ICAM with Special Reference to the Mediterranean Region**, was prepared. At the request of OCA/PAC and with OCA/PAC funding, PAP is participating in the implementation of the UNEP-FAO East African Project on ICAM.

The co-operative project on the mitigation of seismic risk in the Mediterranean region (SEISMED), launched as a PAP project and implemented as a UNDP project, was concluded in 1992. Its principal results are: the establishment of a Mediterranean network on seismic-risk mitigation; training; practical results in the implementation of a thematic framework developed by PAP; a number of workshops and documents on seismic-hazard and vulnerability assessment, and on risk management.

The co-operative project on soil erosion, implemented by PAP/RAC and Spain (ICONA), with the participation of Tunisia, Turkey and FAO, has been completed in respect of the mapping part, whereas the measurement (monitoring) part will be completed by mid-1994. The main result achieved so far is the development of a consolidated mapping methodology to be applied in all Mediterranean countries. It has already been successfully applied in major field works in all three above-mentioned participating countries.

The project on the establishment of an aquaculture-environment network has been re-launched pursuant to a proposal by FAO and MEDRAP II. Following several preparatory meetings, a draft programme for the network for the 1993-1995 period has been prepared, envisaging actions aimed at: resolving problems relative to aquaculture-environment interrelations in the region; the selection and protection of

sites suitable for aquaculture within the land-use planning; and planning and management of aquaculture activities within the context of integrated management of Mediterranean coastal areas. Upon approval by the 8th Ordinary Meeting of the Contracting Parties, the network will become fully operational.

In the reporting period, the following individual priority actions have been implemented:

Water-resources Development of Islands and Isolated Coastal Areas:

Implementation of a Water Resources Management Plan for the Island of Malta; preparation of the project on Water Resources Conservation for the Maltese Islands; and organization of three regional training courses: on water-resource management; on the development of a database for water-resource management; and on aquifer modelling for water-resource management. These actions have been implemented in co-operation with the Maltese authorities and the Water Services Corporation of Malta. The implementing institution for the project on Water-resource Management in the period 1989-1993 was the **Bureau de recherche géographique et minière (BRGM)** of Orleans. The results of that project provided a practical basis for the better management of what is, for Malta, a vital resource. The prepared pilot document on water-resource conservation was disseminated to all Mediterranean countries, and a project proposal on the subject to be submitted to the Maltese Government is in preparation.

Rehabilitation and Reconstruction of Historic Settlements: After four methodological seminars and a concluding workshop, the PAP activity in this field will be concluded in 1993. Apart from a large number of pilot case studies on selected topics of priority interest, a common methodology was developed for the preparation and implementation of protection measures applicable under Mediterranean conditions. This methodology was presented and adopted at the concluding workshop (Genoa, 1992). Guidelines will be prepared for the application of that methodology. Starting in 1994, this activity will become the responsibility of the Historic Sites Regional Activity Centre (Marseille).

Urban Solid and Liquid Waste Management, Collection and Disposal: action on this PAP has been implemented in co-operation with the International Water Institute, of Sophia Antipolis, the City of Marseille, and FAO. Within that co-operation, training courses were organized on urban liquid-waste management, case studies were prepared on solid and liquid waste management, on the re-use of treated waste water for irrigation, and on recovery of polluted aquifers. Guidelines were prepared on the first three of the topics just mentioned, of which those on irrigation were jointly prepared with FAO. At the moment, the documentation and programme are being prepared for a training course on solid-waste management.

Development of Mediterranean Tourism Harmonized with the Environment: This priority action has been aimed at the development and application of carrying-capacity assessment (CCA) for touristic activities. In this period, after the completion of a large number of pilot case studies and guidelines, three such documents have been completed (for the islands of Brioni, Vis and Rhodes), and three more are in preparation within the MAP CAMPs for the Albanian coast, Fuka-Matrouh and Sfax respectively. Following the recommendations of the Meeting of the National Focal Points for PAP (November 1992), this action will, from 1994, be implemented within the action on Integrated Planning and Management of Coastal Zones.

Mediterranean Co-operative Network on Renewable Sources of Energy: action in this field has been implemented jointly with CIEMAT, Spain. Three training courses were organized on the application of solar energy in the Mediterranean, and a large number of training documents and working models were prepared. Due to financial constraints, this action had to be concluded in 1993.

Co-operation with IGOs and NGOs: in the implementation of its programme, PAP/RAC has always been oriented towards as intensive co-operation as possible, primarily with other UN agencies and IGOs. In the reporting period, co-operation has been established in the following fields: water-resource management and solid and liquid waste management, with WHO/EURO; water-resource management, aquaculture, soil erosion and integrated coastal management, with FAO; historic settlements, with UNESCO, ICCROM (Rome) and ICOMOS (Paris); seismic risk mitigation, with DHA-UNDRO, UNESCO, UNIDO and UNCHS-Habitat; training on the application of GIS to integrated coastal management, with GRID-UNEP (Nairobi) and UNITAR (Geneva); tourism, with WTO and UNEP/IEO (Paris); integrated coastal management, with OECD.

In the same way, co-operation has been established with numerous non-governmental organizations, such as: Water Resources Corporation of Malta; CEFRIGE-OIE, Sophia Antipolis; ICONA, Madrid; CIEMAT, Madrid; Mediterranean Water Institute, Marseille; IGME, Athens; ACSAD, Damascus; University of Genoa; ICCOPSA, Genoa; Tahal, Tel Aviv; Greenpeace; ESRI, Redlands, USA; IFREMER, Montpellier; Middle East Technical University, Ankara; Institute for Oceanography, Izmir; Universities of Split and Zagreb; Institute for Oceanography and Fisheries, Split; etc.

As a result of effective co-operation with the relevant National Focal Points for PAP and the above-mentioned UN agencies and institutions, a significant catalytic role of PAP has been fulfilled: for the implementation of SEISMED, the Italian Government allocated US \$ 1,200,000 in cash; for the implementation of the Water Resources Management Project, the Maltese Government received from the EC about 850,000 ECUs; for the implementation of the Kastela Bay CAMP, the World Bank allocated US \$ 330,000 in cash; ICONA, Madrid, allocated more than US \$ 500,000 in cash and kind for the implementation of the project on soil erosion; CIEMAT, Madrid, allocated more than US \$ 100,000 in kind for the organization of training courses on renewable energies; GRID and UNITAR contributed more than US \$ 100,000 in cash and kind to activities relevant to GIS.

Contributions by other agencies and institutions were mostly in kind, amounting to less than those mentioned above, but were especially effective considering the value of the scientific, technical and logistical support given.

SPECIALLY PROTECTED AREAS REGIONAL ACTIVITY CENTRE (SPA/RAC)

Since its establishment in 1991, the main activities have been aimed at setting up the Centre's structure and organizing its activities. In August 1992, the Centre moved from its previous premises in Salamambo to more spacious ones in Tunis.

Assistance to countries in the selection, establishment and management of Specially Protected Areas of ecological value

In this framework, the main achievements and developments of the Centre included:

- An expert mission to Albania (December 1992), to identify fields of SPA/RAC involvement and to evaluate the present situation of coastal protected areas, protection of endangered species, and Albania's possibilities for implementing the SPA Protocol;
- At the request of the Tunisian National Focal Point for SPA (Agence Nationale pour la Protection de l'Environnement - ANPE), a study of the feasibility and opportuneness of establishing protected areas at eight Tunisian sites was carried out at SPA/RAC;
- The **Directory of Areas of Ecological and Biological Interest Proposed for Protection** has been revised, while the **Directory of Marine and Coastal Protected Areas in the Mediterranean Region, Part I - Sites of Biological and Ecological Value** has also been revised (in collaboration with IUCN). A provisional version including 128 sites was presented at the National Focal Points Meeting held in Athens in 1992. The final version is expected to be ready in 1993;
- The preparation and publication of an Arabic version of the first edition of the **Directory of Marine and Coastal Protected Areas in the Mediterranean Region, Part I - Sites of Biological and Ecological Value** has been completed.

Assistance to countries in the selection, establishment and management of Specially Protected Areas of cultural interest

In this context, the following was performed:

- **Directory on Marine and Coastal Protected Areas, Part II - Sites with Scientific, Aesthetic, Historical, Archaeological, Cultural or Educational Interest** was prepared (in collaboration with IUCN). A first draft, mainly dealing with the definition of the sites to be included in this Directory, the criteria for their

inclusion, and a model of a descriptive data sheet, was presented and distributed at the meeting of the National Focal Points.

- A document on a case study of the historical site of Carthage (Tunisia) is being published;
- A meeting on co-operation among persons responsible for the Mediterranean historical sites in Maghreb countries (Djerba, Tunisia, 1993) was co-sponsored with the Tunisian Ministry of Culture, the Institut National du Patrimoine, the Association pour la Sauvegarde de l'Île de Djerba and the Secretariat of 100 Historic Sites; and
- The **Mediterranean Archaeological Coastal Site Catalogue** was prepared under the terms of a Memo of Understanding among UNEP, IUCN and the London University Institute of Archaeology (signed in January 1992) under which the Parties agreed to make use of the documentation (maps, reprints, background documents, photographic prints, etc) already collected by the Institute of Oceanographic Sciences England. The Catalogue will serve as a working research tool for archaeologists in the Mediterranean; the completion of the work by the end of 1993 is expected.

Assistance to countries to set up their legislation related to the implementation of the SPA Protocol

To this end SPA/RAC has collaborated with the Environmental Law Centre of IUCN. The following documents have been produced:

- **A Directory of the Environmental Legislation of Mediterranean Countries Relevant to the Implementation of the SPA Protocol** (in English); **Protected Areas in the Mediterranean: Analytical Study of the Relevant Legislation** (in English, French and Arabic); **A Synthesis of the Legislation of Mediterranean Countries Concerning Threatened Species, in Particular, Cetaceans, Marine Turtles, Monk Seal, Marine Vegetation and Waterfowl**; the first two documents were presented and distributed at the last NFP Meeting (Athens, 1992). The amended versions will be presented as working documents at the forthcoming meeting of experts on environmental legislation;
- A document on **Marine Archaeology in the Mediterranean: Directory of National Legislation, with Explanatory Commentary**, updated to December 1992, was presented and distributed at the UNEP/MAP Meeting of Experts on the Protection of Submarine Archeological Sites Including Wrecks (Bodrum, Turkey, 1993).

A Meeting of Experts on Environmental Legislation Related to Specially Protected Areas and Endangered Species, organized in collaboration with the Ustica Marine Reserve, was scheduled for September 1993.

Assistance to countries in the management and conservation of endangered species

Assistance to countries in the implementation of the Action Plan for the Management of the Mediterranean Monk Seal

SPA/RAC undertook a study of the feasibility and opportuneness of captive breeding of the Mediterranean monk seal. The results of the study are given in the document **Captive Breeding of the Mediterranean Monk Seal: the Time Has Come**, by W.G. Gilmartin, which was presented at the NFP Meeting.

SPA/RAC charged the National Park of Port-Cros with the preparation of two documents on the Mediterranean monk seal: one from a scientific standpoint and another from the public awareness standpoint; the final versions are expected to be available in 1993.

Assistance to countries in the implementation of the Action Plan for the Conservation of the Mediterranean Marine Turtles

A survey of the potential nesting beaches along the Egyptian Mediterranean coast is being developed in collaboration with MEDASSET and Egyptian authorities, and is scheduled from June to August 1993.

A survey of the potential nesting beaches along the southern Tunisian coast is scheduled from June to September 1993.

An impact assessment of coastal fisheries on marine turtle populations in the Gulf of Gabes (Tunisia) is being carried out with the collaboration of APNES (a Tunisian NGO).

A large-scale co-ordinated tagging programme in the Mediterranean is being launched and contacts have been made with NFPs to seek participation and co-operation.

A preliminary version of a **Manual on the Conservation of Marine Turtle Nesting Beaches for Managers** was distributed at the NFP meeting, and the final English version is expected to be published in 1993.

Assistance to countries in the implementation of the Action Plan for Conservation of Cetaceans in the Mediterranean

A review of the technical report on cetaceans in the Mediterranean, which was presented in the NFP meeting (Athens, 1992), was carried out in collaboration with IUCN.

A joint consultation among the Secretariats of the Barcelona, Berne and Bonn Conventions concerning the conservation of cetaceans in the Mediterranean and the Black Seas (Athens, 1992) was organized to discuss the implementation of the Action Plan and the draft Agreement on the Conservation of Small Cetaceans of the Mediterranean and the Black Seas and Contiguous Waters. The meeting proposed a series of recommendations for the implementation of the action plan for cetaceans, which were adopted by the NFP meeting (Athens, 1992) and were annexed to the Action Plan.

Training Courses

In 1992, the Centre organized and/or sponsored three main training activities:

- A study mission for SPA managers from Maghreb countries to several protected areas in France (Port-Cros, Camargue, Cevennes), in April, with the assistance of the MEDPAN Secretariat;
- The participation of three trainees from Mediterranean countries in a training course on the conservation and management of marine turtles (Cyprus, July and August);
- The final session of a training course (in French) on marine vegetation in the Mediterranean (Tunis).

In 1993, the Centre organized four main training programmes:

- The second session of a training course (in English) on marine vegetation in the Mediterranean (Malta);
- The conservation and management of marine turtles (Cyprus);
- A workshop/training course on the management of marine and coastal protected areas in the Mediterranean (Tunisia); and
- A training course on the conservation of the monk seal (Greece) in collaboration with the Greek Ministry of the Environment and ELLINIKI ETAIRIA (an NGO).

SPA/RAC and the Coastal Area Management Programme

The contribution of SPA/RAC to the ongoing CAMPs can be summarized as follows:

- Participation in the Rhodes project and in the preliminary MEDU mission to Sfax, Tunis and in a preparatory MAP mission, also to Sfax (1993);
- A proposal on SPA activities, to be submitted to the CAMP co-ordinator, was prepared;

- Proposals for activities to be implemented by SPA/RAC in Egypt, with participation in the MAP mission to Fuka-Matrouh were made, and two consultants for two preliminary studies were engaged; and
- The studies of the Pantan and Kastela Bay areas were revised.

Data-bases

Following the acquisition of new computer equipment, the Centre has undertaken a considerable restructuring of the existing data-bases and has initiated a new data-base on endangered species.

Co-operation with IGOs and NGOs

An agreement on collaboration with IUCN has been finalized.

In the accomplishment of various activities, SPA/RAC is also collaborating with the following NGOs and IGOs: Mediterranean Association to Save the Sea Turtles (MEDASSET), Greece; Association de la Protection de la Nature et de l'Environnement (APNES), Sfax, Tunis; Hellenic Society for the Protection of the Environment and the Cultural Heritage (Elliniki Etairia) Athens, Greece; Association pour la Sauvegarde de l'île de Djerba; Cyprus Wildlife Society (CWS); Secretariat of the Convention on the Conservation of European Wildlife and Natural Habitats; Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals.

HISTORICAL SITES REGIONAL ACTIVITY CENTRE (HS/RAC)

Since its establishment in 1992, HS/RAC undertaken activities in seven fields of endeavour.

First assessment of the state of Mediterranean sites

Technical missions to define the various types of needs for the protection and management of historic sites were made to Naples, Genoa and Ravenna (Italy), Algiers and Tipasa (Algeria), Tetouan (Morocco), Santorini, Epidaurus, Nauplion, Thasos, Samos, Heraclion, Arcadi and Chania (Greece). HS/RAC experts also made technical visits of opportunity to the Athens (Stone Centre), Salonica (Byzantine Church), Istanbul (Historical Area), Valletta (Hypogeum Hal Saflieni, Gigantija-Tarxien).

Technical assistance to those responsible for Mediterranean Historic Sites

HS/RAC provided technical advice, assisted in fund raising, establishing protection plans, revising legislation concerning the historical archaeological and architectural heritage.

Meetings of technical officials responsible for Mediterranean Historic Sites

The Marseille Centre assisted in the organization of:

- The second international meeting of technical officials responsible for Mediterranean historic sites (Thessaloniki, Greece, 1992);
- The meeting of technical officials responsible for Historic Sites of the Mediterranean Maghreb (Djerba, Tunisia, 1993); and
- The meeting of the Chairmen of the National Committees of ICOMOS (International Council of Monuments and Sites) (Marseille, France, 1993).

Development of a co-operative programme on stone degradation

The work of HS/RAC on the inventory of stone materials used in the historic, archaeological and architectural structures of Mediterranean historic sites continued.

A volume on Mediterranean historic sites is in preparation, publication being scheduled for September 1993.

HS/RAC contributed to the organization of the RILEM-UNESCO International Congress on the Conservation of Stone and Other Materials (Paris, June 1993).

Protection of underwater archaeological sites, including wrecks

The Centre is preparing an assessment of the state of underwater historic and archaeological sites in the Mediterranean covering the present knowledge, means\infrastructures and protection\legislation.

A study was prepared on the state of the underwater archaeological heritage (the French edition was published in 1991, the English edition will be ready in 1993).

An expert meeting on the protection of underwater archaeological heritage (Bodrum, 1993) was jointly organized by Turkey and the HS/RAC.

Training and dissemination of information to technical officials responsible for Mediterranean historic sites

A number of representatives of institutions and laboratories specialized in the photogrammetry, geographical information systems, computerized mapping of the Heritage, analysis and restoration of stone masonry constructions, protection and treatment of underwater archaeological heritage visited the HS/RAC for exchange of technical information.

The Centre organized training courses for architects from Mediterranean countries on protection and upgrading of historical sites.

HS/RAC and the Coastal Areas Management Programme

In the framework of the ongoing CAMPs, technical assistance was provided to national\local authorities in charge of the Rhodes CAMP (Greece). A technical mission to Rhodes is scheduled for 1993.

Technical assistance was provided to national authorities in charge of the Albanian CAMP. A technical mission to Albania is scheduled for 1993.

Technical assistance was provided to national\local authorities in charge of the Sfax CAMP (Tunisia). A technical mission to Sfax was completed in 1993.

Technical assistance was provided to national authorities in charge of the Fuka CAMP (Egypt) to prepare an assessment of urgent protection measures to be taken for the Historical and Archaeological Heritage. A technical mission to Cairo is scheduled for 1993 to prepare a full workplan related to the CAMP activities.

Publications

The following reports/documents were prepared during the reporting period:

- Brochures on methodology (2 per year) "Diagnostic methods, data base and intervention in historic sites".
- An illustrated guide to the ancient harbour of Marseille.
- Technical Document IV: "Photogrammetric data of the Heritage in seismic regions".
- "Treatment of facades of buildings", in co-operation with the French section of ICOMOS.

ACTIVITIES OF THE CONTRACTING PARTIES DIRECTLY RELEVANT TO THE MEDITERRANEAN REGION

National environment and development programmes are primarily aimed at addressing national problems, such as land-use planning, forestation or deforestation, urban development, industrial development, mining, agriculture, fisheries, tourism etc.; the majority of these problems are dealt with at the national level. However, some problems can only be approached at a regional or even global level. The wastes or losses from human activities, whether they pollute the environment or modify it, sometimes favourably, are transported more or less far from their source, which is often extranational. For such problems, international co-operation is necessary, at least at the regional level, usually, and particularly in the Mediterranean. The Mediterranean Action Plan is one, and the main, such regional mechanism.

The activities of the Contracting Parties under MAP are, therefore, only a relatively small part of their overall national environmental and development activities. Being predominantly national, they are also predominantly nation-specific and, although the national reports submitted have many elements in common, the specific problems and their potential solutions differ appreciably from one country to another. Moreover, the environmental and development problems each country faces today flow mainly, but not exclusively, from their socio-economic development in the last two or three decades, if not before. It is not possible in the present document to do more than highlight the principal problems and activities, relative to the Mediterranean, reflected in the available national reports. As stated initially, of the six national reports submitted, only three were drafted especially to meet the request of the MAP Co-ordinator. Two were prepared for presentation at UNCED and followed the format laid down by the Preparatory Committee thereof. The remainder, not concerning the reporting period, were available at the Co-ordinating Unit.

CYPRUS

The following action was taken to implement the Barcelona Convention and its Protocols:

- Legislation for the control water and air pollution from industrial sources was enacted.
- The national pollution monitoring and research programme was continued.
- A system of operating instructions for the procedure to be followed by the private and the public sectors in environmental impact studies was approved by the Council of Ministers and has implications for the implementation of the Land-based Protocol.

- The SPA Protocol was also pursued through the effective operation of the Lara Marine and Coastal Reserve for the Protection of Marine Turtles; two trainees sponsored by MAP were trained at the Reserve.
- The Ministry of Agriculture and Natural Resources, in March 1991, launched a nine-month programme aimed at improving the public's environmental awareness and information; a major part of this programme was devoted to the marine environment.

EUROPEAN COMMUNITY

Community initiatives have led to the elaboration of the following texts.

The **Charter on Euro-Mediterranean Co-operation on the Environment in the Mediterranean Basin**, known as the Nicosia Charter, adopted in 1990. The priority areas of the Charter cover: integrated management of coastal areas; nature conservation; water, energy and waste management; monitoring of Mediterranean ecosystems; management of Mediterranean plant cover; increased exchanges (environment legislation, transfer of technology, etc.); all related to the Mediterranean region. These areas should be the object of specific strategies which should be formulated in co-operation with the Mediterranean Action Plan (Barcelona Convention) of UNEP and which should have as ultimate objective the achievement of sustainable development of the countries of the Mediterranean region.

Four Mediterranean countries have been selected for a pilot phase in the course of which the objectives and the modalities of implementation of the Nicosia Charter would be put into practice and tested. Egypt and Tunisia were chosen as the main targets; Malta, as a pilot project; and Albania, as a special case, in view of its special situation and its strong need to create new infrastructures for environment protection. The four countries have also been asked to prepare national strategic plans indicating their respective political priorities in economic development, their environment policies, their environmental and institutional problems, the existing co-ordinating mechanisms, and their proposed measures and actions to achieve sustainable development.

In co-operation with the Italian authorities, the Community has also sponsored a **Mediterranean Water Charter**.

In the framework of LIFE, the Community's environmental financing mechanism, the Community has contributed 1,388,150 ECUs to the Marine Environment Observatory (BP/RAC) and to a system for combatting major marine pollution accidents (REMPEC), for the period 1993-1996. This funding is to be added to the Community's overall contribution, including regular and voluntary contributions.

FRANCE

During the last twenty years, nuclear energy production, hence nuclear wastes, telephone systems and supermarket surface have grown more (sometimes much more) than fivefold. Electrical power lines, freeways and drained land surface have increased fourfold. Pesticide use, irrigated land surface and electricity consumption have increased threefold. The number of vehicles, hence intercity traffic, the suburban population and the production of pharmaceuticals and fine chemicals, among other socio-economic indicators, have doubled. Most other sectors of the economy have also increased significantly. The only sectors showing negative growth are worked agricultural land and number of agricultural workers, steel and cement production, new housing, rail transport of goods, petrol consumption, energy consumption (per franc of Gross Internal Product), and carbon dioxide production per inhabitant.

The improvements in manufacturing efficiency have reduced the production of many key pollutants, while the increasing range of products has made their monitoring for environmental quality-control purposes more difficult. Also, the continuing growth expected in many of the above-mentioned indicators will make it extremely difficult, if not impossible, to restrain, let alone substantially reduce, the emission of wastes, pollutant or otherwise, to the environment.

In the **Mediterranean** context, most of the general, national trends apply or are even enhanced. Thus, although some fifty per cent of the French littoral zone is more or less densely urbanized, this average is appreciably exceeded along the Mediterranean coast and is now leading to serious social conflict between developers anxious to build and local authorities anxious to preserve amenities, natural beauty, historic sites etc. and to provide adequate sanitation services for current levels of population, tourist and resident.

France continues to host the Blue Plan Regional Activity Centre in Sophia-Antipolis as well as the newly created Historic Sites RAC, in Marseille.

The Ministry of the Environment publishes annually a Report on the State of the Environment, and although the French Mediterranean region is not treated separately, the three main regions (Languedoc-Roussillon, Provence-Alpes-Côte d'Azur, and Corse) are specified, as appropriate, in the numerous statistical breakdowns provided therein and in the French National Report to UNCED.

In the field of **marine pollution**, France has made, and continues to make, considerable efforts to reduce, control and manage its industrial and urban wastes, the latter having a nearly 100-per-cent coverage in respect of collection and treatment (separation, recycling, incineration, controlled dumping). Land-based sources are reasonably well quantified. As a signatory to the London and Oslo Conventions, France has ceased all marine dumping of industrial wastes and incineration at sea.

Regarding **atmospheric pollution**, France is committed to reducing sulphur dioxide levels by 50% and nitrogen oxide and hydrocarbon levels by 30%. The monitoring of key "greenhouse" gases and atmospheric ozone is now routine.

France maintains (since 1974) a system of **general monitoring** of the coastal marine environment, covering water, biota and sediments; this was complemented, in 1987, by specific monitoring of the response of marine flora and fauna to pollutants, notably in natural zones of floristic and faunistic ecological interest (Zones naturelles d'intérêt écologique floristique et faunistique - ZNIEFF). Special monitoring is applied to mussel and oyster culture zones and to bathing-water quality. The Ministries of the Environment and of Social Affairs, Health and Urbanization present a detailed annual report on this quality for all French beaches.

For the **preservation of biodiversity**, France has three specially protected areas in the form of biosphere reserves on the Mediterranean coast: the Camargue (Rhône delta) and two (Vallée du Fango et Scandola) on the island of Corse.

Regarding **international co-operation**, France is an active member of all the intergovernmental organizations concerned with, *inter alia*, the Mediterranean, and particularly the UNEP Mediterranean Action Plan. Its leading scientific and technical institutions, notably IFREMER, CNRS and ORSTOM, are actively involved in the study of the Mediterranean marine environment and in many of the international programmes, (of MAP, EC, FAO, IAEA, ICSEM, IMO, IOC, UNESCO, WB, WHO and WMO), therein.

GREECE

The last twenty years, the economy has been decisively influenced by: two world energy crises; Greece's accession to the European Community; an international shipping crisis; a reversal of the trend in emigration; and instability in the tourist industry. The relative contribution of industry and services (notably tourism) to the Greek economy increased, whereas that of agriculture decreased. The decline in the rural population and the relative predominance of mountainous terrain led to a considerable increase in urbanization, notably in the medium-sized urban centres but also in the two principal urban centres: Athens and Thessaloniki. Although the housing stock has increased and housing conditions have improved considerably, there has been an insufficient control of development around the major cities, resulting in high population densities and inadequate public transport, water supply, sewage treatment, solid-waste disposal, increased traffic congestion, noise and air pollution and, in some areas, marine pollution. The main pollutants are municipal and industrial waste, oil from ships, and agricultural chemicals.

Greece is relatively rich in minerals, the most important being lignite (for energy production), bauxite (for aluminum production), magnesite, nickel-iron ores, and asbestos; there is also significant quarrying of limestone, bentonite and other rock forms. Surface mining and ore processing have created serious environmental degradation, but efforts are now being made to reclaim degraded land, to pursue alternative sources of energy and its more efficient production and use.

Erosion is, however, the main form of land degradation, promoted by annual forest fires, overgrazing and overcultivation of mountain slopes, and is being combatted by reforestation, regulation of grazing and the application of soil-conservation measures.

The large annual influx of tourists continues to have a negative effect on local culture and environment, exceeding the capacity of the local infrastructure to supply enough drinking water and sanitation services, and generating unmanageable amounts of solid waste, litter, noise, traffic and coastal water pollution. To meet some of these needs, but only in a biased way, illegal construction of accommodation has often blighted the existing architectural and natural beauty. Greece, in common with other EC countries is now monitoring bathing water quality routinely.

The Greek priorities for the **protection of the environment** at this stage are: conservation and management of ecosystems; protection of endangered species and their biotopes; protection of the marine environment from pollution; and abatement of air pollution in the major cities. As part of an effort to maintain **biodiversity**, eleven protected wetlands (of which eight are in the coastal zone) and eleven National Parks, among other forms of protected environment, have been established. There are some 800 species of plant and 200 species of animals subject to protection under the law.

Considerable efforts are being made to increase environmental awareness of the environmental component of development (see section on the Hellenic Marine Environment Protection Association, a Greek NGO).

Greece participates actively in international fora at the global, European, Mediterranean and Balkan levels, and in MAP in particular. It hosts the Co-ordinating Unit for the Mediterranean Action Plan.

ISRAEL

Given the relative opacity of its frontiers on the landward side, its coastal zone is of primary importance. The demands of a rapidly growing population (notably from immigration), the consequent urbanization, the necessarily intensive agriculture, and increasing industrialization, tourism and recreation threaten seriously to compromise the quality of the marine and coastal environments. The coast is characterized by high coast, with cliffs close to the shoreline, and low coast, where rivers and wadis interrupt the cliffs, forming broad sandy areas; this sand and that imported by the sea currents from the Nile delta and deposited along the Israeli coast are cast onto the beaches by wave action, thence by winds onto the coastal plains. Human activities, especially the construction of marine facilities, have however arrested the northward movement of sand and caused it to build up toward the south. Of the 188km of Mediterranean coastline, some thirty are authorized as bathing beaches; another 110km are open to the public for recreation and include nature reserves, national parks, archeological and historical sites. Industry, refining and commerce are mainly limited to the ports of Haifa, Ashdod and Ashkelon, and power-generating plants using the sea water for cooling account for another 15km. The remaining coastline is closed to the public.

The Gulf of Eilat in the northern Red Sea is a quite different ecosystem, but subject to similar pressures, especially from tourism and recreation-seekers. Its coral reef was designated a nature reserve in 1965. Eilat is also a very important port for Israel and, because of the Gulf's small size and configuration, it is at great risk from even a modest oil spill.

Regarding **marine pollution prevention and protection of the marine environment**, Israel has made considerable progress in recent years. The Marine and Coastal Environmental Division (MCED) of the Ministry of the Environment is the national authority for all aspects of pollution prevention and abatement. The Division's work plan comprises legislation, enforcement, beach/shore clean-up and operation of a Marine Pollution Prevention Fund the income of which is derived from oil-terminal and port fees and fines imposed on violators of marine pollution laws and regulations, in application of the "polluter pays" principle. The MCED also distributes relevant technical material and provides professional advice.

Israel is able to respond rapidly to small **oil spills**, but lacks the means to deal with major spills. The small spills are dealt with only after reaching the shoreline, but this would not work with large spills. There has, nevertheless, been a large reduction in the amount of beach tar (from 3.6kg/m in 1975 to less than 20g/m today). This decrease is attributed to: improved maritime legislation and enforcement at the national level; implementation of international conventions (notably the MARPOL Convention) by the Mediterranean countries; better enforcement and inspection; technical developments in container ships and coastal installations; reduced transport of oil along Israel's coast; and rapid intervention following a spill. There has, however, since the end of 1992, been a significant increase in the number of investigations of oil spills opened against ships and other bodies causing marine pollution by oil spills.

The MCED now has a pollution control and response centre in the Gulf of Eilat which can deal with spills of a few hundred tons and can protect the coral reef.

The **dumping of waste** from a vessel or aircraft is regulated through a strict permit system allowing: the dumping of coal ash by the Israeli Electric Corporation; and of industrial sludge by Haifa Chemicals. In this, the regulations specify the level of heavy metals, the distance from shore, the sea depth and sedimentation rate at the site, the type of vessel to be used, and the monitoring of the area in the vicinity of the site.

Major progress has also been made in the prevention of **pollution from land-based sources**: domestic and industrial wastes, agricultural run-off and river discharges. Now, only in two small communities in the north is sewage regularly discharged into the sea, pending construction of improved facilities. Elsewhere, sewage treatment plants have greatly reduced microbial pollution along the coast, and much of Israel's waste water is now diverted for re-use after treatment.

Chemical pollution from industrial effluents, port chemical terminals and ships, is carefully controlled. All ship tank washing is carried out in conformity with IMO regulations.

Regarding **beach litter**, some of which is left on beaches by the sea as jetsam and some, by bathers, local authorities are responsible for its removal, but special public clean-up campaigns are carried out twice each summer.

Regarding **international co-operation**, Israel is an active participant in MAP. It was one of the first Contracting Parties to sign a national monitoring agreement under MED POL, and several of its research institutions participate actively in the research component of MED POL. Israel is also entering into a tripartite agreement with Cyprus and Egypt to develop a sub-regional system for combatting major marine pollution accidents affecting or likely to affect the territorial sea, coasts and other related interests of the three countries. This project is under the auspices of IMO with the support of the CEC and REMPEC.

ITALY

The last twenty years, the GNP has increased 72%. Corresponding uncontrolled building, exploitation of resources, waste production and atmospheric pollution and other forms of environmental degradation have accompanied this growth: urban noise, soil and beach erosion, agricultural and industrial pollution of the rivers. The Paduan plain and the Po valley have been subject, in particular, to heavy building and a high level of herbicides and fertilizers used in the agricultural areas, so that the northern Adriatic is under severe environmental stress as a result of the discharges from the Veneto region and its hinterland. Similarly, the lakes have increasing levels of nitrogen and phosphorus, *inter alia*. The coastal population has grown from 12.7 million to 18 million, so that almost the whole coastline is built on. One result is a 44% loss of beaches. There is also a "value lost" element in the economy, not included in the national finances, but reflected in a decline in the quality of life.

Roughly one third of the population and much of Italy's industry and agriculture drain their waste into the Po or its tributaries. This not only pollutes the local environment but may have devastating consequences for the Adriatic, its fishing grounds, shellfish beds and tourism. Industry in the urbanized Po Basin produces roughly half of Italy's hazardous waste but has the capacity to handle only 5 percent of it. Some of the rest finds its way into the Po River and the Adriatic. Coastal waters are contaminated with heavy metals. And, from agriculture as well as industry, 50,000 tons of phosphorous and 60,000 tons of nitrogen each year flows into the northern Adriatic. This type of pollution can lead to algal blooms, dramatically affecting tourist frequentation of the coast and resulting in significant economic losses.

The Italian authorities are now stepping up and coordinating their pollution abatement efforts in the water basin. Their longer-term aim is to re-equip the entire area with adequate pollution abatement infrastructure. They plan a series of wastewater treatment plants for the Basin but that will take 20 years to complete (and ECU 6 billion). The EIB has been part financing this huge project since 1985 and, so far, has made loans totalling ECU 700 million. These have been used to build main sewers and collectors, as well as waste-water treatment plants.

Nevertheless, sulphur emissions from fuel combustion have been reduced by 65% between 1980 and 1986, although levels of nitrous oxide, suspended particles, carbon monoxide and lead have not followed suit. Bathing water quality has generally improved considerably, and a detailed survey of beaches is published regularly. Acid rain, which is a serious problem, especially in the northern half of Italy, now has a lower sulphur dioxide content but a higher nitrate content. Regarding the fauna, 31% species are considered endangered and 45%, vulnerable; of the flora, 5% are considered endangered, 5%, vulnerable, and 15%, now rare.

MALTA

In February 1992, following General Elections, a new Ministry for the Environment was created incorporating the Office of the Parliamentary Secretary for the Environment which had been instituted in May 1990. This new Ministry has a wide portfolio which includes responsibility for environmental Protection, Waste Management, Energy Policy, Water Production, Infrastructural Works and Physical Planning.

In August 1992 Malta's first ever Structure Plan was approved by Parliament together with new, comprehensive planning legislation which has established a "Planning Authority" responsible for the implementation of the policies contained within the Structure Plan as well as detailed procedures for the Environmental Impact Assessment of all new development proposals.

Two very important exercises were concluded in 1992/1993. These are a "Solid Waste Management Strategy" and a "Sewerage Master Plan" indicating the required line of action for a modern and environmentally sound treatment of both solid and liquid waste in Malta. Plans are already in hand for the implementation of the main provisions contained within these 2 reports fully in line with the provisions of the Protocol for the protection of the Mediterranean Sea against pollution from land based sources.

A lot of the effort during the period 1991-1993 went into the establishment of new operational capabilities. The following units have been set-up within the Environment Secretariat (Ministry for the Environment):

- A Pollution Control Coordinating Unit to address miscellaneous pollution threats;
- An Oil Pollution Control Response Unit (set up in conjunction with MEDSERV, a local company) to develop a first-aid intervention capability in the case of seaborne oil pollution;

- A Protected Specie/Biodiversity Section which has published new regulations for the protection of various species of animals including dolphins and sea turtles; and
- A Nature Reserves/Conservation Areas Section which has created four new nature reserves within the Maltese Islands.

These initiatives have been further strengthened through a systematic and imaginative endeavour in the field of environment awareness and education.

SPAIN

Similar phenomena are observed. Wastes arise from urbanization (16%), industry (5%), mining (26%), forestry (6%), agriculture (13%) and livestock (34%). Of the solid urban wastes, 31% of the disposal is uncontrolled. Industrial wastes derive mainly from the chemical industry (30%), paper/cellulose (27%) and metal products (23%).

Control of this industrial waste is carried out under the Plan Nacional de Residuos Industriales; discharges are subject to specific conditions and payment of an environmental fee. Urban sewage treatment only covered 10% of requirements in the 1970s; now it is about 40%, but varies significantly from place to place. Several monitoring networks, under the Direccion General de Politica Ambiental, control atmospheric pollution; sulphur dioxide, suspended particles, black smoke, nitrous oxide, carbon monoxide and lead are routinely measured. Regarding urban noise there is no sign of a downward turn in the present trend (related mainly to the number of vehicles and aircraft) and a major effort is now needed to abate this form of nuisance. On the other hand, water quality control (of continental surface water) is carefully monitored as part of the Red de Control de Calidad de las Aguas; fifteen hazardous substances are monitored, *inter alia*, and numerous guideline parameters are also monitored. Spain participates in the CEC's Blue Ribbon Campaign on beach quality. There is a programme of regeneration (importation of sand from the sea bed offshore), sea-grass are surveyed and geophysical surveys of the sediments are carried out; biological monitoring of the littoral fringe is also maintained. One Spain main problems is soil erosion; 44% of the land surface is affected, 18%, intensively.

TUNISIA

Up to the beginning of the 1970s, the impact of human activities was moderate and perceived as "natural" phenomena. There was some concern over the pollution of Lake Tunis and the incipient industrial pollution (liquid and atmospheric) of the southern suburbs of Tunis. The effects of subsequent urban growth, the concentration of heavy industry (at Gabes) and the development of intensive agriculture were only felt little by little. It was only when the situation in certain sensitive areas became seriously disquieting that concern became nationwide. The ravages of the chemical industry

(fertilizers and derivatives) in the town of Sfax and the Gulf of Gabes set off a call for a complete inventory of industrial pollution, even where the effects were still tolerable. This showed that, besides the obvious degradation, there was a rapid, even irreversible, decline in the economic potential of agriculture, fisheries and tourism.

A major concern was the water resources of northern Tunisia: the Sidi Salem dam showed serious silting and eutrophication due, respectively, to the lack of protection against soil erosion in its drainage basin and the increasing inputs of effluents, wastes and fertilizers into a river with a weak and variable flow.

Two other major concerns in Tunisia are the protection of natural or historical sites, notably Lake Ichkeul, and the coastal zone and its marine environment. The latter is subject to beach erosion and a loss of a number of plant and animal species, due to an uncontrolled occupation of the coastal fringe, over-exploitation of the coastal marine resources, and industrial, urban and marine pollution resulting in a dramatic loss of sea-grass beds.

There is now a significant decline in the quality of life due to the poor control of industrial wastes, of domestic wastes, anarchic housing construction and the difficulties of extending sanitation services to all towns and rural communities. The present trends in population growth, tourism and intensive agriculture will place heavy demands on the water supply and will compromise efforts to achieve an acceptable environmental quality.

At present, the national programmes undertaken to address these problems cover five main fields: preservation of soils and the fight against desertification; protection of nature and endangered species; protection of water resources; protection of the marine environment; and the fight against urban pollution. Although some genuine progress has been made in each, numerous difficulties remain, the main ones being:

- In the fight against **desertification**, there is a shortage of water required for timely action, problems of land ownership (too many smallholdings), lack of alternative energy sources to wood (deforestation) for rural communities, and lack of timely and adequate funding;
- In the **protection of nature**, lack of funding for necessary improvements in the protection and ecological management of nature reserves, and a lack of research facilities;
- In the **protection of water resources**, there is a lack of co-ordination of the work of the various authorities involved, difficulties in applying relevant regulations, inadequate public-awareness programmes and a lack of funding for the establishment of monitoring networks (for surface and subterranean water bodies);

- In the **protection of the marine environment**, there is a lack of integrated planning of the occupation of the coastal strip, inadequate control of the fisheries, a shortage of means for monitoring beach dynamics, and a shortage of managers for the aforementioned purposes; and
- In the fight against **urban pollution**, there is an inadequate involvement of the citizenry and, in particular, the industrialists in improving urban cleanliness; there is inadequate observance of regulations and a shortage of means to control such observance, too much wildcat housing construction to apply integrated planning and domestic-waste management.

To address its environmental and development problems in a much more co-ordinated way, in the context of a global national policy, Tunisia has created a National Environmental Protection Agency. Besides the necessary curative action, greater attention will be paid to preventive action and to greatly increasing public awareness of the main problems. Tunisia will re-enforce its **international co-operation**, as manifested, in particular, by its hosting of the Specially Protected Areas Regional Activity Centre under the Mediterranean Action Programme.

TURKEY

The last twenty years have seen growth of population, of tourism, of urbanization and of trade reflected in environmental impacts that, in spite of increasing prosperity, remain difficult to prevent, control or mitigate. Nevertheless, Turkey has taken numerous initiatives in the context of the Mediterranean Action Plan or directly relevant to it.

Regarding **marine pollution monitoring**, Turkey has, since 1983, been continuing a national marine pollution monitoring programme, in full conformity with the basic MED POL principles. The data obtained are stored in the National Marine Pollution Data Archives in MED POL formats and are used for environmental management planning purposes. The data cover physical/chemical parameters of sea water, suspended solids, sediments and biota, from coastal, source, and offshore stations in the Aegean and Mediterranean Seas. To determine the quantity of pollution arising from atmospheric transport, various parameters of the aerosols, rain water and the air have been measured at the atmospheric measurement and reference stations.

With respect to the **Land-based Sources Protocol**, the Turkish Water Pollution Control Regulation (1988) is consistent with the LBS criteria. A project on the Determination and Monitoring of Land-based Water and Air Pollution, which started in 1987, ended in 1992. Land-based pollutants that affect the Mediterranean and Aegean Seas were determined and coloured pollution maps were prepared. For the pollutants listed in the LBS Protocol, the capacity and characteristics of point sources and industrial sources on the coastline have been determined. The pollution load and

discharges of the main rivers reaching the Mediterranean and Aegean Seas have been determined; coloured maps displaying the organic pollution and that due to mercury and cadmium have been prepared. The determination of fecal and total coliform bacteria in Mediterranean and Aegean coastal waters has been started and publication of the data in a monthly journal is continuing.

With respect to the **Dumping Protocol**, the Turkish Environmental Law (1983) completely bans the discharge of all kinds of waste into the sea (thus applying stricter provisions than those of the Dumping Protocol). The Law also prohibits any means of transportation, storage, disposal and direct or indirect discharges to a receiving body, of any kind of waste unless they are performed in an environmentally sound manner and in full conformity with relevant standards and regulations. Disposal of bilge water, ballast water, solid waste, and domestic and industrial waste water by ships or aeroplanes into the sea under Turkish jurisdiction is completely banned if the conditions are not in conformity with the standards set by the Water Pollution Control Regulation. A draft regulation on Selection and Management of Landfill Areas for Hazardous Waste has been prepared, with the aim of: reducing to a minimum the amount of hazardous wastes generated; managing hazardous waste in an environmentally sound manner; and strictly controlling the transboundary movement of hazardous waste. It covers the disposal and treatment of hazardous wastes that are not eligible for use as landfill, together with domestic and solid waste likely to affect adversely the environment and human health.

Regarding the **Emergency Protocol**, Turkey and REMPEC have co-operated closely in the preparation of the National Contingency Plan. Several local contingency plans for the big cities and some industrial complexes have also been prepared. Turkey is very much interested in the work initiated by REMPEC on the setting up of port reception facilities. In some ports, reception and treatment facilities for petroleum and oily water are in service. In addition, such facilities for bilge water, oily washing water, ballast water, and solid and liquid wastes in loading/unloading terminals for petroleum products are in operation. REMPEC is kept up to date on the locations and capacities of these facilities for petroleum and oily water in ports on the Mediterranean coast. The Water Pollution Control Regulation states that "it is unlawful to precipitate oil which is dispersed in a water medium using chemical precipitants or to dilute it using chemical dispersants except under conditions where there is a risk of fire due to accident. Turkey has requested REMPEC to consider this provision in the revision of Annex 2 of the Code of Practice with respect to the use of dispersants.

With respect to the draft **Protocol on Hazardous Wastes**, Turkey, although a signatory to the Basel Convention, which deals with transboundary movements of hazardous wastes, does not consider it a fully satisfactory instrument, owing to weaknesses in the pre-notification process and vagueness on the matter of rights of innocent passage through the territorial waters of the transit countries. It believes that efforts should be made to eliminate the weak points of the Basel Convention by including stricter rules in the draft Barcelona Convention protocol under discussion.

Regarding the **Coastal Areas Management Programme**, Turkey proposed Izmir, on the Aegean coast, because it is one of the most urbanized and industrialized cities of Turkey and is, consequently, under considerable environmental threat. The actions initially proposed under the Agreement with UNEP/MAP covered: studies of the assimilative capacity of Izmir Bay and of the recovery of the Inner Bay; monitoring of the pollution of Izmir Bay; implementation of the LBS, Dumping and Emergency Protocols and the MARPOL Convention; an environmental impact assessment of the submarine outfall; study of the implications of expected climatic change; GIS training; development-environment scenarios; an integrated planning study for the Izmir area; and study of the criteria and measures for the protection of the Tuzla migratory birds nesting area. However, owing to some technical and financial problems, the study of the assimilative capacity and of the recovery of the inner bay could not be carried out during the CAMP period, but will continue at the national level in 1993-96. The study of the implementation of the LBS Protocol was initiated in 1993. An integrated planning study for the Izmir area is being prepared by the PAP/RAC and the Metropolitan Municipality of Izmir (MMI); major input was provided by a PAP-MMI-Ministry of the Environment workshop on the problems and development of the Izmir area (Izmir, 1992). Also under the UNEP/MAP Agreement, it was agreed that one of Turkey's most important ornithological wetlands (Camalti Saltpan) should be protected by an effective management plan.

With respect to the **environmentally sound management of the Mediterranean coastal zone**, Turkey attaches specific importance to the **Blue Plan**; it believes that this component of MAP will provide the necessary outputs for achieving sustainable development. In 1989, Turkey launched a project aimed at the preparation of the local scenario for Iskenderun Bay, in co-operation with the Blue Plan Regional Activity Centre. A T1 (reference trend) and an A2 (alternative integrated strategy) scenario, projected to the year 2025, as well as a priority action plan and a proposal for the management of Iskenderun Bay, have been prepared.

Regarding the **Protocol on Specially Protected Areas**, which Turkey ratified in 1988, the Authority for the Protection of Special Areas, established in 1989, is responsible for the work on this subject nationwide. There are at present nine Specially Protected Areas in Turkey as well as three National Parks; all are protected according to the criteria of the Protocol. The corresponding data sheets were updated and sent to SPA/RAC in January 1993 and have been included in the second edition of the Directory for Marine and Coastal Protected Areas.

Substantial progress has been made during the reporting period in the protection of marine turtles, monk seals and cetaceans.

Five of the seventeen turtle nesting beaches in Turkey where loggerhead and green turtles lay their eggs have been designated SPAs. A permanent committee has been set up to prepare the management plans for these areas; a national project covering three important green turtle nesting areas will be initiated in 1993.

To protect the monk seal, a National Strategy was adopted in 1991 involving: research and data collection; conservation and rehabilitation; training and enhancement of public awareness and participation. A National Committee set up for this purpose selected Foca as a priority area. A Local Committee for Foca co-operates with the National Committee. A national project on the Implementation of a National Conservation Strategy for the Mediterranean Monk Seal in Turkey and a Foca Pilot Project have been initiated. A related project in the Foca area, supported by the WWF, mainly focusses on the enhancement of public awareness in the region.

Regarding cetaceans, Turkey has participated from the beginning in the preparatory studies for the Action Plan for the Conservation of Small Cetaceans in the Mediterranean and has adopted the Plan. Under Turkish law, it is prohibited to hunt any cetaceans or to use explosives for fishing.

Besides the foregoing activities relevant to conservation of **biodiversity**, Turkey intends to carry out a project in 1994 to identify measures to protect better the sea grass (*Posidonia oceanica*) beds.

In relation to the World Bank's **Mediterranean Environmental Technical Assistance Programme** (METAP), Turkey signed two grant agreements with the Bank: one, on Environmental Management Technical Assistance, covering an environmental financing study, the prevention of marine pollution due to maritime transportation activities in the Sea of Marmara, the Bosphorus and the Dardanelles, and a study of Turkish environmental institutions; the other, on a South-west Coast Environmental Management Study.

In the framework of the agreement between the Commission of the European Communities and Turkey, environment was selected as a priority issue. The programme of work includes a seminar on the integration of national environmental plans and development strategies (1993); the two main agenda items will cover energy and tourism.

The effective implementation of Agenda 21 and other decisions of UNCED, on a national basis, requires review of development plans and programmes, with a view to integrating environmental concerns at all levels of policy-making. The main actions to follow up UNCED are to be found in the preparatory studies of the 7th Five-year Development Plan; for these studies, 62 expert commissions have been created to cover all socio-economic sectors, including the environment.

ACTIVITIES OF OTHER STATES DIRECTLY RELEVANT TO THE MEDITERRANEAN REGION

CROATIA

Although **Croatia** is not a Contracting Party, a national report on environment and development prepared for UNCED was available. It shows that, prior to the present circumstances, which are themselves having a devastating effect on the environment, the generally held view was that environmental protection should flow from economic development, rather than be part of it from the beginning. However, environmental impact assessment was made part of all new industrial development, since 1984. Given the natural and historical heritage with which Croatia has been favoured, and the necessity of post-war reconstruction in prospect, the possibilities for incorporating environmental considerations into development are high. Particular objectives are: the improved management of the northern and central Adriatic, against coastal eutrophication and over-exploitation of the natural marine resources; reforestation; renewed agricultural efficiency and soil reclamation. Regeneration of historical sites is another post-war objective.

Croatia is therefore active in **international co-operation**, especially in MAP (Kastela Bay project) and hosts the Priority Actions Programme Regional Activity Centre in Split.

ACTIVITIES OF UN SPECIALIZED AGENCIES AND INTERGOVERNMENTAL ORGANIZATIONS RELEVANT TO THE MEDITERRANEAN ACTION PLAN

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Forestry

Sylva-Mediterranea is comprised of 25 member countries which meet every other year to discuss matters related to particular forest species, the role of forests in combating desertification, and the recently approved Mediterranean Forestry Action Plan. The purpose is to ensure better planning of forestry matters in the Southern Mediterranean and assist in locating sources of funding for the implementation of the Action Plan.

Soil erosion

FAO contributes to the UNEP sub-programme in Split on methodologies for mapping and measuring soil erosion in some of the Mediterranean countries (Turkey, Tunisia, Spain, Italy). So far, FAO's contribution has not been covered by the Regular Programme but efforts are being made to internalize these costs in the RP, thus allowing more systematic collaboration.

Fisheries

The General Fisheries Council for the Mediterranean (GFCM) continues to provide advice on resource utilization strategy to member countries made up of all coastal States in the Mediterranean. Evidence from FAO's analyses and publications suggests that there is a trend towards nutrient enrichment from land runoff, and this is more evident in semi-enclosed and enclosed basins such as the Adriatic and Black Seas. In combination with over-exploitation, marine resources have come under progressive stress in these systems. Even more dramatic events in the Black Sea have culminated in virtual collapse of the productive aquatic ecosystem, and FAO is working through the GEF mechanism to develop strategies of recovery. Other published analyses have extended these types of effects to other semi-enclosed seas world-wide.

It is envisaged that a sub-committee on aquaculture will be established at the forthcoming GFCM session to provide overall coordination and advice to aquaculture networks, including the network on aquaculture and environment.

A recently completed FAO Technical Cooperation Programme (TCP) project in Cyprus enhanced national expertise in economically and environmentally acceptable coastal aquaculture technology, appraised environmental feasibility and development potential for aquaculture, and assisted in the formulation of environmental regulations to govern aquaculture development. FAO also provide advice to countries bordering the Mediterranean on the introduction of species for aquaculture.

FAO's Fisheries Department is supporting activities by the FAO/UNEP Mediterranean Regional Aquaculture Project (MEDRAP II) to establish, inclose collaboration with the Regional Activity Centre for the Priority Actions Programme of the Mediterranean Action Plan (MAP-PAP/RAC), a cooperative network for aquaculture and the environment. As the future network centre, MAP-PAP/RAC is interested in coordinating regional activities in support of environmental assessment and management of existing and future aquaculture practices. FAO held a Seminar on Constitution of an Aquaculture and Environmental Network, in Athens, 29-30 April 1993.

It is suggested that, at the end of MEDRAP II in 1995, ways of collaboration be identified among countries to institutionalize MEDRAP.

Pollution Monitoring and Research

Since FAO's main preoccupation is the protection of marine life, it handles all MED POL research projects on effects of pollutants on marine organisms, communities and ecosystems.

Based on the recommendations of the FAO-IOC-UNEP Workshop on the **Biological Effects** of Pollutants on Marine Organisms (Malta, 1991), which discussed the applicability of biological effects techniques in field studies on a routine basis and their significance and interpretation vis-à-vis marine pollution risk assessment (results published in MAP Technical Reports No. 69), an FAO-IOC-UNEP training workshop on the techniques of monitoring such effects was also organized (Sophia-Antipolis, 1992). Shortly after, with the collaboration the Euro-Mediterranean Centre for Marine Contamination Hazards, a working group was created and met (Malta, 1992) to consider the possibility of a pilot project on biomonitoring in the Mediterranean and Black Seas. FAO collaborated with EUROMED and UNEP in the organization of the third intensive training course on the application of ecotoxicology to the monitoring, regulation and control of marine pollution (Sunderland, 1993).

Also related to studies on biological effects, FAO, IOC and UNEP organized the fourth (Alexandria, 1991), fifth (Tel-Aviv, 1992) and sixth (Trieste, 1993) training workshops on the statistical treatment and interpretation of marine community data.

With respect to the **monitoring of chemical contaminants in marine biota**, FAO arranged for the analysis of all the relevant data (1974-1991) in the MED POL data bank, with special reference to temporal trends. Training in this field was given at an FAO-UNEP-IAEA workshop on the design of monitoring programmes and management of data on chemical contaminants in marine organisms (Athens, 1992).

FAO is also involved in the **implementation of the LBS Protocol**, to which end it has organized pilot monitoring surveys, leading to the assessments of copper and zinc, while similar assessment on arsenic, lead, chromium and nickel are in preparation. A Pilot Monitoring Survey on herbicides was also completed and a report on it is in preparation. A PMS on fungicides is now being prepared.

FAO is also directly concerned with **plankton blooms and eutrophication** and has been instrumental in initiating the Thermaikos Gulf study; others are also being promoted. It is also assisting in upgrading the technical capabilities of Mediterranean institutions through the purchase of equipment and the preparation of Manuals of Methods in Aquatic Environment Research, as well as of Reference Methods; one Manual, on biological assessment of marine pollution with special reference to benthos, was prepared during the reporting period.

Integrated coastal area management

In 1991, the Inter-Departmental Working Group on Environment and Sustainable Development created a sub-group on Integrated Coastal Area Management (ICAM). The sub-group's activities include the production of two sets of guidelines: the WB/UNEP/FAO guidelines with two sections, one for senior policy-makers and the other for technicians; and the FAO guidelines to integrate the agriculture sector in ICAM, with three parts (for senior policy-makers, operational guidelines and sectoral guidelines). Through this sub-group FAO has also provided comments for the UNEP PAP/RAC guidelines ;as well as for the Coastal Areas Action Plan for the coastal region of Albania.

Small islands

Malta and Cyprus are ;among the 27 small island States involved in FAO's efforts to address the special concerns of these countries. An Inter-Regional Conference for Small Island Countries on Environment and Sustainable Development in Agriculture, Forestry and Fisheries was held by FAO in Barbados (April 1992), and a second conference is planned for Autumn 1994, as a follow-up to the UN Global Conference of Small Island Developing States, scheduled for April 1994.

INTERNATIONAL ATOMIC ENERGY AGENCY

The IAEA Marine Environment Laboratory (Monaco) has been heavily committed to providing technical support to the MED POL component of the Mediterranean Action Plan. The Marine Environmental Studies Laboratory (MESL) acts as the regional analytical support laboratory for MED POL, and the other two sections, the Radiometrics Laboratory and the Radio-ecology Laboratory, have made major contributions to regional knowledge of the sources, transport mechanisms and fate of radionuclide contaminants and on the passage of nuclear contaminants through food chains, particularly the transport of contaminants by particle flux.

IAEA-MEL's contribution to the Mediterranean Action Plan

Assistance to MAP-MEDPOL is broadly divided into: quality assurance support (method development, intercomparison exercises); pilot monitoring (testing the feasibility/need for including new MED POL parameters); supervision of research projects (about 8-10 per year); support with data interpretation (including the preparation of a "status and

trends" report on contamination); emergency analytical support in the event of environmental accidents; and enhancement of the capacity of national laboratories (including instrument installation and servicing, and user training courses).

Support for data quality assurance

Intercomparison exercises represent an essential element of method testing and of evaluating data quality at a global and a regional level. So far, 11 exercises have been organized for trace elements and 10 for trace organic contaminants in marine biota and sediment samples. All Mediterranean laboratories, whether part of the official MED POL network or not, have been encouraged to participate in the data-quality intercomparison exercises and have been offered support with appropriate methods, standard reference materials (free of charge) and calibration standards.

Results obtained from intercomparison exercises are the main source of information on Mediterranean quality. MESL gives special attention to showing discrepant results in an intercomparison exercise and assists them in "trouble-shooting" and correcting their analytical problems. A full report on each exercise is issued which maintains strictly confidential the identity of the individual participants. IAEA, with UNEP and IOC, works closely with other producers of Reference Materials to ensure a continuous supply of them to laboratories undertaking quality assurance/control work. A full catalogue of materials is published regularly. A bank of some 600 standards and reference materials is maintained at MESL in Monaco and these are available free of charge to all MED POL monitoring laboratories.

Details on participation of Mediterranean laboratories in intercomparison exercises are summarized in the IAEA (MESL)-UNEP Report on Data Quality Review for MED POL (Draft, Monaco, 1993).

Laboratories are encouraged to sustain their data quality by setting up quality control procedures based on the systematic measurement of reference materials (one reference sample for every batch of ten or so test measurements). Precision and accuracy are checked by participation in a "blind" intercomparison exercise.

To maintain a sufficient number and quantity of certified reference materials, the MESL will continue to organize a maximum of two intercomparison exercises per year, and will participate in other international intercomparison exercises.

Regarding **reference methods**, a difficulty faced by many analysts starting studies of marine contamination is finding a reliable method which uses easily available (and serviceable) instruments. For this purpose, UNEP has, since 1983, made available its **Reference Methods for Marine Pollution Studies**. The responsibility for editing and testing the Reference Methods series was assumed by IAEA's Monaco Laboratory in 1984 in co-operation with several UN Agencies, and the series now includes over 70 volumes, available free of charge world-wide.

The enhancement of the capacity of national laboratories to participate in MED POL

The intercomparison exercise reveals the need to encourage wider participation in the MED POL programme. In response, the staff of MESL and MEDU have jointly developed a new strategy of joint monitoring exercises and training courses which was introduced on a pilot basis in 1987, consisting of initial appraisals of institutional capacity and requirements; support for improving or replacing analytical instruments; training of key personnel at MESL (see next section); extended missions by MESL specialists to selected institutions to conduct group training, joint monitoring and to set up a quality-control routine; split-sample analyses in MESL and the national institutions (to check analytical data quality); follow-up activities, including maintenance visits, data reviews, refresher workshops on new developments in techniques and assessment strategies; and appraisals of the effectiveness of project implementation.

An important element of this strategy is the **instrument installation and maintenance programme**. The service has been running from Monaco since 1975 and has ensured the successful operation of instruments throughout MED POL Phases I and II. This service has evolved to include training courses on preventive maintenance and teaching the users to trouble-shoot and correct simple faults, with a view to reducing the "down-time" of instruments.

Joint monitoring missions to Mediterranean laboratories (6-8 three-week missions per year) are another key component of the overall strategy. They provide group training support and result in the establishment of a local data quality control programme.

A series of "Status and Trends" reports are now being prepared by MEDU, with the technical assistance of MESL (and other UN organizations) and with the participation of national scientists. These illustrate how monitoring data can be used to address problems of national and regional environmental management.

Training for MED POL

Since 1987, MESL has trained numerous technicians and scientists in the use (and maintenance) of analytical instruments used to quantify environmental pollutants. Training has been carefully integrated into its Quality Assurance programme to afford feed-back to measure success and to identify those laboratories experiencing difficulties. Attention has been concentrated on trace metals, chlorinated hydrocarbons and petroleum hydrocarbons. Technical scientists from the Member States are initially received for intensive (3-week) training at MEL. On arrival they are provided with samples of reference materials (of known pollutant concentrations) and during their stay they conduct, under strict supervision, the relevant analyses. By the end of the course they compare their results with the certified values for the samples. With careful supervision, performance is always good. This provides trainees with an excellent grounding in good laboratory practice and gives them the realization that they are capable of generating good data. To follow up the training, MESL scientists then visit the technical scientist in their own laboratories. During these visits, training is provided within their own environment; sampling is demonstrated and advice is

provided on laboratory design/organization. Samples collected locally are analysed in the Member State laboratories, but portions are also returned to MESL for confirmatory analyses. The efficacy of the training is once again (and then routinely) tested through distribution of "blind" samples within intercomparison exercises.

In recent years the topics covered by training courses have been extended to include: instrument maintenance, analyses of methyl mercury; quantification of tributyl tin (the antifouling agent added to marine paints) and analyses of organophosphorous pesticides. Since 1987, demand for training has increased dramatically. In response, MESL has expanded its efforts in the field and, during the last few years, an average of four courses (receiving approximately 20 MED POL trainees) are organized annually. An average of five extended quality-assurance missions to Member States are also undertaken annually. Demand, however, still exceeds the number of places that can be offered on the training courses or the visits that can be made to Member State laboratories.

Pilot Monitoring Studies

The Contracting Parties to the Barcelona Convention have undertaken to eliminate pollution of the Mediterranean Sea from land-based sources by substances listed in Annex I to the LBS Protocol and strictly to limit pollution by substances or sources listed in Annex II to the Protocol. To this end, the Contracting Parties have agreed to elaborate and implement, jointly or individually, as appropriate, the necessary programmes and measures.

Very little information is available on the levels, distribution and behaviour of many of the listed substances in the Mediterranean environment. For example, Annex I includes 'organophosphorous compounds', 'organotin compounds', 'mercury compounds' and "substances having proven carcinogenic, teratogenic or mutagenic properties in or through the marine environment". Annex II is even more general and lists "biocides and their derivatives not covered in Annex I of the protocol".

To obtain further information on the various groups of pollutants, the Contracting Parties decided to implement **Pilot Monitoring Studies** to assess the present degree of contamination.

In co-operation with FAO, the MESL has actively participated in four pilot monitoring studies on **organophosphorus pesticides, organotin compounds, herbicides** and, most recently, on **fungicides**. The Monaco laboratory has provided expert technical advice on the analytical chemistry necessary to quantify the pollutants and on the environmental chemistry used to interpret results obtained. In addition, intercomparison exercises have been organized by MESL to ensure comparability of results reported by the individual participants.

Results of the organotin pilot survey revealed extensive contamination of the Mediterranean and led to the rapid adoption of legislation by the Contracting Parties to restrict its use severely. The 3rd International Organotin Symposium was organized by MESL and hosted in Monaco.

The approach used in past pilot studies will be developed further as a proposed contribution to the next phase of MED POL.

Biogeochemistry of the Mediterranean

The Radio-ecology Laboratory continues to co-ordinate IAEA-MEL's participation in several national and international programmes in the western Mediterranean that are aimed at assessing spatial and temporal variability of the biogeochemical cycles of inorganic and organic contaminants. In the framework of SCOR's Joint Global Ocean Flux Study (JGOFS), one of the French JGOFS Programmes DYFAMED (Dynamique des Flux Atmosphériques en Méditerranée), the Laboratory has carried out temporal particle-flux studies using sediment traps at two sites in the open Ligurian Sea. The results show that particulate carbon flux occurs as pulses of particles linked to biological productivity patterns in the overlying waters. Such particles provide a focus for the aggregation of atmospherically introduced dust (e.g. Saharan) and other fallout contaminants (e.g. Chernobyl).

IAEA-MEL has also participated in the CEC's EROS (European River-Ocean Systems) 2000 programme, which has also been examining the transfer of important elements and contaminants from land to sea and their subsequent fate in coastal margin waters where MEL sediment traps were moored for several months in the Gulf of Lions and the Alboran Sea, as well as allowed to drift for a few days. Results show that, during productive bloom periods in the Gulf of Lions, aggregated biotic particles sink so rapidly that there is insufficient time to absorb and alter the chemistry of certain particle-reactive rare-earth elements, such as cerium, in the upper waters. During alternate periods, when the finer particles sink much more slowly, cerium is scavenged from the water and its concentration enhanced in the particulate fraction. This work has allowed the first estimates of the residence times of these elements in the Mediterranean to be made. The same experiments have helped revise upwards the residence times of plutonium and americium.

A third initiative beginning in 1993 is the ELNA (Eutrophic Limits of the Northern Adriatic) project in the Adriatic Sea, co-sponsored by the CEC. It is well known that the northern Adriatic suffers extreme stress from various pollutant inputs and is undergoing disturbing changes in its trophic nature. The degradation of its waters could have important consequences for the surface and deep waters of the entire Mediterranean. The main aim of the project will be to assess the carbon-assimilation capacity of the northern Adriatic so as to set acceptable limits to its eutrophication.

Improving the data base for assessing radioactive contamination

Two tasks of the Radiometrics Laboratory of IAEA-MEL relate to on-going (and future) work in the Mediterranean. These are: the provision of analytical radiological quality assurance services to IAEA Member States; and development of a global marine radioactivity database (to include the Mediterranean).

In addition to these studies, the Laboratory conducts regular intercomparison exercises which are part of IAEA's Analytical Quality Control Service and cover virtually every Mediterranean laboratory monitoring radioactivity. At least two exercises are conducted annually and reference materials are prepared and distributed world-wide.

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC/UNESCO)

Physical Oceanography

In a sea area like the Mediterranean, the general circulation is the main factor governing water exchange (flushing) on the continental shelf and in the coastal zone. The main objectives of the ongoing and proposed IOC activities related to the physical oceanography of the Mediterranean are: the establishment of a definitive phenomenology of water-mass formation, distribution, stratification and dynamics; assessment of the dominant driving mechanisms (winds, thermo-haline structure); local variability of the general circulation (e.g., eddies, meanders) and its implications for the distribution of tracers, nutrients and pollutants. Such variability is reflected, in particular, in two types of phenomena: frontal zones and mesoscale turbulent structures, which play an important role in biological productivity and the dispersion of contaminants. Their study is of fundamental importance for the development of coastal-zone oceanography aimed at providing the scientific basis for integrated coastal-zone management; e.g., for the siting of sewage outfalls, assessment of coastal erosion and of sea-water quality, pollution control, and sustainable development of living and non-living resources.

Two research programmes address these subjects in the region.

The **Physical Oceanography of the Eastern Mediterranean (POEM)**, is co-sponsored by IOC and UNESCO, has so far undertaken five surveys of the eastern Mediterranean followed up by an intensive effort to model the circulation in this basin. Phase I of POEM ended in 1990; the results have been discussed at two POEM Workshops and have been published in a special issue of **Dynamics of Atmosphere and Oceans**, April 1991, Elsevier Science Publishers, on the Mediterranean Sea.

They show that the circulation is dominated by sub-basin-scale gyres (cyclonic and anticyclonic) connected by meandering currents and jets (concentrated currents) which redistribute the water masses in the basin.

Phase II of POEM was launched in 1991. The oceanographic results of Phase I were here applied to the study of the biology and chemistry of the water column in relation to the physical forcing mechanisms. The first interdisciplinary survey (POEM-BC-1991) of the basin was carried out in October 1991.

International Research Programme in the Western Mediterranean (PRIMO), from the French **Programme de recherche internationale pour la Méditerranée occidentale**, is co-sponsored by IOC and ICSEM. Generally speaking, its objectives are similar to those of POEM. Existing observations indicate that the circulation in the western Mediterranean is very turbulent (variable) along the African coast, whereas it is relatively stable along the European continental shelf. The southern part can therefore be considered as favouring the dispersion of pollutants and promoting significant growth of the component organisms of the entire food chain.

The first phase is aimed at elucidating seasonal variability particularly in straits and some areas along the northern coast of the western Mediterranean. The first PRIMO operation (PRIMO-0) was aimed at verifying existing models of the seasonal variability in the circulation of the northern part of the basin. Current measurements were made simultaneously in the Corsican Channel, in the vicinity of Nice, in the central part of the Ligurian Sea and in the Ibiza Channel. The results of PRIMO-0 will be published in a special issue of **Oceanologica Acta** in 1994.

The next experiment, PRIMO-1, will start in late-1993 or early-1994, with the following main objectives: specify the fluxes and their seasonal variations in the Sicilian Channel; investigate the relationship between the barotropic and baroclinic exchanges through the various straits and channels and their effects on the Mediterranean Sea; specify the mean circulation of the intermediate and deep water masses in the vicinity of the Sardinian Channel; and verify the validity of some working hypotheses on the possible migration of deep mesoscale eddies and their effects on the circulation of the Mediterranean Sea.

Ocean Mapping: International Bathymetric Chart of the Mediterranean and Its Geological-Geophysical Series (IBCM)

The IBCM, on a scale of 1:1,000,000, was published in 1981 under the aegis of IOC and a second edition is planned after the five Geological-Geophysical Series have been completed, about 1995-6. A new edition of the IBCM brochure will be published in 1993.

The IBCM Editorial Board, with the close co-operation of many scientists from Mediterranean institutions, has compiled the following Geological-Geophysical Charts:

- **Bouger Gravity Anomalies** (IBCM-G) series published in 1989;
- **Seismicity** (IBCM-S) series was published in 1991;

- **Plio-Quaternary/Messinian Sediments** (IBCM-PQ) series to be published in late 1993 or early-1994;
- **Unconsolidated Sea-Bed Sediments** (IBCM-SED) series, scheduled for publication in 1994; and
- **Magnetic Anomalies** (IBCM-M) series, is tentatively scheduled for publication in 1995.

Marine Pollution

IOC, in collaboration with UNEP/MAP, has co-ordinated several MEDPOL research projects on physical processes, transport of pollutants, biogeochemical cycles and models, through contracts with Mediterranean research institutions. The results of these projects are reported at marine pollution workshops organized in conjunction with the biennial ICSEM Congresses, with the support of IOC, UNEP and other organizations.

Other relevant workshops and training courses have also been organized:

- An IOC-MAP Training Course on Modelling of Outfalls and Coastal Water Quality (Athens, 1987) was organized in direct response to the Genoa Declaration. The aim was to present models dealing with the siting of coastal outfalls, dispersion in the nearshore and offshore waters, and the related water quality;
- Because of the lack of information on marine and coastal debris in the Mediterranean, IOC, FAO and UNEP convened an *ad hoc* Meeting on Persistent Synthetic Materials (Athens, 1987) which recommended the establishment of a pilot monitoring programme in selected Mediterranean areas (Cyprus, Sicily, Spain and Turkey) to assess the quantity of persistent garbage littering the Mediterranean coastline, to evaluate its geographical distribution, to investigate the seasonal variation in the quantity of litter and to define its sources. The results of the aforementioned programme were considered at an IOC-FAO-UNEP Review Meeting on the Persistent Synthetic Materials Pilot Survey (Haifa, 1989). They showed that plastics are the dominant (65-75%) component of marine and coastal litter. The main recommendations of the meeting were that: all countries bordering the Mediterranean Sea should ratify Annex V of the MARPOL Convention, and the Convention itself, if they have not yet done so (Annex V forbids the dumping of plastics in the sea and restricts discharge of other types of litter); garbage dumps on the coast should be prohibited; and governments should encourage clean-up programmes. An **Assessment of the State of Pollution of the Mediterranean Sea by Persistent Synthetics**, jointly prepared by IOC and FAO, was approved by the Contracting Parties to the Barcelona Convention in Cairo, 1991;
- In co-operation with UNEP, IOC organized a Review Meeting on Oceanographic Processes of Transport and Distribution of Pollutants (Zagreb, 1989);

- The IOC-IAEA-UNEP Group of Experts on the Effects of Pollutants (GEEP) has provided guidance in the development of the series of FAO-IOC-MAP Training Workshops on the Statistical Analysis and Interpretation of Marine Community Data (Piran, 1988; Athens, 1989; Split, 1990; Alexandria, 1991; Tel-Aviv, 1992; and Trieste, 1993; and
- In co-operation with MAP, IOC organized a Training Course on the Analysis of Physical Oceanographic Data and Time-series Analyses (Athens, 1989).

The IOC-UN Programme on Ocean Science in Relation to Non-Living Resources (OSNLR)

This programme was adopted to serve as a "guide to the governments of Member States of IOC on the planning of programmes for the rational management of the potential valuable mineral resources of the world's ocean", with priority being given to the study of the resources of the coastal zone. Its main components are:

The **Sub-programme on Sedimentary Environments, Eustatic Sea-level Changes, Tectonics and Resources (SETR)** which includes: study of natural and human effects on the coastal zone (e.g., global sea-level rise, regional subsidence, extraction of groundwater and hydrocarbons, river-estuarine-coastal dynamics and interactions); and mapping of the distribution and composition of superficial shelf sediments.

The **Sub-programme on Shelf and Upper Slope Dynamics (SUSD)** covers understanding of nearshore processes (e.g., channel behaviour, sediment transport, slope-sediment slumping) that are clearly important for solving such marine engineering problems as undersea-cable laying, oil-rig installation and harbour construction.

In the **Mediterranean**, more clearly than anywhere else in the world, the coastal zone is of fundamental importance. Land surface changes in many Mediterranean littoral areas are due to several factors: sediment compaction (e.g., deltaic sedimentation); long-term coastal movements, episodic seismic-tectonic events, etc. As far as the marine environment itself is concerned, data requirements include: sea-level monitoring, through the establishment of sea-level gauge networks; observation of wave energy and its dissipation at the coast line; flow patterns and riverine sediment loads (before and after damming, diversion or other hydraulic works); and the effects of coastal-zone processes on ground water (the relative rise of sea level can have a disastrous effect on coastal-zone aquifers, resulting in salinization of fresh water, acceleration of subsidence due to over-exploitation of ground water and, in some countries, of hydrocarbons).

The IOC-UN Guiding Group of Experts on OSNLR, at its third session (Bordeaux, 1989), developed a Mediterranean component, to be carried out in co-operation with ICSEM. The general theme of the proposed research is coastal sedimentary dynamics, to be developed in three phases: insular coastal systems; deltaic systems; and Mediterranean littoral systems. The Co-ordinator, Professor Salvino Busuttil, has been chairing the monitoring group for the Mediterranean.

Regarding **insular systems**, a project focussing on Malta and Cyprus, as case studies, was adopted. Initial surveys of the Maltese coastline have been made (1992) and the results analysed.

A workshop to develop a programme of work for the Algerian and Tunisian coasts is envisaged for 1994.

The SUSD Sub-programme is of particular relevance to the Mediterranean system which, for the most part, is characterized by a narrow continental shelf and very often a continental slope close to the coastline. The structure of this margin largely explains some of the problems that have been encountered with man-made structures (e.g., Nice airport) and is an important factor in the exploration and exploitation of various mineral resources and placers yielding building materials such as gravel and sand.

The IOC-FAO Programme of Ocean Science in Relation to Living Resources (OSLR)

It is planned to extend the **Sardine-Anchovy Recruitment Project (SARP)** to the Mediterranean and to develop a Mediterranean component of the **Harmful Algal Blooms** programme. The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, at its second session, encouraged the Mediterranean Action Plan and national representatives from the Mediterranean region to prepare an outline of their needs relative to the regional components of the programme. An IOC-FAO-State of Bremen Training Course on Qualitative and Quantitative Determination of Algal Toxins is envisaged for 1994 for participants from the Mediterranean and Black Sea regions.

THE WORLD BANK

The Bank's **Mediterranean Environmental Technical Assistance Programme (METAP)** is jointly funded by the World Bank itself, the Commission of the European Communities, the European Investment Bank, and the UN Development Programme. It brings together the 18 Mediterranean coastal countries and assists them, individually and collectively, to design and implement environmental projects, strengthen or build environmental institutions, develop appropriate policy options, and mobilize resources. METAP is also a vehicle to raise public awareness of the environment. The initial priority areas, addressed in Phase I, were: coastal-zone management; management of solid and hazardous waste; diminishing and unsafe water resources; and marine pollution. Phase II will concentrate on the preparation of National Environmental Action Plans and Strategies, and draw on the priorities defined therein; emphasis will be on urban and water issues. Pre-investment studies of specific environmental components of priority projects will continue to be prepared and will seek to influence the subsequent investment. METAP will examine the possibility for limited support to feasibility studies and will aim for the least costly, and most appropriate, technologies.

THE WORLD HEALTH ORGANIZATION

Introduction

Of the twenty-one coastal States in the Mediterranean, thirteen are Member States of WHO's European region and seven are Member States of WHO's Eastern Mediterranean region. Algeria is a Member State of WHO's African region.

There are therefore no exclusively Mediterranean regional activities in the Organization's Regular Work-Programme and Budget. Such activities are, however, performed within the framework of the Mediterranean Action Plan and are financed, as is the case with all other extrabudgetary activities, from other sources; in this particular instance, from the Mediterranean Trust Fund. The WHO Regional Office for Europe (Copenhagen) has been designated as the lead Regional Office for implementing this programme, with the Regional Offices for Africa and for the Eastern Mediterranean as collaborating Regional Offices. In many specific areas of activity, the WHO/EURO Project Office for the Mediterranean Action Plan, located in Athens, receives a substantial technical input from related work already performed by the Organization in other regions (mainly the European), thus enabling the adaptation of existing work to Mediterranean conditions and preventing duplication of effort.

The following information relates to the organization's Regular Programme and does not cover those activities performed by WHO within the specific framework of the Mediterranean Action Plan.

Areas of activity

Activities directly or indirectly relevant to the Mediterranean environment are performed by WHO within the framework of its **Promotion of Environmental Health Programme**. These activities cover: community water supply and sanitation; environmental health in rural and urban development and housing; health risk assessment of potentially toxic chemicals; control of environmental health hazards; and food safety.

Within each region, these activities are geared to the particular requirements of the Member States involved, individually and jointly.

Intercountry programmes

In the European region, ongoing programmes include the following:

Air pollution: provides scientifically sound information on levels of air pollutants, their potential health effects and the population exposure in Europe; it gives guidance on the effectiveness of air pollution control scenarios with respect to the public health risks; identifies hot spots that require immediate remedial action; and outlines programmes for sustainable development.

Chemical Safety: evaluates toxicological evidence on the health effects of environmental pollutants as well as exposure data as a basis for setting guidance values for exposure through various environmental media; prevention, response and cleanup of chemical accidents and emergencies are also addressed.

Environmental aspects of healthy cities: works closely with city authorities to place - and keep - environmental health issues high on their agenda, and uses the WHO Healthy Cities Project as its major vehicle.

Environmental epidemiology: evaluates evidence on the impact of environmental factors on health, and promotes and assists research on environmental factors affecting health and on qualitative and quantitative relationships between health and environment.

Environmental health information systems: collects and stores information on environment, health and socio-economic factors at the subnational level, its main aim being to permit Member States to identify priority areas of concern for remedial efforts.

Environmental health services: works with countries to set up new organizational structures that can better deliver the services needed.

Food safety: makes available scientifically sound information on levels of contaminants such as heavy metals, pesticides, mycotoxins, radionuclides and veterinary drug residues, in food and beverages, and disseminates information on foodborne infections and intoxications, through its Europe-wide networks.

Occupational health: develops and promotes concepts and principles that assist Member States to strengthen their preventive occupational health services and their efforts to adopt lifestyles maximally conducive to good health, focussing on information management support, mobilization of collaborative approaches, development of a European support structure, and research, education and training.

Policy and management: helps Member States to integrate the principles of the European Charter on Environment and Health into their policies, the strategy for which includes conserving natural resources, promoting sustainable development, controlling health risks in air, water, soil and waste, and creating an environment supportive of health and wellbeing where people live and work.

Radiation protection: advises Member States in the event of a nuclear emergency, providing technical assistance on how best to protect the public from exposure to natural radiation, to man-made sources used in industry, medicine and research, and from the consequences of nuclear accidents and the operation of a nuclear fuel cycle in power generation.

Risk assessment: is developing a framework to help Member States to harmonize their approaches to assessing the impact of development projects and other complex activities on public health.

Waste management: provides guidance on the management of collection, transport and disposal of community and industrial wastes, helps Member States to tackle the difficult problem of soil polluted by wastes, and assesses methods of waste reduction (re-use and recycling).

Water and sanitation: provides guidance on providing water of a quality and in amounts adequate for its intended purposes, and on managing and cleansing waste waters from homes, agriculture and industry, and promotes cost-effective management of community water and waste-water services.

Through its participation in the **Mediterranean Action Plan** WHO enhances national marine pollution monitoring programmes in the Mediterranean area, and promotes and assists research projects in microbiology, the relationships between water quality and health effects, and biological monitoring of population groups at risk through chemical contamination of seafood. A revised assessment of the state of pollution of the Mediterranean Sea by pathogenic micro-organisms, and a comprehensive assessment of the health risks from marine pollution in the Mediterranean, are both financed from WHO's regular budget as part of the Organization's contribution to MAP, and scheduled for completion in late 1993. Work on the WHO Survey of Pollutants from Land-based Sources in the Mediterranean is continuing.

Since the adoption of the European Charter on Environment and Health, the Environment and Health Department of the WHO Regional Office for Europe has been considerably strengthened by the establishment of the WHO European Centre for Environment and Health, with branches in Bilthoven, Nancy and Rome. The Bilthoven Division focuses on air pollution, toxicology and descriptive epidemiology, the Rome Division concentrates on water and waste issues with international dimensions, food safety, radiation protection and analytical epidemiology. The Nancy Project Office tackles the problems of community water, wastewater and waste management. In addition, the Bilthoven and Rome Divisions are developing a European Environment and Health Information System.

Country programmes

Apart from intercountry programmes, activities are also carried out at the individual country level, for which each Member State signs a medium-term biennial programme agreement with the appropriate Regional Office, which makes a modest contribution to the cost of specified activities.

In the case of the Regional Offices for the Eastern Mediterranean and for Africa, a significant amount of Regular Budget funds is allocated to country projects. The proportion of such funds utilized for environmental health purposes depends on the priorities assigned by countries within the overall spectrum of requirements in the field of health.

A number of projects, mainly on water-resource management, waste management and environmental health impact assessment, have been executed by WHO with funding from UNDP and other outside sources. All developing Mediterranean countries have benefitted from such projects. This is a continuous process, and a number of projects in the above-mentioned areas are ongoing or planned.

Environment and Development

In preparation for the 1992 United Nations Conference on Environment and Development, the WHO Commission on Health and Environment was appointed as a fully independent body in 1990. The report of the Commission, under the title **Our Planet, Our Health**, was submitted to the Rio Conference. A number of the Commission's recommendations were incorporated into the appropriate chapters of Agenda 21.

In 1993, the World Health Assembly approved a WHO Global Strategy for Health and Environment.

The future technical input by WHO to the Mediterranean Action Plan through its WHO/EURO Project Office in Athens will therefore, through its global strategy for Health and Environment, as well as the European Charter, be fully in line with the concept of sustainable development and UNCED's Agenda 21.

WORLD METEOROLOGICAL ORGANIZATION (WMO)

Within the United Nations system the World Meteorological Organization (WMO) has a continuing responsibility for providing authoritative scientific information and advice on the state and behaviour of the earth's atmosphere and climate. To this end it has a number of operational observation networks, one of which is the **Global Atmosphere Watch (GAW)**.

The GAW system was established in 1989 and has integrated a number of WMO's research and monitoring activities in the field of atmospheric environment, notably the **WMO Background Air Pollution Monitoring Network (BAPMON)** and the **WMO Global Ozone Observing System (GO₃OS)** established, respectively, in the 1960s and in the 1950s.

The main objective of GAW is to provide data and other information on the chemical composition and related physical characteristics of the atmosphere required to improve understanding of the behaviour of the atmosphere and its interactions with the oceans and the biosphere. The data collected at the GAW monitoring stations are used to improve understanding of: the relationship between changes in atmospheric composition and in global and regional climate; the long-range atmospheric transport and deposition of potentially harmful substances over terrestrial, fresh-water and marine ecosystems; and the natural cycling of chemical elements in the global atmosphere/ocean/biosphere system, and the impact of human activities thereon.

The GAW system comprises global and regional monitoring stations. The global stations carry out a complete range of measurements relevant to climate change, atmospheric ozone changes and to other global-scale environmental issues. The measurements, include: ozone (total column, vertical profile and near the surface); other greenhouse gases (CO₂, CFCs, CH₄, NO_x, CO); chemical composition of rain and atmospheric particles; radionuclides; and meteorological parameters.

The GAW regional stations provide data for assessing regional environmental problems such as: acid rain; increased surface ozone; the deterioration of ecosystems; air pollution in rural areas; airborne pollution of the sea, etc. The "core" measurement programme at GAW regional stations includes: surface ozone; precipitation chemistry; radiation (visible and UV-B); CH₄; CO; aerosol composition; black carbon; total ozone; and meteorological parameters. Recommendations have been made concerning concrete measurement programmes for fourteen geographic regions (including Mediterranean and Northern Africa) identified by the International Geosphere-Biosphere Programme (IGBP) of the International Council of Scientific Unions (ICSU).

At present, the GAW system of regional stations consists of about 200 GAW-BAPMON stations and more than 1450 GAW-GO₃OS stations.

To collect, process, analyse and distribute data obtained from the GAW stations, five World Data Centres have been established by WMO on: ozone (Toronto, Canada); other greenhouse gases (Tokyo, Japan); precipitation chemistry (Research Triangle Park, USA); turbidity (Asheville, USA); and solar radiation (St. Petersburg, Russia). The GAW data are regularly published and are available directly from the Centres, upon request, to all organizations, scientific institutions and individual scientists.

The **research and monitoring of pollution of the Mediterranean Sea** through the atmosphere is one of the GAW regional activities that is also a part of the long-term Programme for Pollution Monitoring and Research in the Mediterranean Sea (MED POL).

The monitoring and modelling programme on pollutant transport to the sea through the atmosphere was elaborated at the First Workshop on Airborne Pollution of the Mediterranean Sea (Belgrade, 1987). The major goals of the programme are: to evaluate the importance of the atmospheric transport and deposition of land-based contaminants to coastal and open Mediterranean waters; to assess the airborne contamination levels of potentially harmful substances; to identify sources and source areas for these atmospheric contaminants; and to develop predictive models for assessing airborne pollution load.

For routine monitoring, the programme recommended by the above-mentioned Workshop includes measurements of the following parameters: **in precipitation** - pH, conductivity, SO₄, NH₄, NO_x, Na, K, Mg, Ca, Cl, Cd, Pb, Cu and Zn; **in air** - Cd, Pb, total particulate matter and surface ozone.

At a later stage, the monitoring programme should be complemented by measurements of radionuclides (^{137}Cs and transuranic elements) and organic species (PCBs, DDTs, HCHs, PAHs and other particulate hydrocarbons).

Moreover, the Second Workshop on Airborne Pollution of the Mediterranean Sea (Monaco, April 1991) recommended that the priority measurement parameters should also include nutrients (N and P compounds), which may cause eutrophication, and black carbon, as a good inert tracer for validating model calculations.

At present, about fifteen monitoring stations in the Mediterranean region conduct measurements which contribute to the MED POL airborne pollution monitoring programme. These measurements as a rule are still irregular and not continuous as required, but the first data have recently started entering the MED POL data centre and they are used for the assessment of atmospheric deposition of some pollutants over the Mediterranean regions.

Valuable contributions to the understanding of long-range transport and deposition of pollutants to the Mediterranean Sea have also been made by several national research studies conducted at monitoring stations (e.g. in Corsica, Cap Ferrat, Mallorca) and during research cruises.

The availability of measurement data and model calculations based on meteorological information have shown that a significant proportion of the pollutants entering the Mediterranean Sea is transported by the atmosphere from coastal and remote inland sources.

These results are important not only from the scientific point of view, but also for the development of strategies, policies and legal instruments to protect the environment of the Mediterranean region. This means that the control of airborne pollution of the sea should be given the same attention as has been given to the control of pollution through rivers, direct effluent discharges or waste dumping. The first step in this direction was made in October 1991 when the Contracting Parties to the Barcelona Convention adopted an Annex to the Protocol on the Protection of the Mediterranean Sea against Pollution from Land-Based Sources which defined the conditions under which this Protocol should apply to pollution through the atmosphere.

COUNCIL OF EUROPE

The Council of Europe's action relating to the protection of the environment, at intergovernmental and interregional levels, is intended to protect nature - spaces and species - and to make sure that human activities are so organized that "sustainable development" with an environmental protection dimension is possible.

In several spheres, the Council of Europe takes specific account of particular features of the Mediterranean area and co-operates with the countries of the southern shore. The texts that it adopts and programmes of action that it carries out are a contribution to the preservation and improvement of the state of the Mediterranean environment.

Intergovernmental Co-operation

Nature Protection

Regarding the **preservation of biodiversity**, the Berne Convention (1979) on the Conservation of European Wildlife and Natural Habitats - the text of which was adopted by the Committee of Ministers of the Council of Europe - is intended to ensure that account is taken of the conservation of European wildlife and natural habitats in general national planning and development policies and in pollution-prevention measures. A veritable "European Biodiversity Convention", it is open to the non-European Mediterranean world, one of its particular aims being to promote co-operation in the conservation of common and migratory species. To date it has 27 Contracting Parties including Cyprus, France, Greece, Italy, Spain and Turkey. Albania, Morocco and Tunisia, among others, have also been invited by the Council's Committee of Ministers to accede, and other States should receive invitations in the near future.

The Convention's programme of activity has included research and expert reports concerning the most at-risk Mediterranean species - the marine turtles (*Caretta caretta* and *Chelonia mydas*) and monk seal (*Monachus monachus*) - and several recommendations to the States concerned have been adopted. Action under the Convention also includes the draft of an Agreement on the Conservation of Small Cetaceans of the Mediterranean and the Black Seas and Contiguous Waters.

Several meetings on the general subject of biodiversity have been held or are planned. Regarding **Mediterranean-type wetlands**, a first seminar took place at Donana (Spain) in 1989, and a second at Ria Formosa (Portugal) in 1992, both in conjunction with the Convention on Wetlands of International Importance Especially as Waterfowl Habitat.

Through its action for **protected areas**, the Council of Europe has set up two networks of protected areas including several Mediterranean sites.

The European Network of Biogenetic Reserves is intended to maintain biological balance and ensure that as many representative examples of European flora, fauna and natural areas as possible are effectively protected. Among the reserves with a shoreline, nine are in the Mediterranean area (in Cyprus, France, Greece, Italy, Malta and Turkey).

The European Diploma was introduced in 1965, with a view to protecting the natural sites of Europe, which are of the greatest interest because of their international value and their scientific, cultural, aesthetic and/or recreational qualities. Awarded for a (renewable) period of five years, it has so far been granted to 38 areas in fourteen Council of Europe Member States. Of these, six include a Mediterranean marine ecosystem. They are in France (Scandola Nature Reserve [Corsica], Camargue National Reserve), Greece (Samaria National Park), Italy (Montecristo Island and Maremma Natural Park) and Turkey (Kuşçenneti National Park).

In its endeavours for **coastal protection**, and to help safeguard what was regarded as one of Europe's most magnificent regions, the Documentation and Information Centre for the Environment and Nature (NATUROPA Centre) of the Council of Europe held a series of colloquia between 1988 and 1991 on the protection of Mediterranean coasts. Four meetings took place (Messina, Italy, 1988; Izmir, Turkey 1989; Escala, Spain 1990; and Bastia, France 1991), enabling the main aspects of the protection of the Mediterranean coastline to be considered, through study and explanation of the various instruments likely to play a useful role, and conclusions to be adopted at each colloquium.

The Messina colloquium studied the question of land purchase as a means of protection. The Izmir colloquium highlighted the importance of spatial planning instruments as a means of protecting the coasts; particular attention was drawn to development away from the coastline. The Escala colloquium was an opportunity to study the use of protected areas as a method of safeguarding the Mediterranean coastline. Finally, the Bastia colloquium dealt with the Mediterranean's marine parks as a means of coastal protection.

The NATUROPA Centre also held two pan-European colloquia on "Tourism and Environment", one of which covered tourist development and delta protection (Bucharest and Danube delta, Romania, 1992).

Human activities

Regarding **spatial planning**, three texts adopted by the Committee of Ministers of the Council of Europe are of particular importance for the development of the Mediterranean area: on the protection of coastal areas; on the European Regional/Spatial Planning Charter; and on planning policies in maritime regions. These define the general planning and management principles that should guide integrated planning affecting coastal areas, taking account of long-term goals.

In the domain of **major natural and technological hazards**, the Committee of Ministers of the Council of Europe, in 1987, instigated the EUR-OPA agreement, the Open Partial Agreement on the Prevention of, Protection against, and Organization of Relief in, Major Natural and Technological Disasters. The main purpose of the Agreement is to give new impetus to co-operation among Member States, drawing on all existing resources and knowledge to provide for more efficient prevention of, protection against, and organization of, relief in the event of major disasters (earthquakes, volcanic eruptions, industrial accidents, etc). Albania, Algeria, Spain, France, Greece, Israel, Italy, Malta, Monaco and Turkey, among others, are already parties to the Agreement.

Twelve specialized European Centres carry out research and provide training relevant to disaster medicine, conservation of the cultural heritage, technological disasters, geodynamic and morphodynamic hazards, geodynamics, earthquakes and marine contamination hazards. A European Warning System is also being set up to give the alert in the event of disasters.

Of particular interest to the Mediterranean area are: the European Training Centre for Natural Disasters (AFEM), in Ankara (Turkey); the European Centre for the Prevention and Forecasting of Earthquakes (ECFPE), in Athens (Greece); the Euro-Mediterranean Centre on Marine Contamination Hazards, Valletta (Malta); and the Observatoire océanographique européen (OOE), in Monaco. The University of the Mediterranean, set up by a 30-strong group of Mediterranean universities, should also be joining in a European Decentralized Faculty of Risk Sciences.

An effort is being made in the Mediterranean area to ensure that there is efficient seismic monitoring in all the countries that are members of the European Warning System, so that they will be more supportive of each other in the event of any major earthquakes.

Inter-regional co-operation

Regarding the **Conferences of Mediterranean Regions**, and in conjunction with the Parliamentary Assembly of the Council of Europe, the Standing Conference of Local and Regional Authorities of Europe (CLRAE), of the Council of Europe, has for eight years been developing interregional co-operation in the Mediterranean area. Three Conferences of Mediterranean Regions have already taken place: Marseille (France), 1985; Malaga (Spain), 1987; and Taormina, (Italy), 1993. A fourth Conference is to be held in Cyprus in 1995, and a fifth in the Languedoc-Roussillon region (France) at a later date. These focus on environmental matters.

The first Conference discussed problems of environment and development of the Mediterranean basin. The second Conference (Malaga) had three main themes: tourism in the Mediterranean basin; transport and communications in the same area; and ways of improving interregional co-operation. The third Conference (Taormina) concluded that a realistic policy of the Mediterranean regions should have two objectives: to strengthen the position of the regions of the northern shore in the European context (within European Union and East-West co-operation); and to place exchanges between the northern and southern shores of the Mediterranean in the context of North-South dialogue and co-operation.

Activities in the Mediterranean

Under the aegis of the Standing Conference of Local and Regional Authorities of Europe (CLRAE), a Seminar on Tourism and Integrated Planning was held in Cyprus in 1989. The declaration adopted there points out that tourist development over and above a certain level may well destroy the very assets - nature, the historical heritage - that attract the tourists, leaving a bill for restoration of the environment exceeding the extra income generated by the additional development.

Under the aegis of the Council of Europe, the regional governments of Andalusia, Languedoc-Roussillon and Tuscany are also making a joint effort to draw up a Mediterranean Landscape Charter, the preliminary draft of which will shortly be submitted to an international colloquy.

ACTIVITIES OF NON-GOVERNMENTAL BODIES RELEVANT TO THE MEDITERRANEAN ACTION PLAN

GREENPEACE

Greenpeace was first granted observer status at the Barcelona Convention in 1985 and has participated ever since, providing scientific and technical information, hosting meetings and placing special emphasis on pressuring countries to put words into action. Campaigns are regularly designed with this in mind, and often bear witness to non-compliance with internationally and regionally agreed commitments.

The Greenpeace Mediterranean campaign was originally conceived as an initiative to press for the rapid implementation of the Genoa Declaration objectives, but the original objectives have expanded, to seek the effective protection of the Mediterranean region as a whole.

In 1993, Greenpeace Mediterranean campaigns have concentrated on the following issues, all of them underpinned by the traditional Greenpeace methods of direct action and non-violent protest:

- illegal driftnetting in the Mediterranean Sea - providing reports, video and still photo footage and calling for the establishment of a Mediterranean High Seas Fisheries Convention;
- the Barcelona Convention Hazardous Waste Protocol - specific reports on two waste trade scandals;
- illegal installation of artificial reefs in Tunisia to halt illegal trawling and provide protection for the Posidonia oceanica meadows in the Gulf of Gabès;
- the production of a report on the environmental impact of organochlorines in the Mediterranean region and an accompanying video;
- work towards reliance on clean renewable energy sources instead of fossil fuels and nuclear power.

The overall goal of the Mediterranean Campaign is described in a document published in 1992, titled "Greenpeace Proposal for the Establishment of the Mediterranean as a Protected Area", in which Greenpeace work in the region is carried out.

THE HELLENIC MARINE ENVIRONMENT PROTECTION ASSOCIATION (HELMEPA)

Since its foundation in 1982, HELMEPA's efforts have been mainly directed towards the environmental training of Greek seafarers at annual training seminars. Its activities have also been directed towards environmental motivation of the general public in Greece and, with the help of international organizations, abroad.

In 1989, HELMEPA submitted to the Commission of the European Communities its proposal to undertake, in 1990, special programmes in Greece within the framework of the EC's **Mediterranean Special Programme of Action for the Environment** (MEDSPA). This EC Programme is aimed at the protection and the upgrading of environmental conditions in the Mediterranean through demonstration projects, motivation of the public, and technical assistance.

It covered: the training of seafarers; the introduction of database computer programmes for vessel crew members; the study of the pollution along the coast of Attica and the nearby islands; garbage management; and hands-on implementation of raw-material recycling of urban solid waste.

On the basis of the experience gained, the CEC's concern for pollution in the Mediterranean, and the shortage of reception facilities for garbage-vessel wastes, world-wide but especially in the Mediterranean, HELMEPA undertook a new programme in the period 1991-1993. To this end, it submitted to the CEC four proposals under MEDSPA; two of the proposals were approved. They cover training of seafarers on board ship and ashore, and a uniform environmental initiative/action programme in the Mediterranean. They have been carried out in three phases, one per year, between 1991 and 1993.

Training of seafarers

The aims of this project are: promotion of the implementation of the international conventions and national legislation on marine pollution from ships and on safety at sea; raising the environmental awareness of Greek seafarers; complementing the State education of seafarers with updated information and motivational material, together with simplified technical publications and training on specialized computer programmes; minimization of the human factor as a potential cause of maritime accidents and accidental or operational pollution incidents; and extension of IMO's campaign for "Safer Ships and Cleaner Seas" to an even wider audience, from merchant marine school cadets to merchant navy officers on active duty, especially in the Mediterranean.

Uniform Environmental Initiative/Action Programme

The aims of this project are: establishment of a Federated Network (MEDMEPA) of Mediterranean non-governmental environmental protection associations committed to the abatement and prevention of pollution from terrestrial and marine sources; establishment of a voluntary Action Plan with emphasis on pollution of the sea and beaches by garbage, complemented by public awareness campaigns, to provide non-governmental groups with the information and the means to motivate the public on local environmental issues and activities; creation of an environmental momentum towards safeguarding the marine and coastal resources of the region against pollution; promotion of regional co-operation and an understanding with the member countries of the European Community and with non-EC countries on the sensitive areas of the Mediterranean, consistent with the aims of the UNEP Mediterranean Action Plan; and promotion of regional co-operation among the various sectors of society, such as intergovernmental organizations, governments, industry, local authorities and the general public

Other developments in the Mediterranean

HELMEPA has produced and submitted to UNEP/MAP (Athens) and to REMPEC (Malta) its printed and audiovisual motivational material/art work, translated into most of the Mediterranean languages, to be further disseminated in the region.

A new Marine Environment Protection Association (CYMEPA) has been founded in Cyprus, and another, TURMEPA, in Turkey in 1993. HELMEPA will provide guidance and expertise to TURMEPA so that fruitful co-operation will be established again within MEDMEPA.

Other Developments in Greece

HELMEPA continues its own regular programme of motivating the general public, schoolchildren, pleasure-craft owners and crew, and others. Under its **Voluntary Public Awareness Campaign**, with the co-operation of the State, special TV and radio spots produced by HELMEPA are played free of charge by the Greek National Broadcasting Network as well as by other, private TV and radio stations. The aims of this initiative are: to inform and to motivate the public with a view to controlling the beach pollution they themselves create; and to prepare beaches of significant natural beauty for their possible participation in the Blue Flag campaign, insofar as they have the required infrastructure and there is an upward trend in the number of bathers using them in the summer. A Voluntary World Beach Clean-up Day was established in 1991 and twenty-four countries around the world participated in it, including Greece with HELMEPA's co-ordination. On the 1992 anniversary, nineteen Greek Prefectures responded to HELMEPA's invitation to clean up their beaches; port authorities, environmental bodies, Boy Scouts and Girl Guides, the Armed Forces, and the general public participated.

The national "GOLDEN STARFISH" Project, initiated by HELMEPA in 1990, is continuing, with the co-operation of the competent State authorities (e.g., the Ministries of the Environment, of the Merchant Marine, and of the Interior, local authorities, and the National Tourist Organization).

INTERNATIONAL COMMISSION FOR THE SCIENTIFIC EXPLORATION OF THE MEDITERRANEAN SEA (ICSEM)

As the leading scientific body for the Mediterranean Sea, ICSEM has played an active part in relation to MAP. At each of its Plenary Assemblies and Congresses, it has, for the past eleven of its gatherings, organized an ICSEM-IOC-UNEP Workshop on the Pollution of the Mediterranean Sea; at each, particular themes have been taken. At the Xlth such Workshop (Trieste, 1992) the two subjects of direct interest were: eutrophication and plankton blooms; and data quality assurance. Twenty-four scientists from twelve Mediterranean Countries received MAP travel grants enabling them to attend the Workshop.

MEDITERRANEAN ASSOCIATION TO SAVE THE SEA TURTLES (MEDASSET)

Ongoing activities

MEDASSET's ongoing national and international activities and objectives relevant to the Mediterranean Action Plan objectives are:

- **The Project on the Monitoring of the Incidental Catches of Loggerhead Turtles on Swordfish Longlines in Greek Waters of the Ionian Sea.** In this Greek national project, monitoring of incidental catches of turtles in the central and southern Ionian Sea is continuing for the fourth consecutive year, during the swordfish fishing season (April to September). At present, little is known about the threat to the turtle in its principal habitat, the sea, since most research has concentrated on their nesting beaches. Two threats are thought to be significant, however: incidental capture by drift nets and by swordfish (and tuna) longlines in the Ionian Sea. The mortality so caused remains unknown, although, for the longline fishery it is estimated to be between 15% and 50%. The need for more data to assess the impact of these fisheries on this long-lived species is evident. The concurrent use of drift nets and longlines and the destruction of nesting beaches in one of the main loggerhead breeding areas may prove fatal for this species.
- **The Project on the Assessment of Turtle Nesting Beaches in Northern Cyprus** is an international project supported by MEDASSET. The assessment is being carried out for the second consecutive year by researchers from the University of Glasgow (Scotland).

- **The Project on the Assessment of Tourists' Awareness of Sea Turtles on Zakynthos Island (Laganas Bay)** is a combined national (Greece)/international (UK) project, in which MEDASSET is supporting a research team from King's College, Taunton.

MEDASSET's efforts since 1985 have contributed to the improvement in the attitude of the captains of Greek swordfish boats, operating out of Kefalonia, towards seals and turtles, and to their willingness to participate in research and conservation.

Planned Activities

A Project on the Conservation and Management of Sea Turtles along the Mediterranean Coast of Egypt will be supported by the Egyptian Government and the UNEP/MAP Specially Protected Areas Regional Activity Centre (Tunis). The objectives of this project are to: investigate, by field surveys, the turtle nesting beaches along the Mediterranean coast and the density of nesting; identify the species involved; collect data on predation; assess the degree to which nesting sites might be threatened by coastal development, and to which degree turtle populations are affected by commercial exploitation; investigate the occurrence of sea turtles in the sea; study the inter-relations between turtles and fisheries, by interviews with fishermen; assist the Egyptian authorities in establishing a programme for the conservation and rational management of the sea turtle populations in their care; and describe the overall status of the Egyptian coast with respect to its natural habitats for wildlife, with emphasis on coastal wetlands and sand dunes.

A Project to Survey Turtle Nesting Beaches along the Libyan Coast will be supported by the Libyan Government and by UNEP/MAP SPA/RAC. The objectives of this project are to: investigate marine turtle nesting beaches along the Mediterranean coast of Libya; identify the species; estimate the nesting density; make recommendations for the conservation of the most important nesting beaches; and provide a suitable basis for long-term assistance to the authorities concerned for the development and management of the relevant coastal areas.

The Greek national **Project on the Monitoring of Incidental Catches of Loggerhead Turtles on Swordfish Longlines in Greek Waters of the Ionian Sea** will be continued.

MEDASSET is also negotiating with the Maltese Government and local NGOs in order to launch a similar project in Malta.